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**UNIVERSITY OF HAWAI'I BULLETIN**

**VOLUME XLIII**

February 1964

Number 4

The University of Hawaii Bulletin is published quarterly at the University of Hawaii, Honolulu, Hawaii, U.S.A. Entered as second-class matter at the Post Office at Honolulu, Hawaii, November 14, 1921, under Act of Congress of August 24, 1912.
1964-65 CALENDAR

**First Semester**

September 14-15, Monday and Tuesday: Orientation of freshmen

September 14, Monday: Registration: seniors, classified graduate students; unclassified foreign graduate students

September 15, Tuesday: Registration: sophomores in Selected Studies Program

September 16, Wednesday: Registration: sophomores; freshmen in Selected Studies Program

September 17-18, Thursday and Friday: Registration: freshmen

September 19, Saturday: 8:00 a.m. to 2:00 p.m. Registration: unclassified students and auditors

September 21, Monday: Instruction begins

September 25, Friday: Last day of registration for credit

October 3, Saturday: Primary Election Day (holiday)

October 19, Monday: Last day of withdrawal from courses without “grade” penalty

November 3, Tuesday: General Election Day (holiday)

November 1, Wednesday: Veterans’ Day (holiday)

November 13, Friday: Last day of withdrawal from courses

November 26-28, Thursday through Saturday: Thanksgiving recess

December 7, Monday: Last day for withdrawal from courses

December 19, Saturday: Last day before Christmas recess

January 4, Monday: Instruction resumes

January 16, Saturday: Last day of instruction, first semester

January 18, Monday: Final examinations begin

January 23, Saturday: First semester ends

**Second Semester**

February 4, Thursday: Registration: new juniors, seniors, classified graduate students; unclassified foreign graduate students; all Selected Studies students

February 5, Friday: Registration: freshmen

February 6, Saturday: 8:00 a.m. to 2:00 p.m. Registration: unclassified students and auditors

February 8, Monday: Instruction begins

February 12, Friday: Last day of registration for credit

February 22, Monday: Presidents’ Day (holiday)

March 8, Monday: Last day of withdrawal from courses without “grade” penalty

March 24, Wednesday: Last day for removal of “Incomplete”

March 26, Friday: Prince Kuhio Day (holiday)

April 2, Friday: Deficiency reports due

April 16, Friday: Good Friday (holiday)

April 17-24, Saturday through Saturday: Easter recess

May 3, Monday: Last day for withdrawal from courses

May 30, Sunday: Memorial Day (holiday)

May 31, Monday: Holiday (Monday after a holiday falling on Sunday)

June 1, Tuesday: Last day of instruction

June 2, Wednesday: Final examinations begin

June 8, Tuesday: Second semester ends

June 13, Sunday: Commencement

**Summer Session**

June 28, Monday: Registration day for Summer Session

1965-66

September 13-18, Monday through Saturday: Registration
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Graduate School Staff

Wytze Gorter, Ph.D., Dean

Sumie F. McCabe (Mrs. T. J.), M.A., Assistant to the Dean for Foreign Student Matters

June Kusumoto, B.A., In charge of American admissions

Doris Oyadomari (Mrs. K.), Secretary to the Dean

Andrea A. Matsuda (Mrs. R. M.), Stenographer

Faith K. K. Osurman (Mrs. T. L.), Stenographer

Margaret Kim, Foreign Student Records and Receptionist
GENERAL INFORMATION

The University of Hawaii is located in the city of Honolulu on the island of Oahu. Because of the geographic position of the Hawaiian Islands near the center of the Pacific Ocean, it enjoys one of the most equable climates of the world. Multiple, peaceful migrations of people from many portions of America, Asia, and Europe have resulted in an extremely varied, cosmopolitan population which is renowned for its lack of racial, religious, or other social frictions and a resulting social and cultural amalgam which is unique.

The University has many natural advantages for excellence in various fields of intellectual interest. Because of its position and the nature of the population, Hawaii is truly a gateway between Asia and America. Many facets of both cultures can, therefore, be experienced as well as studied in a benign milieu. Because the Islands have a highly developed mechanized industry, including agriculture, it is also possible to experience and study modern technical and scientific fields. Graduate programs are approved only in fields in which the University can offer a program of high quality. The various fields in which the master's and doctoral degrees are offered are listed under the discussion of the degrees.

The University library contains approximately 400,000 bound volumes, and 1,000,000 unbound parts and pamphlets. It serves as a depository for U.S. government and United Nations publications. Included in the library are extensive collections of research materials relating to the Pacific. The University is strong in materials on Asia, with over 160,000 items including 120,000 in Chinese, Japanese, and Korean, and 8,000 reels of microfilm of important Asian newspapers and archival sources. Other excellent collections in Honolulu open to graduate students are the Library of Hawaii, a general public library in downtown Honolulu; the reference library at the Bishop Museum; the Hawaiian Mission Children’s Library, with material on missionary activities in the Pacific; the Public Archives, emphasizing Hawaiian history; the library of the Honolulu Academy of Arts; and the scientific libraries of the Hawaiian Sugar Planters’ Association, the Honolulu County Medical Association, the Pineapple Research Institute, and the Honolulu Biological Laboratory of the U.S. Fish and Wildlife Service.

Various organized research activities of the University offer outstanding possibilities for graduate study and research. Among these are the Hawaii Marine Laboratory which, through its branches at Waikiki and
Kaneohe Bay, provides facilities for experimental and inshore research in the various aspects of marine biology. The newly completed building of the Pacific Biomedical Research Center includes facilities for research in genetics, microbiology, biochemistry, parasitology, and experimental psychology. The Hawaii Institute of Geophysics offers excellent facilities for research in the solid earth sciences, meteorology, oceanography, and astrophysics. The Institute also houses the University's Statistical and Computing Center.

Graduate Faculty

The Graduate Faculty is composed of those members of the instructional and research staff of the University who, because of training, interest, experience, and scholarly activity, are selected to assist candidates for advanced degrees in their endeavors. The resident Graduate Faculty is supplemented in many Fields of Study by scholars in other research institutions in Honolulu. These persons constitute the Affiliate Graduate Faculty and serve in all capacities of the resident faculty except as chairman of a thesis or program committee. Members of the Graduate Faculty are listed under the appropriate Field of Study. All members are eligible to serve on program and thesis committees in any Field of Study with the approval of the chairman of that field.

Admission

Admission to the Graduate School simply permits registration in graduate courses for which the student's previous training has prepared him and does not insure admission to candidacy for an advanced degree.

Applications for admission must be received by July 15 or December 15 to ensure consideration for admission for the succeeding semester.

American Residents. Students with baccalaureate degrees from accredited American institutions of higher learning may be admitted to the Graduate School. Persons who do not intend to work for an advanced degree may be admitted as unclassified students, and in lieu of official transcripts may submit a certification of their having been awarded the baccalaureate degree. A form for such certification may be obtained from the Office of the Graduate School. Those wishing to work for an advanced degree must submit a formal application and official transcripts of undergraduate and previous graduate records to the Dean of the Graduate School. Failure to submit all records of previous study may constitute basis for disqualification for further registration at the University of Hawaii. Upon acceptance the intended candidate must supply a second set of official transcripts to the Chairman of his chosen Field of Study for use in advising. The Graduate School records are not available for this purpose. No one will be admitted as an intended candidate unless he can demonstrate an adequate
undergraduate background in the major and related fields in which the degree is to be taken, and has an average grade of B or better for all undergraduate courses in the major, or in all courses taken during the last two years of undergraduate work. Those who fail to meet these standards may be allowed to register as probational unclassified graduate students for a semester in order to demonstrate whether or not they can do satisfactory work at the graduate level. If this semester's work is adequate, the Graduate Faculty of the Field of Study may recommend that the undergraduate grade requirement be waived. Graduates of institutions other than the University of Hawaii may also be requested to supply the results of the Graduate Record Examination. Various of the Faculties require the Graduate Record Examination of all applicants. Admission to the Graduate School simply permits registration in graduate courses for which the student's previous training has prepared him.

Graduate students carrying a course load of 10 or more credits must file a medical record form with the Student Health Service.

Foreign Residents. Students with baccalaureate degrees from accredited institutions of higher learning may be admitted to the Graduate School. All foreign students must submit a formal application and two copies of official transcripts of previous educational records to the Dean of the Graduate School. A record indicating a minimum level of achievement of B or the equivalent is required for admission. In very unusual circumstances, a student who fails to meet these standards may be allowed to register as a probational unclassified graduate student for a semester in order to demonstrate whether or not he can do satisfactory work at the graduate level. If this semester's work is adequate, the Graduate Faculty of the appropriate Field of Study may recommend that the requirement be waived. Students who have a record adequate for admission but whose previous academic work was in an institution which is not recognized by the University of Hawaii may be admitted on a probational unclassified basis upon the recommendation of the Graduate Faculty of the appropriate Field of Study.

In addition to the academic requirements for admission to the Graduate School, all foreign students must have a proficiency in oral and written English which will allow them to pursue work at the graduate level. Therefore, all applicants from foreign countries where the English language is not the usual means of communication are required to file with the Dean of the Graduate School a certificate of proficiency in English. This certificate is issued by the nearest United States consulate, and applicants must make their own arrangements with the consulate to take the examination.

After arrival at the University, all foreign students are referred to the Director of the University's English Language Institute for determination
of their proficiency in the English language. Those found to be in need of further training in English may be assigned to the Institute for a full-time or part-time program. The Institute offers intensive noncredit training in reading, writing, speaking, and listening. Students linguistically capable of carrying on graduate-level work will be so certified to the Dean of the Graduate School and allowed to enroll for a full-time credit program. Students assigned full time to the Institute must pay $70.00 in special course fees in addition to regular tuition and fees. Students assigned to the Institute on a part-time basis will pay a smaller amount for special course fees.

In order to be admitted, all foreign students must present positive evidence of adequate financial support during their expected stay at the University. They must also submit results of a medical examination on a form provided by the University. Examination of the form and approval by the University medical doctor is required before admission is completed. In addition, foreign students must carry accident and medical insurance coverage during their stay at the University.

**Admission as Special Student**

Persons who do not have previous training which will admit them as a regular student at the University of Hawaii (e.g., do not have a high school diploma) or who may have had adequate prior education but are unable to present official evidence of such training (e.g., refugees) may be admitted to the University as Special Students. Such admission is for a specified course or courses and carries no commitment whatever for subsequent admission to any regular status or consideration for a degree in the University. Persons may be admitted as Special Students only by request to the Director of Admissions by the East-West Center or an academic department and the Dean concerned. The category of Special Student may not be used as a probationary status for students who have a bachelor’s degree but whose previous record is inadequate for admission to the Graduate School.

**Admission to Candidacy**

Admission to candidacy for an advanced degree, after the student has enrolled in the University, requires the recommendation of the graduate faculty of the major field of study. Intended candidates must indicate this intention at registration, so that the Graduate Faculty may be notified of this intention and a preliminary conference can be scheduled.

The Graduate Faculty of the Field of Study or a committee of the Faculty shall at a preliminary conference: (1) determine whether the student seems to have the ability to pursue graduate work within the
particular field of study, (2) determine through scrutiny of the student's record whether his undergraduate background in the field is adequate, (3) specify any courses that the candidate should take in order to meet inadequacies in undergraduate preparation or to complete the requirements for the advanced degree. The faculty or committee shall further (1) supervise the general examination required before admission to candidacy in the master's programs, (2) recommend to the Dean of the Graduate School that the applicant be either admitted to candidacy or denied admission to candidacy, (3) approve the approximate title of the thesis research, and suggest the composition of the thesis committee.

Intended candidates for advanced degrees will not be admitted to candidacy if they obtain more than two grades below B in courses taken in their major or related fields as graduate students, including those taken at the University of Hawaii to remove undergraduate deficiencies. Because of special difficulties sometimes encountered by foreign students, this rule may be waived for such students the first semester of attendance at the University upon request of the Graduate Faculty of the Field of Study.

Any graduate student who, having been admitted to candidacy for an advanced degree, fails to obtain a grade of B or better in any two of the courses forming part of his program for the advanced degree is automatically dropped from candidacy. A student thus dropped from candidacy reverts to unclassified status and may only be readmitted to candidacy after consideration by the entire Graduate Faculty of the Field of Study, approval of a majority of such faculty, and successful reperformance on the general examination.

Registration and Grades

Sixteen credit hours in a semester and 7 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 is 12 credit hours (6 for graduate assistants and research assistants). Graduate teaching assistants and assistants in research, whose duties ordinarily require 20 hours per week, are restricted to 9 hours of course work for credit (including thesis research 800). Minimum registration is for one credit hour. No noncredit registration in 800 is allowed.

Registration after the officially designated period is permitted only in exceptional cases for valid reasons, and the procedure is as follows: (1) during the first seven days following the last official day of registration, written approval must be obtained from the Dean of the Graduate School, (2) subsequent to the seventh day, written approval must be obtained from the Dean and the instructor concerned, and students may enroll only for individual reading or research courses, the thesis course (800), or as auditors.
Change of registration is made on an official blank issued by the Office of the Graduate School. This blank must be returned to the Office of Admissions and Records bearing the required signatures.

Complete withdrawal from the University is applied for on a form issued by the Office of Admissions and Records, and this blank must be returned to that office with the proper signatures. During the first three weeks of a semester, a formal withdrawal is marked W on the student's record. A withdrawal at a later date, but prior to the last four weeks of class instruction in a semester, is marked W if the work of the student in the course was passable; otherwise, it is marked F (for failure). No withdrawals from courses are permitted during the last four weeks of instruction in a semester, but the Dean may permit complete withdrawal from the University for legitimate reasons. A student who ceases to attend a course without complying with the official withdrawal procedure receives a failure in the course.

The Graduate School reserves the right to deny further registration to any student whose work is below the required level.

Seniors in the University of Hawaii may carry a limited amount of work for graduate credit 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 the courses for which graduate credit is desired carry graduate credit in the major field. For such graduate course credit to be available for possible application toward an advanced degree written approval of the Dean of the appropriate undergraduate College and of the Graduate School must be obtained at the time of registration for the course.

Graduate students may obtain credit by examination in courses numbered 400–599 with the approval of the Qualifying Committee, Thesis Committee or Program Committee, the instructor concerned, and the Dean of the Graduate School, 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.

No graduate credit is allowed for correspondence courses.

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

Courses numbered 600–799 are intended primarily for graduate students. Courses numbered 400–599 are undergraduate courses which also may carry graduate credit. No course which is required for an undergraduate major may be used for graduate credit in that field of study.
Graduate students are graded on a scale of A to F. A grade of A or B must be earned in any course to secure graduate credit. No credit is granted for thesis research courses (number 800 in each field) until the thesis has been accepted. The thesis is graded H (honors) or S (satisfactory). Failure to make satisfactory progress on a thesis does not entitle a student to refund of tuition fees.

A candidate or an intended candidate for an advanced degree taking a course in the College of General Studies for which he desires credit toward his degree must have the approval of his advisor and the Dean of the Graduate School at the time of registration. Cards for indication of such approval are available from the Office of the Graduate School or the College of General Studies. Although the requirements for a degree may be completed at any time during the year formal award of degrees is limited to the end of the two semesters.

**Responsibility**

Students admitted to the Graduate School are assumed to be mature adults and are expected to comport themselves as such. Although the various advisory committees and individuals provided for in the operation of the various graduate programs have the responsibility of assisting the student, he has the primary responsibility for following the procedures and completing various steps in his program in good order and by the stipulated dates. Failure of an advisor to remind a student of a requirement or deadline date will not constitute an acceptable basis for waiver of the requirement. Requirements of the Graduate School, both procedural and substantive, may be waived only by written request of the committee concerned and must have the written approval of the Dean.

**Tuition and Fees**

*(Tuition and fees subject to change)*

Tuition and registration fees for graduate students are the same as those for undergraduates. Students registered for 12 or more credit hours in any semester pay $85.00 for tuition and $10.00 for registration per semester. Students registered for fewer than 12 credit hours in any semester pay $8.00 per credit hour, including audited courses. Summer session students pay $10.00 per credit hour, a $10.00 registration fee, and an activities fee of $2.00. Students registered in the College of General Studies pay fees as indicated in the bulletins of that College. Laboratories and course fees vary with the individual course. All students registered for daytime courses pay a Student Health Fee of 75 cents each semester. Persons who register after the announced days of registration pay a late registration fee of $5.00.
A fee of $2.00 is charged for each change of registration after the official registration period, unless such changes are the result of actions of the University.

All recipients of advanced degrees are required to pay a diploma fee of $5.00 and in thesis programs an additional fee of $4.00 to cover the cost of binding two copies of the thesis.

**Living Accommodations and Expenses**

**Campus Housing**

Gateway House, a coeducational residence hall offers graduate and selected undergraduate students enrolled in a full program of study comfortable living in pleasant surroundings conducive to advanced study and exchange of ideas.

Two ten-story wings, which accommodate 104 persons each, make up the men's and women's living areas. The wings are joined by a central main lounge, lobby, administrative offices, and dining area. Each two double rooms connect with a bathroom shared by only four residents. Each twelve residents share a private living room. Room and board fee is $335 per semester (board includes ten meals per week).

**Off-Campus Housing**

The University maintains a file of off-campus rooming houses, single rooms in private homes, and apartments. Assistance in finding off-campus housing can be given to students only after the student arrives.

For further information on living accommodations, write to the Director of Student Housing, Johnson Hall A, University of Hawaii.

Minimum expenses of the off-Island student are estimated at $2,000 per academic year for board, room, tuition, registration, course fees, and books. These estimates do not include the cost of clothing, laundry, transportation, and other personal items.

**Graduate Assistantships and Scholarships**

The University offers a number of teaching assistantships to graduates of accredited institutions of higher learning who have satisfactory scholastic records, an adequate undergraduate background in the major field, and evidence of a high level of English proficiency. Graduate assistants serve as readers or part-time laboratory assistants and carry a limited program of study. The initial remuneration is $2,448 payable in twelve monthly installments. The period of service is September 1 to June 15. Applications should be addressed to the Dean of the Graduate School.
and should be filed before March 1. Each application must be accom­panied by a transcript of academic record, a photograph, and three letters of recommendation from professors under whom the applicant has taken his major courses. A few half-time research assistantships are available for graduate students in agriculture. Inquiries and applications for these should be addressed to the Dean of the College of Agriculture. Half-time graduate teaching and research assistants are exempt from registration and tuition fees for a maximum of 9 credit hours; they must be registered in at least 6 credit hours of work each semester.

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 such assistantships should be addressed to the Chairman of the appropriate Field of Study.

Special fellowships for students working toward the Ph.D. with an interest in systematic insects of medical importance are available through the Bernice P. Bishop Museum in Honolulu. Interested students should write directly to the Museum or to the Chairman of the Department of Entomology, University of Hawaii.

In order to further cultural interchange between East and West, the East-West Center has made available a number of grants to students from the United States who are interested in those fields of study which relate to Asia and the Pacific. American students interested in applying for an East-West Center grant should write directly to the Director of Selection, East-West Center, University of Hawaii, Honolulu.

The only scholarships available for foreign students are those provided by the East-West Center. These are available to students from Asia (Japan to Pakistan) and the Pacific islands, including Australia and New Zealand. To apply for an East-West Center grant, a student from aboard should write or call upon the United States Information Service Office or some comparable American facility nearest to him.
DEGREES, REQUIREMENTS
AND PROCEDURE

Master's Degrees

The University of Hawaii confers the degrees of Master of Arts, Master of Business Administration, Master of Education, Master of Fine Arts, Master of Science, and Master of Social Work.

The Master of Arts is offered in:

- American Studies
- Anthropology
- Art
- Asian Studies
- Chinese
- Drama and Theatre
- Economics
- English
- French
- Geography
- German
- History
- Japanese
- Linguistics
- Mathematics
- Music
- Overseas Operations
- Pacific Islands Studies
- Philosophy
- Political Science
- Psychology
- Sociology
- Speech
- Teaching of English as a Second Language

The Master of Science is offered in:

- Agricultural Economics
- Agricultural Engineering
- Agronomy
- Animal Science
- Biochemistry
- Botany
- Chemistry
- Civil Engineering
- Electrical Engineering
- Entomology
- Food Science
- Genetics
- Geological Sciences
- Horticulture
- Meteorology
- Microbiology
- Nursing
- Nutrition
- Oceanography
- Physics
- Plant Pathology
- Poultry Science
- Public Health
- Soil Science
- Zoology
The Master of Education is offered in:

- Educational Administration
- Educational Psychology
- Elementary Education
- History and Philosophy of Education
- Secondary Education

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

- Art
- Drama and Theatre
- Music

The Master of Social Work is offered by the School of Social Work.

Following are the minimum requirements for the master's degrees. Additional requirements are stated by fields of study in the latter portion of this Bulletin.

Residence

The minimum residence requirement is two semesters of full-time work or four six-week summer sessions. However, only the exceptionally well-prepared student is able to complete the requirements for the degree in this minimum time. For the Master of Social Work, four semesters of full-time work are required.

Time Allowed

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

Course Requirements

A maximum of 8 semester hours of graduate credit may be transferred from accredited institutions upon recommendation of the Graduate Faculty no later than admission to candidacy. For the M.A., M.B.A., M.Ed., and M.S., two plans of procedure are available.

Plan A (Thesis)

Plan A is available in all fields of study except the following: Overseas Operations, Public Health, and Teaching of English as a Second Language.

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

Candidates must be registered in the appropriate thesis research course (800) during the entire semester in which the work for the degree is completed except that candidates who complete all requirements for the degree during the regular six weeks summer term need not be registered during the subsequent fall semester. Candidates may finish their work during the summer only if their full Thesis Committee is present.

**Thesis Requirement.** When a thesis problem has been approved by the Graduate Faculty of the student's Field of Study, the chairman sends to the Office of the Graduate School the candidate's name, the proposed thesis title, and recommendations for a thesis committee, including one member from outside the major field of study. The Thesis Committee, appointed by the Dean of the Graduate School, subsequently approves the thesis outline and forwards three signed copies to the Office of the Graduate School for consideration by other referees and revision or approval. After approval of the outline, the candidate may register for the thesis research course (800). The thesis outline approved by the Thesis Committee must be submitted to the Office of the Graduate School by December 15 or May 15 of the session preceding the one in which the candidate expects to complete the requirements for the degree. Candidates who expect to finish their program during the summer session must submit the thesis outline to the Office of the Graduate School by the preceding February 1.

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

A 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 thesis 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 thesis, and (2) a representative of the related field is placed on the student's Thesis Committee.

After the Thesis Committee has been appointed, the candidate should look to the chairman of this committee for primary direction regarding research methods and the preparation of results. It is the responsibility
of 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 thesis. A brochure on instructions for thesis preparation is available at the Office of the Graduate School.

Copies of the completed thesis must be submitted to committee members at least two weeks prior to the date of the final examination. The original and first carbon copies must be deposited with the secretary of the Graduate School two weeks before the close of the session in which the degree is conferred.

A majority of the members of the Thesis Committee must approve both the thesis and the examination on the thesis. A minority member has the right of appeal to the Graduate School Council for a final decision. The chairman must ensure that the final form of the thesis, including revisions and amendments agreed upon, is acceptable to a majority of the committee. The committee members express their approval or disapproval on a special form issued by the Office of the Graduate School.

Chairmen of graduate Fields of Study have the privilege of being ex officio members of all thesis committees in the field.

Examinations. In addition to all examinations in courses for which he desires credit, a general examination in the chosen Field of Study is required of each intended candidate for the master's degree. It is intended to be not only evaluative, but also diagnostic in character and should therefore be taken as early in the program as possible so that areas of weakness discovered may be rectified. It should be completed by the end of the first semester, but in any case must be completed successfully before admission to candidacy. Students who fail the general examination may repeat it upon recommendation of the Graduate Faculty of the Field of Study and approval of the Dean. At least three months must elapse between the date of failure and such repetition. A second failure on the examination will deny the student further consideration for candidacy.

A final oral examination upon the thesis and related material, conducted by the Thesis Committee and open to all faculty members, is required. As an alternative, the committee chairman may have the candidate present the results of the thesis at a departmental graduate seminar, but all members of the Thesis Committee must be present. Candidates must notify the Office of the Graduate School at the beginning of the semester or summer session in which the work is to be completed, and arrangements for the final examination must be made at least one month prior to the end of the term. Should a student fail to pass the final examination or seminar appearance satisfactorily he may be allowed to repeat such examination only upon recommendation of the Graduate Faculty concerned and the approval of the Dean. At least three months must elapse before such reexamination.
Summary of Procedure

1. Application for admission to the Graduate School
2. Filing of notice of intention to work for a degree
3. Preliminary conference
4. Appointment of interim advisor
5. General examination
6. Admission to candidacy
7. Approval of thesis problem
8. Appointment of Thesis Committee
9. Approval of thesis outline by Committee and Graduate School
10. Completed thesis submitted to Committee
11. Final examination
12. Final copies of thesis submitted to Graduate School
13. Granting of the degree

Plan B (Nonthesis)

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

- Agricultural Economics
- American Studies
- Art (Eastern art history)
- Asian Studies
- Biochemistry
- Civil Engineering
- Economics
- Education
- Electrical Engineering
- Food Science
- Geography
- Geological Sciences
- German
- History
- Horticulture
- Mathematics
- Microbiology
- Music Education
- Overseas Operations
- Philosophy
- Physics
- Plant Pathology
- Political Science
- Public Health
- Sociology
- Speech
- Teaching of English as a Second Language
- Zoology

A minimum of 36 (30 in Engineering) graduate credit hours is required. Of these at least 6 shall be earned in courses outside the major field. A minimum of 18 credits must be earned in courses numbered 600-799, including at least one graduate seminar related to the major field.

When the student is advanced to candidacy, the chairman of the Field of Study appoints a Program Committee of three members of the Graduate Faculty, one of which shall be from a Field of Study other than the major. The Program Committee plans and approves a coherent program of courses for the candidate and sends a copy of the program to the Graduate School. Courses taken which are not included in the approved program will not be counted toward the degree. The program
is to be approved and submitted to the Office of the Graduate School before the student has completed more than 15 hours of credit which is to be part of the master's program.

Examinations. In addition to all examinations in courses for which he desires credit, a general examination in the chosen Field of Study is required of each intended candidate for the master’s degree. It is intended to be not only evaluative, but also diagnostic in character and should therefore be taken as early in the program as possible so that areas of weakness discovered may be rectified. It should be completed by the end of the first semester, but in any case must be completed successfully before admission to candidacy. Students who fail the general examination may repeat it upon recommendation of the Graduate Faculty of the Field of Study and approval of the Dean. At least three months must elapse between the date of failure and such repetition. A second failure on the examination will deny the student further consideration for candidacy. Candidates shall make a seminar appearance near the conclusion of their program to which all members of the graduate faculty shall be invited, at which time they shall be examined by the Program Committee. Candidates must notify the Office of the Graduate School at the beginning of the semester or summer session in which the work is to be completed. Should a student fail to pass the final examination or seminar appearance satisfactorily he may be allowed to repeat such examination only upon recommendation of the Graduate Faculty concerned and the approval of the Dean. At least three months must elapse before such reexamination.

Summary of Procedure

1. Application for admission to Graduate School
2. Filing of notice of intention to work for a degree
3. Preliminary conference
4. Appointment of interim advisor
5. General examination
6. Admission to candidacy and appointment of Program Committee
7. Establishment of program of courses
8. Completion of course work
9. Seminar appearance and examination
10. Granting of the degree

Doctor of Philosophy

The degree Doctor of Philosophy is the highest conferred in course. It is a research degree and is conferred only for high scholarly attainment and an original contribution to knowledge in a special field. Only the exceptional applicant will be admitted to the doctoral program.
A student is admitted to candidacy for the Ph.D. only when the Graduate Faculty of his chosen Field of Study is satisfied that he is competent to undertake the rigorous schedule required. Advancement to candidacy may not occur until certification of proficiency in one foreign language is submitted to the Office of the Graduate School and it may be deferred until after satisfactory performance on the comprehensive examination.

Candidates are accepted only in Fields of Study in which the teaching staff, library, laboratory equipment, and co-operative relationships with other research institutions make it possible to offer thorough training. These are:

- Agricultural Economics
- Anthropology
- Biochemistry
- Botany
- Chemistry
- Entomology
- Genetics
- Geological Sciences
- History
- Horticulture
- Meteorology
- Microbiology
- Philosophy
- Physics
- Political Science
- Psychology
- Soil Science
- Zoology

Minimum requirements are stated below. Additional requirements are stipulated by faculties of the Fields of Study.

### Residence and Credit

The comprehensive knowledge expected of the student in his major field is such that the requirements for the degree demand not less than six semesters of full-time work or the equivalent, at least three of which must be in residence at the University of Hawaii. While the experienced and exceptionally prepared student may meet the requirements by completing a minimum of 72 credit hours of course work, including research (12 credit hours is the official minimum full-time load), many students will have deficiencies in preparation or have requirements for proper training such that a greater time will be necessary for the completion of the degree. At least three semesters of full-time course work must be completed at the University of Hawaii.

Additional requirements including specific course requirements are determined by the Graduate Faculty of each Field of Study. Their general requirements are indicated under the headings of the various Fields of Study in this Bulletin. Additional requirements for programs of individual students are established by the Graduate Faculty and the Thesis Committee.

Two semesters credit may be allowed toward the doctorate for a master's degree, if it is germane.
Candidates must be registered for the appropriate thesis research course (800) during the entire semester in which the work for the degree is to be completed.

Language Requirements

A knowledge of two foreign languages sufficient to make the literature in the languages available to the student is required. The Graduate Faculty of the Field of Study shall determine the languages most appropriate for each student and notify the Dean of the Graduate School of the languages selected. Examinations for proficiency in all languages are to be of a nature to determine that the student is able, with the aid of a dictionary, to read comprehensively and with reasonable speed research materials in his field of interest. The examiners (the faculty of the suitable language department) are to determine that the student is able to make a good, intelligent translation. Further, it is expected that the various Graduate Faculties will indicate suitable materials to the language departments for use in examinations. The language departments will attempt to determine that the materials used in different fields will require the same level of proficiency.

Examinations are given three times per year as announced by the Graduate Office.

Certification of proficiency in one of the required foreign languages must be obtained prior to admission to candidacy. Certification of proficiency in both required languages must be deposited in the Office of the Graduate School before the candidate will be permitted to take the comprehensive examination.

Doctoral candidates from foreign countries where the English language is not normally used in the school system may use English as one of the foreign languages required, upon petition of the Graduate Faculty concerned and approval of the Dean.

Examinations

In addition to the regular course examinations, doctoral candidates must pass a comprehensive examination and a final oral examination in defense of the thesis. The comprehensive examination, which may be oral or oral and written, must include an examination in the major field and one or more minor fields, the latter represented by a member or members of the Thesis Committee. Students who fail the comprehensive examination may repeat it at the discretion of the Graduate Faculty concerned. At least three months must elapse before such reexamination. A second failure on the examination will deny the student further consideration for candidacy. At least eight months must elapse between the satisfactory completion of the comprehensive examination and the final
examination. Arrangements for the final examination must be made at least one month in advance, and it must occur at least two weeks before the end of the session. Should a student fail to pass the final examination he may be allowed to repeat such examination with the approval of the Dean, after considering the recommendation of the Graduate Faculty concerned.

Thesis and Thesis Committee

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 thesis problem has been approved by the Graduate Faculty of the Field of Study, the chairman of the Field of Study sends to the Office of the Graduate School the candidate's name, the proposed thesis title, and his recommendations for a thesis committee of at least five members including representatives of the minor field or fields. The Thesis Committee, appointed by the Dean of the Graduate School, determines necessary additional course work, advises in the research, and conducts the comprehensive and final examinations. The Committee also must approve the thesis outline and forward three signed copies to the Office of the Graduate School for consideration by other referees and revision or approval determined by the Dean. Information on the preparation of the thesis outline is available in the Office of the Graduate School. After approval of the outline, the candidate may register for the thesis research course (800).

A graduate student may undertake a research problem when the subject is primarily in one field but has close relationship to other fields; in such an event, at the time the student submits his thesis 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 thesis, and (2) a representative of the related field is placed on the student's thesis committee.

After the thesis committee has been appointed, the candidate should look to the chairman of this 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 is available at the Office of the Graduate School.

Copies of the completed dissertation must be submitted to committee members at least four weeks prior to the date of the final oral examination. The original and first carbon copies must be deposited with the secretary of the Graduate School two weeks before the close of the session in which the degree is to be conferred.
A majority of the members of the thesis committee must approve both the thesis and the examination on the thesis. A minority member has the right of appeal to the Graduate School Council for a final decision. The chairman must ensure that the final form of the thesis, including revisions and amendments agreed upon, is acceptable to a majority of the committee. The committee members express their approval or disapproval on a special form issued by the Office of the Graduate School.

Chairmen of graduate Fields of Study have the privilege of being ex-officio members of all Thesis Committees in the field.

Summary of Procedure

1. Application for admission to the Graduate School
2. Filing of notice of intention to work for a degree
3. Preliminary conference
4. Appointment of interim advisor
5. Certification of proficiency in one foreign language
6. Admission to candidacy and appointment of Thesis Committee
7. Approval of thesis proposal
8. Certification of proficiency in second foreign language
9. Comprehensive examination
10. Final examination
11. Copies of dissertation filed in Graduate Office
12. 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 thesis research may be delayed until after successful performance on the comprehensive examination.

Professional Teaching Certificate

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

Faculties, Requirements, and Courses

Courses listed here numbered 400–599 are undergraduate courses available for graduate credit 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 General Catalogue. Students should consult the time schedules issued prior to the opening of sessions for information on courses offered, credit, instructors, etc.

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

Agricultural Economics

GRADUATE FACULTY

F. S. Scott, Jr., Ph.D. (Chairman)—marketing
L. Aver, Ph.D.—production economics
H. L. Baker, Ph.D.—forest economics
E. R. Barmettler, Ph.D.—marketing
J. T. Ishida, Ph.D.—marketing
A. B. Larson, Ph.D.—price analysis
C. W. Peters, M.S.—marketing (on leave 1964–65)
P. F. Philipp, Ph.D.—production economics

AFFILIATE FACULTY

P. P. Wallrabenstein, Ph.D.—statistics

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

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

Candidates for the Ph.D. in Agricultural Economics must meet requirements specified for admittance to candidacy for the MS in Agricultural Economics.

AGRICULTURAL ECONOMICS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>423</td>
<td>Agricultural Cooperatives (3)</td>
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<tr>
<td>424</td>
<td>Marketing of Tropical and Subtropical Agricultural Products (3)</td>
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<tr>
<td>425</td>
<td>Marketing of Livestock, Poultry and Dairy Products (3)</td>
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<td>426</td>
<td>Agricultural Economics Extension (3)</td>
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<tr>
<td>428</td>
<td>Production Economics (3)</td>
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<tr>
<td>429</td>
<td>Agricultural Policy and Planning (3)</td>
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<tr>
<td>430</td>
<td>Agricultural Finance (3)</td>
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<td>431</td>
<td>Forest Economics (3)</td>
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<tr>
<td>433</td>
<td>Advanced Farm Management and Plantation Economics (3)</td>
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<tr>
<td>434</td>
<td>Marketing Research (3)</td>
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<tr>
<td>625</td>
<td>Economics of Agriculture: Tropical Countries and Asia (3)</td>
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<td>626</td>
<td>Collection of Economic Data in Agriculture (3)</td>
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<tr>
<td>629</td>
<td>Production Economics (3)</td>
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<td>630</td>
<td>Market Development for Agricultural Products (3)</td>
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<td>631</td>
<td>Seminar: Consumer Economics and Food Distribution (3)</td>
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<td>632</td>
<td>Economics of Agricultural Processing Industries (3)</td>
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<td>634</td>
<td>Advanced Agricultural Prices and Statistical Analysis (3)</td>
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<tr>
<td>636</td>
<td>Seminar: Agricultural Policy (3)</td>
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<td>637</td>
<td>Economics of Agricultural Resource Development (3)</td>
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<td>638</td>
<td>Seminar: Land Use in Developing Countries (3)</td>
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<td>639</td>
<td>Financing Agriculture in Developing Countries (3)</td>
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<tr>
<td>699</td>
<td>Directed Research (ar.)</td>
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<tr>
<td>800</td>
<td>Thesis Research (ar.)</td>
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</tbody>
</table>

Agricultural Engineering

GRADUATE FACULTY

D. M. Kinch, Ph.D. (Chairman)—power and machinery, farm processing
B. D. van't Woudt, Ph.D.—irrigation, soil and water relationships
Jaw-Kai Wang, Ph.D.—farm processing, power and machinery

AFFILIATE FACULTY

R. A. Duncan, M.S.—power and machinery
W. E. Hart, M.S.—power and machinery, irrigation
R. T. Tribble, M.S.—power and machinery, irrigation

Intended candidates for the M.S. must present a bachelor's degree in an accredited agricultural, civil or mechanical engineering program or the equivalent.
Courses available for graduate credit are listed below. Courses from the related fields of Civil Engineering, Mechanical Engineering, Mathematics, Physics, Food Science, Agronomy and Soil Science may be approved in a degree program. The only required course from related fields is Mathematics 401. Candidates may specialize in farm processing, power and machinery, or soil and water conservation. Required courses are marked with an asterisk.

**AGRICULTURAL ENGINEERING**

<table>
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<th>Course</th>
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<tr>
<td>431</td>
<td>Agricultural Power and Equipment</td>
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<tr>
<td>435</td>
<td>Irrigation Principles and Practices</td>
<td>(3)</td>
</tr>
<tr>
<td>631</td>
<td>Analysis of Implement Design</td>
<td>(3)</td>
</tr>
<tr>
<td>635</td>
<td>Farm Irrigation System Design</td>
<td>(3)</td>
</tr>
<tr>
<td>*637</td>
<td>Instrumentation</td>
<td>(3)</td>
</tr>
<tr>
<td>*638-639</td>
<td>Topics in Tropical Agricultural Engineering</td>
<td>(2-2)</td>
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<tr>
<td>699</td>
<td>Directed Research</td>
<td>(ar.)</td>
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<tr>
<td>*800</td>
<td>Thesis Research</td>
<td>(ar.)</td>
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**Agronomy**

**GRADUATE FACULTY**

- L. D. Swindale, Ph.D. (Chairman)—soil management
- H. F. Clements, Ph.D.—sugar cane agronomy
- R. L. Fox, Ph.D.—soil and crop management
- D. L. Plucknett, Ph.D.—crop management
- P. P. Rotar, Ph.D.—plant breeding
- G. D. Sherman, Ph.D.—soil and crop management (on leave 1964-65)
- M. Takahashi, M.S.—tropical range management
- O. R. Younge, Ph.D.—soil and crop management

**AFFILIATE FACULTY**

- N. S. Hanson, Ph.D.—weed control
- W. G. Sanford, Ph.D.—agronomy
- G. H. Stanford, Ph.D.—sugar cane agronomy
- J. N. Warner, Ph.D.—sugar cane breeding

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

Courses in the major field are to be selected from those listed below. All candidates must register for the seminar in agronomy and soil science (soil fertility). Courses may be taken in related fields: Botany, Climatology, Genetics, Horticulture, Agricultural Engineering, and Microbiology. Candidates may specialize in crop production or tropical range management.
AGRONOMY
501    Tropical Crop Production (3)
502    Principles of Agronomy (3)
503    Range Management (3)
510    Sugar Cane Agronomy (3)
605    Seminar in Tropical Range Management (1)
699    Directed Research (ar.)
800    Thesis Research (ar.)

SOIL SCIENCE
687    Soil Science Seminar (1)
689    Advanced Soil Fertility (4)
690    Advanced Soil Chemistry (ar.)

American Studies

GRADUATE FACULTY
Seymour Lutzky, Ph.D., (Chairman)—history and social backgrounds
Reuel Denney, B.A.—literature and sociology
Gene Hamaker, Ph.D.—history and political science
James McCutcheon, Ph.D.—social and cultural history

Intended candidates for the M.A. should present a broad undergrad­uate preparation in either the humanities or the social sciences that is acceptable to the American Studies faculty.

Admission to candidacy is based on (1) the quality of the undergrad­uate record; (2) proficiency in written and spoken English determined by an English language and oral examination; (3) performance in the evalu­ative and diagnostic examination required by the Graduate School.

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

A minimum of 12 semester credits in American Studies seminars, including a methods seminar, is required of candidates under either plan. In addition, candidates must submit a program which includes courses in the following associated fields:

1. Literature and the Arts
2. History and Philosophy
3. Other social sciences

Plan A: In addition to the required 12 hours in American Studies, the thesis program should include a minimum of 12 hours in one of the associated fields and three hours in a second field.

Plan B: In addition to the required 12 hours in American Studies, the nonthesis program should include a minimum of 12 hours in one of the associated fields and a minimum of 12 hours from the other two fields.

Courses available for graduate credit in American Studies are listed below.
AMERICAN STUDIES

485-486 Contemporary American Civilization (3–3)
630 Criticism in the Mass Media Age (3)
690 Introduction to Contemporary America (3)
699 Directed Research (ar.)
700 Methods in American Studies (3)
750 Seminar: The Interaction of Asia and America (3)
800 Thesis Research (ar.)

Animal Science

GRADUATE FACULTY
E. H. Cobb, Ph.D., (Chairman)—animal breeding and genetics
J. H. Koshi, Ph.D.—dairy science
K. K. Otagaki, Ph.D.—animal nutrition
R. W. Stanley, Ph.D.—animal nutrition
O. Wayman, Ph.D.—physiology

AFFILIATE FACULTY
F. T. Lynd, D.V.M.—pathology

Intended candidates for the M.S. must present a minimum of 18 hours of undergraduate credit in animal science and related fields. The related subject matter fields are Agronomy, Biochemistry, Botany, Chemistry, Genetics, Home Economics, Horticulture, Mathematics, Microbiology, Poultry Science, and Zoology.

Courses available for graduate credit are listed below.

ANIMAL SCIENCE

442-443 Physiology of Domestic Animals (4–4)
444 Animal Nutrition (4)
445 Animal Breeding (3)
446 Animal Diseases and Their Control (3)
641 Seminar in Animal Science (1)
642 Ruminant Nutrition (2)
643 Physiology of Reproduction and Milk Secretion (3)
645 Advanced Animal Breeding (2)
699 Directed Research (ar.)
800 Thesis Research (ar.)

Anthropology

GRADUATE FACULTY
T. W. Maretzki, Ph.D., (Chairman)—East Asia and culture and personality studies
F. M. Cammack, Ph.D.—Malayo-Polynesian languages and linguistics
A. Dewey, Ph.D.—Indonesia and Oceania, social anthropology
Intended candidates for the M.A. or Ph.D. must present a minimum undergraduate background of 18 credits in anthropology, or be prepared to make up such work during the first year of graduate work. Students with the B.A. in related fields are particularly welcome as graduate students in anthropology. A broad base in related courses in the social sciences, humanities, and natural sciences is strongly recommended in any case.

The M.A. candidate is expected to acquire a basic knowledge of all major fields of anthropology (biological anthropology, archaeology, linguistics, and social anthropology), a familiarity with the historical development of anthropology as a formal discipline, and an understanding of the convergent approaches used by anthropologists, sociologists, and social psychologists in the study of human behavior. Required courses are Anthropology 700, 701, any two semester offerings of 750. A reading knowledge of one foreign language useful in the candidate's research is required.

In addition to the broad preparation in anthropology described as prerequisite for the master's degree, the doctoral candidate must demonstrate competence in anthropological methods of theory construction, research design, and the collection and evaluation of data. Before undertaking his dissertation research he must acquit himself satisfactorily in faculty-supervised field research. Required courses are Anthropology 700, 701, 710, 711, any four semester offerings of 750. Each candidate is expected to know basic statistical methodology, and to give evidence of his ability to prepare and present instructional material in anthropology at the undergraduate level. Upon recommendation of the supervisory committees, oral competence alone may be accepted for one of the two required languages. The doctoral dissertation must be based upon fieldwork in another culture; such fieldwork may take up to one year and should not be less than six months.
Courses for the graduate program may be selected from those listed below and from offerings in related Fields of Study as directed by the candidate's supervisory committees.

**Anthropology**

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<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>400</td>
<td>Hawaii</td>
<td>3</td>
</tr>
<tr>
<td>419</td>
<td>Islamic Culture</td>
<td>3</td>
</tr>
<tr>
<td>501</td>
<td>The American in Foreign Cultures</td>
<td>3</td>
</tr>
<tr>
<td>504</td>
<td>Applied Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>515</td>
<td>Anthropology and Education (same as Ed HP 570)</td>
<td>3</td>
</tr>
<tr>
<td>549</td>
<td>Folk Literature of the Far East</td>
<td>3</td>
</tr>
<tr>
<td>600</td>
<td>Polynesia</td>
<td>3</td>
</tr>
<tr>
<td>601</td>
<td>Micronesia</td>
<td>3</td>
</tr>
<tr>
<td>604</td>
<td>Indonesia</td>
<td>3</td>
</tr>
<tr>
<td>606</td>
<td>Seminar in South Asia</td>
<td>3</td>
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<tr>
<td>610</td>
<td>Asian Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>699</td>
<td>Directed Research (ar.)</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>History of Anthropology</td>
<td>3</td>
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<tr>
<td>701</td>
<td>Culture, Society, and Personality</td>
<td>3</td>
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<tr>
<td>710</td>
<td>Methods I</td>
<td>3</td>
</tr>
<tr>
<td>711</td>
<td>Methods II</td>
<td>6</td>
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<tr>
<td>750</td>
<td>Seminar</td>
<td>3</td>
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<tr>
<td></td>
<td>(1) Linguistics</td>
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<tr>
<td></td>
<td>(2) Archaeology</td>
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<td></td>
<td>(3) Social Anthropology</td>
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<tr>
<td></td>
<td>(4) Culture and Personality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5) Folklore</td>
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<tr>
<td>800</td>
<td>Thesis Research (ar.)</td>
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</table>

**Art**

**Graduate Faculty**

J. H. Cox, M.A. (Chairman)—painting, Oceanic art  
C. W. Anderson, M.A.—painting, design  
J. Charlot, D.F.A.—mural painting, Western art  
G. E. Ecke, Ph.D.—Far Eastern art  
M. T. Everson, M.F.A.—weaving, textile design  
C. F. Horan, M.A.—ceramics  
K. G. Kingrey, M.A.—design  
H. O. McVay, M.A.—ceramics  
P. Neogy, M.A.—Far Eastern art  
B. Norris, B.A.—painting  
H. A. Robinson, M.A.—textiles  
E. Stasack, M.F.A.—painting, print making  
M. Turnbull, M.A.—painting

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

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

A deficient or incompatible undergraduate program will require, at the discretion of the Graduate Faculty, additional course work for either degree.

Courses available for graduate credit are listed below. A maximum of 10 hours may be earned in certain advanced courses in Anthropology, Classics, English, History, Music, and Philosophy, or other pertinent fields.

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

**ART**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>476</td>
<td>Italian Renaissance Painting and Sculpture (3)</td>
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<tr>
<td>477</td>
<td>Northern Renaissance Painting and Sculpture (3)</td>
<td></td>
</tr>
<tr>
<td>478</td>
<td>19th Century Painting and Sculpture (3)</td>
<td></td>
</tr>
<tr>
<td>479</td>
<td>20th Century Painting and Sculpture (3)</td>
<td></td>
</tr>
<tr>
<td>565</td>
<td>Visual Communication (2)</td>
<td></td>
</tr>
<tr>
<td>585</td>
<td>Chinese Painting (3)</td>
<td></td>
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<tr>
<td>612</td>
<td>Figure Drawing (2)</td>
<td></td>
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<tr>
<td>615-616</td>
<td>Printmaking (2-2)</td>
<td></td>
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<tr>
<td>621-622</td>
<td>Painting (2-2)</td>
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<tr>
<td>623</td>
<td>Watercolor Painting (2)</td>
<td></td>
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<tr>
<td>625</td>
<td>Materials and Techniques of Painting (2)</td>
<td></td>
</tr>
<tr>
<td>636-637</td>
<td>Design and Research in Weaving (2-2)</td>
<td></td>
</tr>
<tr>
<td>641-642</td>
<td>Ceramics (2-2)</td>
<td></td>
</tr>
<tr>
<td>643-644</td>
<td>Ceramic Glazes and Clay Bodies (2-2)</td>
<td></td>
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<tr>
<td>661-662</td>
<td>Visual Design (2-2)</td>
<td></td>
</tr>
<tr>
<td>663</td>
<td>Applied Arts of China (3)</td>
<td></td>
</tr>
<tr>
<td>684</td>
<td>Chinese Painting from Ming to Early Ching (3)</td>
<td></td>
</tr>
<tr>
<td>685</td>
<td>Chinese Painting from Ching to the Present (3)</td>
<td></td>
</tr>
<tr>
<td>689</td>
<td>Seminar in Oriental Art (2)</td>
<td></td>
</tr>
<tr>
<td>690</td>
<td>General Seminar (3)</td>
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<tr>
<td>699</td>
<td>Directed Work (ar.)</td>
<td></td>
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<tr>
<td>782</td>
<td>Buddhist and Hindu Art of India (3)</td>
<td></td>
</tr>
<tr>
<td>784</td>
<td>Early Chinese Art (3)</td>
<td></td>
</tr>
</tbody>
</table>
Asian Studies

Asian Studies is an interdisciplinary area program leading to the M.A. degree. Students may concentrate their studies in a particular country or region of Asia. Specialization is also possible on topical problems which cut across national boundaries. All students will be required to have control of an Asian language adequate for research in their special geographical area of interest. They will also be expected to gain a broad basic knowledge of Asia, in addition to their speciality. This will be tested in a comprehensive examination during the last semester in residence.

Intended candidates for the M.A. in Asian Studies should present a minimum of 15 semester hours credit in Asian Studies at the undergraduate level, or comparable experience in the field sufficient to engage profitably in graduate work in interdisciplinary study. Students lacking such background may be required to take, without credit toward the degree, such area courses as are deemed necessary to make up the deficiencies.

Requirements for the M.A. in Asian Studies include: (1) a minimum of 12 semester credits of approved Asian courses in one discipline; (2) 6 semester credits of approved Asian courses in one cognate field; (3) 6 semester credits in a graduate Asian Studies "civilizations" course; (4) 6 credits of thesis research, for a total of 30 semester credits in addition to language.

The major field may be a country of East Asia (Japan, China, Korea), Southeast Asia (Indonesia, Thailand, Philippines, Malaya), or South Asia (India, Pakistan). Courses other than the general requirements will be determined by the supervising committees in consultation with the student.

There are over 178 language and area courses dealing with Asia which are open to graduate students in Asian Studies, 78 of them dealing with Southeast Asia, 78 South Asia, and 129 East Asia. For complete listing see bulletin of the Asian Studies Department.
ASIAN STUDIES
521–522 Civilizations of the East: Japan, China, and Korea (3–3)
523–524 Civilizations of the East: Southeast Asia (3–3)
525–526 Civilizations of the East: South Asia (3–3)
699 Directed Research (3–3)
798–799 Seminar in East Asian Studies (3–3)
800 Thesis Research (ar.)

Biochemistry and Biophysics

GRADUATE FACULTY
T. Winnick, Ph.D. (Chairman)—metabolism and biosynthesis of proteins and peptides
J. B. Hall, Ph.D.—nucleic acids of viruses
J. W. Hylin, Ph.D.—plant biochemistry, nitrogen and sulfur compounds
H. Matsumoto, Ph.D.—metabolism of toxic plant products
R. H. McKay, Ph.D.—physical biochemistry, biological oxidations
H. F. Mower, Ph.D.—biological nitrogen fixation
K. T. Yasunobu, Ph.D.—relationship of enzyme structure to function

AFFILIATE FACULTY
G. G. Dull, Ph.D.—plant biochemistry, natural products
W. A. Gortner, Ph.D.—biochemistry of plants and foods, radiochemistry
R. M. Heinicke, Ph.D.—enzymology, nutrition, plant biochemistry
L. G. Nickell, Ph.D.—physiology and biochemistry of sugar cane

Intended candidates for either the M.S. or Ph.D. must have or acquire adequate preparation in organic, physical, and analytical chemistry. They should consult with the department faculty in planning their curricula and in choosing appropriate courses offered by other departments, such as Microbiology, Genetics, Plant Physiology, Zoology, Chemistry, and Mathematics. Courses available for graduate credit are listed below.

BIOCHEMISTRY
601–602 General Biochemistry (3–3)
611–612 Biochemistry Laboratory (2–2)
621 Chemistry of the Proteins (2)
622 Metabolism and Biosynthesis of Proteins (2)
651 Advanced Enzymology (2)
660 Survey of Intermediary Metabolism (2)
691–692 Specialized Instrumentation and Methodology (2–2)
699 Directed Research (ar.)
711 Nucleic Acids and Viruses (2)
720 Molecular Genetics and Comparative Biochemistry (2)
791–792 Seminar (1–1)
800 Thesis Research (ar.)

BIOPHYSICS
750 Special Topics in Biophysics (2)
Botany

GRADUATE FACULTY
- C. H. Lamoureux, Ph.D. (Chairman)—anatomy
- G. E. Baker, Ph.D.—mycology
- A. J. Bernatowicz, Ph.D.—phycology
- J. B. Cooil, Ph.D.—physiology
- M. S. Doty, Ph.D.—phycology
- G. W. Gillett, Ph.D.—systematics
- J. A. Lockhart, Ph.D.—physiology
- E. W. Putman, Ph.D.—physiology
- B. J. Rogers, Ph.D.—physiology
- A. C. Smith, Ph.D.—systematics
- D. P. Gowing, Ph.D.—physiology
- B. Krauss, M.S.—anatomy
- L. G. Nickell, Ph.D.—physiology
- W. G. Sanford, Ph.D.—physiology

AFFILIATE FACULTY
- D. P. Gowing, Ph.D.—physiology
- B. Krauss, M.S.—anatomy
- L. G. Nickell, Ph.D.—physiology
- W. G. Sanford, Ph.D.—physiology

Intended candidates must present a minimum of 18 hours of undergraduate credit in botany. Within the undergraduate and graduate program, the student should demonstrate adequate preparation in the physiology, morphology, and taxonomy of cryptogams or vascular plants. Fields of specialization include the systematics, morphology, ecology, physiology, and genetics of cryptogams and vascular plants. Courses available for graduate credit are listed below. Courses required of all graduate students are marked with an asterisk.

BOTANY

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>Plant Anatomy</td>
<td>(3)</td>
</tr>
<tr>
<td>412</td>
<td>Plant Microtechnique</td>
<td>(3)</td>
</tr>
<tr>
<td>418</td>
<td>Cytology</td>
<td>(3)</td>
</tr>
<tr>
<td>425</td>
<td>Nonvascular Plants</td>
<td>(3)</td>
</tr>
<tr>
<td>426</td>
<td>Vascular Plants</td>
<td>(3)</td>
</tr>
<tr>
<td>430</td>
<td>Mycology</td>
<td>(3)</td>
</tr>
<tr>
<td>436</td>
<td>Medical Mycology</td>
<td>(2)</td>
</tr>
<tr>
<td>460</td>
<td>Systematic Botany of Flowering Plants</td>
<td>(3)</td>
</tr>
<tr>
<td>461</td>
<td>Taxonomy and Exploration</td>
<td>(3)</td>
</tr>
<tr>
<td>470</td>
<td>Principles of Plant Physiology</td>
<td>(4)</td>
</tr>
<tr>
<td>553</td>
<td>Plant Ecology</td>
<td>(4)</td>
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<tr>
<td>562</td>
<td>Advanced Taxonomy</td>
<td>(1)</td>
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<tr>
<td>570-571</td>
<td>Advanced Physiology</td>
<td>(3-3)</td>
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<tr>
<td>572</td>
<td>Techniques in Physiology</td>
<td>(2)</td>
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<tr>
<td>573</td>
<td>Techniques in Physiology-Biochemistry</td>
<td>(2)</td>
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<tr>
<td>586</td>
<td>Biological Productivity of the Sea</td>
<td>(3)</td>
</tr>
<tr>
<td>610</td>
<td>Botanical Seminar</td>
<td>(1)</td>
</tr>
</tbody>
</table>

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GRADUATE FACULTY

E. C. Pendleton, Ph.D. (Chairman)—labor economics, industrial relations
J. Adler, Ph.D.—accounting, finance
D. W. Bell, B.S.—real estate, land economics
R. B. Buchele, Ph.D.—management
D. S. Carlson, M.B.A.—management, business finance
C. F. Congdon, M.B.A.—statistics, marketing
D. A. Corbin, Ph.D.—accounting, finance
J. B. Ferguson, Ph.D.—personnel management, industrial relations
H. W. Grayson, Ph.D.—economic theory
A. L. Kirkpatrick, M.A.—economic theory, money and banking
K. Lau, LL.M.—business law, finance
Y. S. Leong, Ph.D.—public finance, statistics
K. W. Pierson, M.A.—insurance
P. M. Pratt, Ph.D.—marketing
H. S. Roberts, Ph.D.—labor economics, industrial relations
K. Sasaki, Ph.D.—statistics
K. K. Seo, Ph.D.—economic theory, money and banking
H. B. Stellmacher, M.B.A.—marketing
R. Taussig, Ph.D.—accounting, finance

Intended candidates for the M.B.A. must have had a minimum of 24 semester hours of undergraduate credit in business administration, including elementary accounting, business statistics, elementary principles of economics, money and banking, managerial economics, business finance, principles of management, and principles of marketing.

Intended candidates must submit the results of the Educational Testing Service examination "Admission Test for Graduate Study in Business."

The M.B.A. is a 36-credit hour nonthesis program offered under plan B of the Graduate School. In addition to course requirements, intended candidates must meet the following: (1) the satisfactory completion of an
independent investigation in the field of specialization, as evidenced by a grade of B or better in the research course in the major field: Management 610, or Marketing 610, or Finance 610, or Accounting 620, or Directed Research 699; and (2) satisfactory performance in a comprehensive final examination covering both major and minor fields.

Required courses are listed in Group I. Six electives from Group II, including a research course, are to be approved by the candidate's Program Committee. At least six semester hours of electives must be outside of the College of Business Administration.

**Group I**

**ACCOUNTING**
- 600 Seminar in Management Accounting (3)

**BUSINESS ANALYSIS AND STATISTICS**
- 600 Seminar in Quantitative Analysis (3)

**BUSINESS ECONOMICS**
- 600 Seminar in Managerial Economics (3)

**FINANCE**
- 600 Seminar in Financial Problems (3)

**MANAGEMENT**
- 600 Seminar in Management Problems (3)

**MARKETING**
- 600 Seminar in Marketing Problems (3)

**Group II**

**ACCOUNTING**
- 605 Seminar in Accounting History and Theory (3)
- 610 Seminar in Contemporary Accounting Theory (3)
- 620 Seminar in Advanced Accounting (3)

**BUSINESS ANALYSIS AND STATISTICS**
- 610 Seminar in Statistical Decision Theory (3)
- 620 Seminar in Operations Research (3)
- 630 Seminar in Quantitative Methods of Business and Economic Forecasting (3)

**BUSINESS ECONOMICS**
- 690 Seminar in Current Economic Problems (3)

**FINANCE**
- 610 Research in Financial Theory (3)

**INSURANCE**
- 600 Seminar in Insurance (3)
MANAGEMENT
610 Research in Management Theory (3)
640 Seminar in Business Policy (3)

MARKETING
610 Research in Marketing Theory (3)

PERSONNEL AND INDUSTRIAL RELATIONS
690 Seminar in Current Labor Problems (3)

REAL ESTATE
600 Seminar in Real Estate (3)
699 Directed Research (ar.)

Chemistry

GRADUATE FACULTY
R. G. Inskeep, Ph.D. (Chairman)—infrared spectroscopy, hydrogen bonding, complex ions
I. L. Barnes, Ph.D.—analytical chemistry and geochemistry, age determination of minerals, chemistry of the solid state
M. M. Frodyma, Ph.D.—analytical chemistry, polarography, gas analysis
J. L. Ihrig, Ph.D.—reaction mechanisms, free radicals, kinetics, magnetochemistry
E. F. Kiefer, Ph.D.—reaction mechanisms, small ring compounds, olefin transition metal complexes
H. O. Larson, Ph.D.—natural products, new synthetic methods, rearrangements
J. A. Mann, Ph.D.—physical chemistry, theoretical chemistry, physics and chemistry of surfaces
J. J. Naughton, Ph.D.—analytical, physical, solid state and geochemistry
L. L. Schaleger, Ph.D.—physical organic chemistry, kinetics and mechanism of acid catalyzed organic reactions, hydrolysis and hydration phenomena
P. J. Scheuer, Ph.D.—organic chemistry, structure determination of natural products
R. A. Sparks, Ph.D.—physical chemistry, crystallographic chemistry, computers
J. L. T. Waugh, Ph.D.—boron chemistry, intermetallic and heteropoly compounds, X-ray studies
H. Zeitlin, Ph.D.—organic and oceanographic chemistry, reflectance spectrophotometry

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AFFILIATE FACULTY

G. E. Felton, Ph.D.—food technology, carbohydrate chemistry
H. W. Hilton, Ph.D.—agricultural chemicals and carbohydrates
R. W. Leeper, Ph.D.—organic synthesis
C. E. Mumaw, Ph.D.—organic chemistry, food chemistry
J. H. Payne, Ph.D.—carbohydrate chemistry, sugar technology
H. Y. Young, M.S.—analytical chemistry

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

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>421</td>
<td>Intermediate Inorganic Chemistry</td>
<td>(3)</td>
</tr>
<tr>
<td>424</td>
<td>Preparative Inorganic Chemistry</td>
<td>(3)</td>
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<tr>
<td>441</td>
<td>Preparative Organic Chemistry</td>
<td>(3)</td>
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<tr>
<td>444</td>
<td>Qualitative Organic Analysis</td>
<td>(4)</td>
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<td>445</td>
<td>Intermediate Organic Chemistry</td>
<td>(3)</td>
</tr>
<tr>
<td>580</td>
<td>Oceanographic Chemistry</td>
<td>(3)</td>
</tr>
<tr>
<td>582</td>
<td>Chemical Literature</td>
<td>(2)</td>
</tr>
<tr>
<td>621</td>
<td>Atomic Structure</td>
<td>(3)</td>
</tr>
<tr>
<td>622</td>
<td>Ionic Compounds and Complexes</td>
<td>(3)</td>
</tr>
<tr>
<td>623</td>
<td>Atomic and Molecular Compounds and Complexes</td>
<td>(3)</td>
</tr>
<tr>
<td>624</td>
<td>Metals and Intermetallic Compounds</td>
<td>(3)</td>
</tr>
<tr>
<td>631–632</td>
<td>Instrumental Methods of Analysis</td>
<td>(4–4)</td>
</tr>
<tr>
<td>633</td>
<td>Advanced Chemical Analysis</td>
<td>(4)</td>
</tr>
<tr>
<td>642</td>
<td>Organic Chemistry Theory</td>
<td>(3)</td>
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<tr>
<td>646</td>
<td>Quantitative Organic Analysis</td>
<td>(3)</td>
</tr>
<tr>
<td>651–652</td>
<td>Intermediate Physical Chemistry</td>
<td>(3–3)</td>
</tr>
<tr>
<td>655</td>
<td>Radiochemistry and Nuclear Reactions</td>
<td>(3)</td>
</tr>
<tr>
<td>656</td>
<td>Radiochemical Techniques</td>
<td>(3)</td>
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<tr>
<td>*691–692</td>
<td>Seminar</td>
<td>(1–1)</td>
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<tr>
<td>699</td>
<td>Directed Research</td>
<td>(ar.)</td>
</tr>
<tr>
<td>731–732</td>
<td>Special Topics in Analytical Chemistry</td>
<td>(3–3)</td>
</tr>
<tr>
<td>741</td>
<td>Natural Products Chemistry</td>
<td>(3)</td>
</tr>
<tr>
<td>742</td>
<td>Chemistry of Cyclic Compounds</td>
<td>(3)</td>
</tr>
<tr>
<td>743</td>
<td>Stereochemistry</td>
<td>(3)</td>
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<tr>
<td>751</td>
<td>Molecular Structure</td>
<td>(3)</td>
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<tr>
<td>753–754</td>
<td>Quantum Chemistry</td>
<td>(3–3)</td>
</tr>
<tr>
<td>799</td>
<td>Directed Research</td>
<td>(ar.)</td>
</tr>
<tr>
<td>*800</td>
<td>Thesis Research</td>
<td>(ar.)</td>
</tr>
</tbody>
</table>
Chinese

GRADUATE FACULTY

J. J. Y. Liu, M.A. (Chairman)—classical poetry and drama; literary criticism
Y. Shen, Ed.D.—theoretical and applied linguistics; acoustic phonetics
L. P. H. Winters, M.A.—traditional and modern literature; philosophy in literature; biography as a literary form

Intended candidates for the M.A. in Chinese must have a B.A. in Chinese or have had equivalent preparation in the discipline.

The minimum requirement for the M.A. is 24 semester hours of course work and 6 semester hours of thesis research. A minimum of 18 semester hours for which graduate credit is given must be selected from courses in Chinese, and the rest in related fields. No more than 6 credits from courses numbered below 600 may be applied toward satisfaction of this requirement. In addition, a reading knowledge of some other language approved by the Graduate Faculty of the Field of Study is required.

Courses available for graduate credit are listed below. Required courses are marked with an asterisk.

CHINESE

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>401-402</td>
<td>Chinese Literature in English (3-3)</td>
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<tr>
<td>407</td>
<td>Contemporary Chinese Literature in English (2)</td>
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<tr>
<td>611-612</td>
<td>Contemporary Chinese Literature (3-3)</td>
<td></td>
</tr>
<tr>
<td>613-614</td>
<td>Chinese Poetry (2-2)</td>
<td></td>
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<tr>
<td>616</td>
<td>History of Chinese Literary Criticism (2)</td>
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<tr>
<td>*693-694</td>
<td>Methods in Chinese Studies (3-3)</td>
<td></td>
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<tr>
<td>699</td>
<td>Directed Research (Ar.)</td>
<td></td>
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<tr>
<td>*701-702</td>
<td>Research Seminar in Chinese (2-2)</td>
<td></td>
</tr>
<tr>
<td>*800</td>
<td>Thesis Research (ar.)</td>
<td></td>
</tr>
</tbody>
</table>

Civil Engineering

GRADUATE FACULTY

A. Chiu, Ph.D. (Chairman)—structures
J. R. Evans, M.S.—soil mechanics
M. L. P. Go, Ph.D.—structures
R. Haselwood, M.S.—transportation and soil mechanics
S. L. Lau, Ph.D.—hydraulics
T. Mitsuda, M.S.—applied mechanics

Intended candidates for the M.S. in Civil Engineering must present a B.S. in Civil Engineering or the equivalent. Both plans A and B are available. Choice of plan must be made before 14 credits of graduate work applicable to the degree have been completed.
Under plan A the program may include a maximum of 6 credits of approved courses in fields other than Civil Engineering. At least two graduate seminars are required.

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

Courses required in both programs are marked with an asterisk.

**CIVIL ENGINEERING**

- 621 Advanced Fluid Mechanics I (3)
- 622 Advanced Fluid Mechanics II (3)
- 623 Ground Water Hydrology (3)
- 624 Flow in Porous Media (3)
- 651 Advanced Soil Mechanics I (3)
- 652 Advanced Soil Mechanics II (3)
- 671 Theory of Elasticity (3)
- 672 Plates and Shells (3)
- 673 Structural Dynamics (3)
- 674 Theory of Elastic Stability (3)
- 681 Advanced Indeterminate Structures (3)
- 682 Numerical Methods of Stress Analysis (3)
- 683 Advanced Reinforced Concrete Design I (3)
- 684 Advanced Reinforced Concrete Design II (3)
- 687 Civil Engineering Seminar (1)
- 688 Civil Engineering Seminar (1)
- 699 Directed Research (ar.)
- 800 Thesis Research (ar.)

**Special Program in Environmental and Sanitary Engineering**

In addition to the regular Graduate Faculty in Engineering the following are utilized in this program.


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

W. E. Stanley, M.S.—environmental engineering theory and design (1963–1964)

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

A. Q. Y. Tom, Sc.D.—environmental engineering theory and design (affiliate graduate faculty)
Administered with the close cooperation of the Department of Public Health, the program is intended for candidates with a B.S. in Engineering who meet the Graduate School admission qualifications. Plan A (thesis program) is highly recommended for this program of study although in exceptional cases plan B (nonthesis) may be permitted. Suggested electives are Public Health 601–602, 610, 625, 636–637, 651, 710; Chemistry 441, 580, 655, 656; Zoology 401, 425, 620, 621, 629, 645; Microbiology 415, 620, 625, 631, 632, 655; Civil Engineering 621, 622, 624, 651, 652.

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

**CIVIL ENGINEERING**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>623</td>
<td>Ground Water Hydrology (3)</td>
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<tr>
<td>631</td>
<td>Environmental and Sanitary Engineering Theory I (3)</td>
<td></td>
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<tr>
<td>632</td>
<td>Environmental and Sanitary Engineering Theory II (3)</td>
<td></td>
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<tr>
<td>633</td>
<td>Environmental and Sanitary Engineering Design I (3)</td>
<td></td>
</tr>
<tr>
<td>634</td>
<td>Environmental and Sanitary Engineering Design II (3)</td>
<td></td>
</tr>
<tr>
<td>*635</td>
<td>Environmental and Sanitary Engineering Chemistry (4)</td>
<td></td>
</tr>
<tr>
<td>*636</td>
<td>Environmental and Sanitary Engineering Microbiology (4)</td>
<td></td>
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<tr>
<td>637</td>
<td>Environmental and Sanitary Engineering Laboratory (3)</td>
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<tr>
<td>638</td>
<td>Environmental and Sanitary Engineering Public Health (3)</td>
<td></td>
</tr>
<tr>
<td>*687</td>
<td>Seminar I (1)</td>
<td></td>
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<tr>
<td>*688</td>
<td>Seminar II (1)</td>
<td></td>
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<tr>
<td>699</td>
<td>Directed Research (ar.)</td>
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<tr>
<td>800</td>
<td>Thesis Research (ar.)</td>
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</tbody>
</table>

**Drama and Theatre**

**GRADUATE FACULTY**

E. Ernst, Ph.D. (Chairman)—oriental theatre, aesthetics, modern theories
L. Bentley, M.A.—acting, creative dramatics, puppetry
E. Langhans, Ph.D.—history, directing, playwriting
R. Mason, M.F.A.—scene design, costumes, play production
J. Trapido, Ph.D.—introduction to theatre, stagecraft, lighting
Intended candidates for an advanced degree in Drama and Theatre should present an adequate undergraduate background in the humanities, preferably in English, other languages and literatures, art and music, and in theatre or speech. Deficiencies in undergraduate preparation must be made up without credit. Intended candidates must submit official scores from the general portion of the Graduate Record Examination.

Two degrees are offered: the Master of Arts and the Master of Fine Arts. For the M.A. thesis the candidate does research with documentary materials in theatre history, criticism, or theory. The M.F.A. thesis involves creative work in one of two areas: play production or playwriting. For the production thesis, the student designs and directs a play of demonstrable historical and/or literary importance and gives a complete account of the production in a production script. For the playwriting thesis the candidate writes a full-length play.

Candidates are required to have a reading knowledge of a foreign language and to pass a comprehensive examination prior to the final examination on the thesis.

Courses available for graduate credit are listed below. However, candidates having sufficient undergraduate preparation may also take advanced courses in other departments, for example, literature and dramatic literature courses in English or in European and Asian languages, and selected courses in Anthropology, Art, Music, Psychology, Philosophy. All candidates are required to take 6 credits from Drama and Theatre 620, 630, 635, or 640, and 3 from 660 or 670. Besides work in course, candidates are required to participate in the production of at least three plays.

East-West Scholarship holders from the United States must attain proficiency in an Oriental language.

**DRAMA AND THEATRE**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>405</td>
<td>Puppetry (3)</td>
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<tr>
<td>410</td>
<td>Creative Dramatics (3)</td>
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<tr>
<td>415</td>
<td>Playwriting (3)</td>
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<tr>
<td>420</td>
<td>Acting (3)</td>
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<tr>
<td>430</td>
<td>Direction (3)</td>
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<tr>
<td>435</td>
<td>Design in the Theatre (3)</td>
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</tr>
<tr>
<td>440</td>
<td>Modern Stagecraft and Stage Lighting (3)</td>
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</tr>
<tr>
<td>445</td>
<td>Costume for the Stage (3)</td>
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<tr>
<td>540</td>
<td>Oriental Drama and Theatre (3)</td>
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<tr>
<td>550</td>
<td>History of the Theatre (3)</td>
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<tr>
<td>560</td>
<td>Historic Stage Production (1)</td>
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<tr>
<td>620</td>
<td>Advanced Acting Techniques (3)</td>
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<tr>
<td>630</td>
<td>Problems in Direction (3)</td>
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<td>635</td>
<td>Advanced Design (3)</td>
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<tr>
<td>640</td>
<td>Problems in Stagecraft and Stage Lighting (3)</td>
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</tr>
<tr>
<td>660</td>
<td>Modern Theories of Stage Presentation (3)</td>
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Economics

GRADUATE FACULTY

H. T. Oshima, Ph.D. (Chairman)—national income accounting, economic development
R. Hensley, Ph.D. — international economics and finance, industrial organization and public policy, economic development
F. C. Hung, Ph.D.—economic theory, Asian economic development
T. H. Ige, Ph.D.—labor economics (On leave 1964–65)
R. M. Kamins, Ph.D.—Soviet economics, public finance
S. M. Mark, Ph.D.—economic theory, mathematical economics, economic development (On leave 1964–65)
R. H. Myers, Ph.D.—economic history
R. Sato, Ph.D.—mathematical economics, economic theory, econometrics

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

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

ECONOMICS

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

Educational Administration

GRADUATE FACULTY

L. D. Jackson, Ed.D. (Chairman) — administrative leadership, school business

J. B. Crossley, Ed.D. — administration of intermediate, secondary, trade and vocational education

H. V. Everly, Ph.D. — general school administration

R. W. Johnson, Ed.D. — administrative organization, supervision

P. P. Mickelson, Ph.D. — administration of elementary, higher, and adult education

R. J. Simpson, Ed.D. — school law, plant, and publicity

Intended candidates for the M.Ed. must present a minimum of 18 semester hours in professional education courses, and in addition, have had two years of successful teaching experience.

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

The plan A requirements include three semester hours in philosophy of education, three semester hours in educational psychology, three semester hours in research methods, and at least one seminar in educational
administration or supervision. Included in the requirements under plan B are 9 to 15 semester hours in fields other than education, three semester hours in philosophy of education, three semester hours in educational psychology, one seminar in educational administration or supervision, one additional seminar in administration or supervision, terminal in nature, and directed by the candidate's Program Committee.

Selection of specific courses in the above fields will be by the Program Committee of the candidate.

EDUCATIONAL ADMINISTRATION

670 Supervision of Instruction (2)
671 School Publicity and Public Relations (2)
679 Supervision of Student Teaching (2)
680 Public School Organization (2)
682 Administration of the Elementary School (2)
683 Administration of the Secondary School (2)
686 Organization and Administration of Vocational and Technical Schools (2)
687 Organization and Administration of Adult Education (2)
688 Administration of the Intermediate School (2)
689 The School Plant (2)
699 Directed Research (ar.)
762 Higher Education in the United States (3)
770 Seminar in Supervision of Instruction (2)
780 Seminar in Educational Administration (2)
781 Legal and Business Aspects of School Administration (2)
783 Organization of Instructional Programs (2)
800 Thesis Research (ar.)

Educational Psychology

GRADUATE FACULTY
G. Sax, Ph.D. (Chairman)—measurement, research
R. S. Alm, Ph.D.—diagnosis and remedial instruction
F. E. Clark, Ed.D.—counseling and guidance
D. R. Collins, Ed.D.—counseling and guidance
D. Fitzgerald, Ph.D.—learning and cognitive processes
G. Fujita, Ph.D.—statistics, research
D. Leton, Ph.D.—school psychology
W. F. Char, M.D.—child psychiatry, special education
T. A. McIntosh, Ed.D.—special education, guidance
W. A. Wittich, Ph.D.—audio-visual

AFFILIATE FACULTY
T. M. C. Chang, Ph.D.—educational psychology
Y. Y. Harris, Ed.D.—counseling and guidance
Intended candidates for the M.Ed. in educational psychology must present a minimum of 18 semester hours in professional education courses and, in addition, credit for supervised student teaching or one semester of teaching experience. As a part of the undergraduate preparation, students will have completed a minimum of 12 hours of work in psychology or educational psychology including work in developmental psychology, educational psychology, and test and measurements. Students should plan on meeting proficiency in statistics prerequisite for Educational Research Methods.

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

Areas of study offered are audio-visual education, counseling and guidance, remedial and diagnostic techniques, special education, and the general field of educational psychology (learning, developmental, measurement, and research methods). The programs in counseling and guidance, and special education meet the certification requirements of the Hawaii State Department of Education; the program in remedial and diagnostic techniques meets the recommendations of the International Reading Association.

In plan A, the program may include a maximum of 10 semester hours in approved courses other than educational psychology which are related to the candidate's announced goals. At least one graduate seminar in educational psychology is required. A minimum of 4 units in philosophy of education and history of education is required.

In plan B, the program must include a minimum of 36 hours in a planned and approved sequence of courses, 21 of which will normally be in educational psychology. A minimum of six hours of graduate work shall be taken in Fields of Study other than educational psychology. Ordinarily, the related field of study shall be in the behavioral sciences. At least one graduate seminar in educational psychology is required. A minimum of 4 units in philosophy of education and history of education is required.

EDUCATIONAL PSYCHOLOGY

507 Remedial Reading (2)
510 Education of Exceptional Children (3)
514 Audio-Visual Media (3)
601 Guidance in the School (3)
602 Elementary School Guidance (2)
604 Occupational Information in Guidance (2)
605 Problems of School Adjustment (2)
Clinical Procedures in Reading (3)
Tests and Inventories in Guidance (2)
Education of the Mentally Retarded (2)
Education of Gifted Children (2)
Curriculum Development for Mentally Retarded Children (3)
Seminar in Education of Mentally Retarded (2)
Educational Statistics
Television in Education (3)
Advanced Educational Psychology (3)
Directed Research (ar.)
Seminar in Guidance (2)
Group Guidance (2)
Guidance Practicum (3)
Seminar in Audio-Visual Education (3)
Production of Audio-Visual Materials (3)
Research Methods (3)
Educational Evaluation (3)
Organization of New Media Programs (3)
Seminar in Educational Psychology (2)
Thesis Research (ar.)

Electrical Engineering

GRADUATE FACULTY

P. C. Yuen, Ph.D. (Chairman)—microwave electronics
A. V. Chow, M.S.—communication theory
S. N. Das, Ph.D.—microwaves
E. Gott, D.Eng.—statistical communication theory, circuit theory, computer circuitry
B. S. M. Granborg, Ph.D.—automatic control
W. E. Meserve, Ph.D.—automatic control
K. Najita, M.S.—applied mathematics and microwave devices
W. W. Peterson, Ph.D.—information theory

Intended candidates for the M.S. in Electrical Engineering must present the B.S. in Electrical Engineering or the equivalent. Both plans A and B are available. Choice of plan is required before 15 credits of graduate work applicable to the degree have been completed.

Plan A may include a maximum of 6 credits of approved courses in departments other than Electrical Engineering. At least two graduate seminars are required.

Plan B requires 30 credits of graduate study. It normally includes 21 credits in Electrical Engineering courses and 9 credits (and not less than 6 credits) in approved courses in Mathematics and Physics. At least two graduate seminars are required.
ELECTRICAL ENGINEERING

601-602 Electromagnetic Theory and Applications (3–3)
603 Active Network Analysis (3)
604 Magneto-Ionic Theory (3)
605-606 Network Synthesis (3–3)
607 Energy-State Devices (3)
608 Analysis of Non-linear Systems (3)
610 Advanced Feedback Control Systems (3)
611 Information Theory (3)
621-622 Advanced Microwave Theory (3–3)
641 Statistical Communication Theory (3)
697-698 Seminar in Electrical Engineering (1–1)
699 Directed Research (ar.)
800 Thesis Research (ar.)

Elementary Education

GRADUATE FACULTY

M. R. Porter, Ph.D. (Chairman)—elementary education, curriculum for elementary schools
A. B. Carr, Ed.D.—science education for elementary schools
M. Ezer, Ed.D.—language arts, reading, social studies, curriculum for elementary schools
E. D. Hayes, Ph.D.—language arts, reading, creative expression in elementary education
A. L. Pickens, Ed.D.—art education

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

Admission to candidacy is based upon (1) the quality of the student’s undergraduate record, (2) his performance on the general examination, (3) his performance on the Graduate Record aptitude and the Miller Analogies tests, and (4) an interview with the Graduate Faculty.

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

In plan B, the program normally includes 21–27 semester hours of foundation courses, research, and elementary education, and 9–15 semester hours in a planned and approved sequence of elective courses which carry graduate credit in fields of study other than elementary education. It is
designed to enable teachers to develop depth and creativity in a teacher's role. Elementary Education 722 is required.

Nine credits in History and Philosophy of Education and Educational Psychology (including 708) are required of all candidates.

Required courses in Elementary Education are marked with an asterisk in the list below.

**ELEMENTARY EDUCATION**

- 620 Teaching Reading in the Elementary School (2)
- 621 Modern Language Arts Program, Elementary (2)
- 622 Elementary School Curriculum (3)
- 623 The Elementary Science Curriculum (2)
- 624 The Elementary Mathematics Curriculum (2)
- 625 The Elementary Social Studies Curriculum (2)
- 626 Art in Elementary Education (2)
- 630 Curriculum Development in Creative Expression (3)
- 667 Curriculum Trends in Early Childhood Education (3)
- 699 Directed Research (ar.)
- 722 Seminar in Elementary Curriculum Foundations (3)
- 800 Thesis Research (ar.)

**English**

**GRADUATE FACULTY**

- T. L. Summersgill, Ph.D. (Chairman)—Elizabethan literature, Chaucer
- J. M. Backus, Ph.D.—American literature
- C. S. Bouslog, Ph.D.—English romanticism, twentieth-century British and American literature
- D. S. Brown, Ph.D.—American literature
- A. G. Day, Ph.D.—American literature, writing
- J. W. Frierson, Ph.D.—Victorian literature
- T. H. Fujimura, Ph.D.—Restoration literature
- D. George, Ph.D.—eighteenth-century literature
- M. F. Heiser, Ph.D.—American literature
- W. E. Huntsberry, M.A.—writing
- B. F. Kirtley, Ph.D.—literature, anthropology
- A. P. Leib, Ph.D.—American literature
- A. J. Levy, Ph.D.—American literature
- J. K. Lowers, Ph.D.—Elizabethan literature
- S. Lutzky, Ph.D.—American literature and social backgrounds
- D. Stempel, Ph.D.—nineteenth-century literature, linguistics
- B. M. Stillians, Ph.D.—English romanticism, American literature
- C. G. Stroven, Ph.D.—American literature
- T. F. Teevan, Ph.D.—modern English and Irish literature
- L. Wellein, Ph.D.—comparative literature, Middle English
W. Wilson, Ph.D.—drama, playwriting
L. E. Winters, Ph.D.—comparative literature, Chinese

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

Both plan A and plan B are available. Under both plans, English 630 must be offered in addition to the required 12 and 18 graduate credits.

Applicants for admission to graduate study in English must submit official scores from the General and Literature portions of the Graduate Record Examination.

**ENGLISH**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>440</td>
<td>English Drama to 1642 (3)</td>
</tr>
<tr>
<td>443-444</td>
<td>Modern Dramatic Literature (3-3)</td>
</tr>
<tr>
<td>447</td>
<td>The English Novel to 1832 (3)</td>
</tr>
<tr>
<td>448</td>
<td>The English Novel, 1832-1900 (3)</td>
</tr>
<tr>
<td>451</td>
<td>Medieval English Literature (3)</td>
</tr>
<tr>
<td>452</td>
<td>Chaucer (3)</td>
</tr>
<tr>
<td>455</td>
<td>Sixteenth-Century English Literature (3)</td>
</tr>
<tr>
<td>457-458</td>
<td>Shakespeare (3-3)</td>
</tr>
<tr>
<td>460</td>
<td>Early Seventeenth-Century English Literature (3)</td>
</tr>
<tr>
<td>465</td>
<td>Restoration Literature (3)</td>
</tr>
<tr>
<td>466</td>
<td>Milton (3)</td>
</tr>
<tr>
<td>470</td>
<td>Early Eighteenth-Century English Literature (3)</td>
</tr>
<tr>
<td>471</td>
<td>Late Eighteenth-Century English Literature (3)</td>
</tr>
<tr>
<td>480</td>
<td>The Romantic Movement in England (3)</td>
</tr>
<tr>
<td>485</td>
<td>Victorian Literature (3)</td>
</tr>
<tr>
<td>490</td>
<td>Twentieth-Century British Novel (3)</td>
</tr>
<tr>
<td>571-572</td>
<td>American Literature (3-3)</td>
</tr>
<tr>
<td>573</td>
<td>American Literature and Cultural History (3)</td>
</tr>
<tr>
<td>585</td>
<td>Literature of the Pacific (3)</td>
</tr>
<tr>
<td>590</td>
<td>Twentieth-Century American Novel (3)</td>
</tr>
<tr>
<td>592</td>
<td>Twentieth-Century British and American Poetry (3)</td>
</tr>
<tr>
<td>620</td>
<td>Seminar in Teaching Composition (3)</td>
</tr>
<tr>
<td>*625</td>
<td>History of the English Language (3)</td>
</tr>
<tr>
<td>*630</td>
<td>Seminar in Research Methods (3)</td>
</tr>
<tr>
<td>635</td>
<td>Seminar in Comparative Literature (3)</td>
</tr>
</tbody>
</table>
Intended candidates for the M.S. or Ph.D. in Entomology must present a minimum of 18 hours of undergraduate credit in entomology and zoology, including general zoology, general entomology, economic entomology, insect morphology, and systematic entomology. In addition, they should have credit for two years of chemistry (including inorganic and organic), one year of physics, and courses in algebra, botany, and genetics. Deficiencies in undergraduate preparation must be made up.

Courses available for graduate credit are listed below. Courses in the fields of Zoology, Botany, Microbiology, and Genetics may be allowed in the degree program. Required courses are marked with an asterisk.

**ENTOMOLOGY**

661 Medical and Veterinary Entomology (3)
662 Advanced Systematic Entomology (3)
663 Scale Insects (3)
664 Immature Insects (3)
671 Insect Ecology (3)
Acarology (3)
Insect Pathology (3)
Biological Control of Pests (3)
Insect Toxicology (4)
Insect Transmitted Diseases of Plants (3)
Entomology Seminar (1)
Directed Research (ar.)
Thesis Research (ar.)

ZOOLOGY
*601 Zoological Literature (1)
*602 Preparation of Scientific Manuscripts (1)

Food Science

GRADUATE FACULTY
E. Ross, Ph.D. (Chairman)—food science and technology
L. Allen, Ph.D.—food technology, processing
H. A. Frank, Ph.D.—food science, food microbiology
H. Y. Yamamoto, Ph.D.—food science, food biochemistry

AFFILIATE FACULTY
G. G. Dull, Ph.D.—natural products, plant biochemistry
G. E. Felton, Ph.D.—food technology, carbohydrate chemistry
J. H. Payne, Ph.D.—sugar technology

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

Courses for the graduate program are to be selected from those offered in the major field of Food Science, and the related fields of Agricultural Engineering, Chemistry, Biochemistry and Biophysics, Microbiology, and Nutrition. A maximum of 6 credits may be earned in other fields. Required courses are marked with an asterisk.

FOOD SCIENCE
510 Tropical Food Processing (3)
511 Tropical Food Products (2)
601 Principles in Food Science and Technology (3)
603 Microbiology of Foods (3)
604 Laboratory Methods for Food Microbiology (2)
*620 Seminar (1)
630 Biochemical and Chemical Aspects of Foods (3)
*699 Directed Research (ar.)
*701 Recent Advances in Food Research (1)
800 Thesis Research (ar.)
French

GRADUATE FACULTY

D. B. Aspinwall, Ph.D. (Chairman)—literature of 19th and 20th centuries

A. Bégué, Ph.D.—civilization

R. Bertrand—stylistics

L. Chirol, M.A.—stylistics

J. Holton, Ph.D.—methods of teaching the language

E. Jackson, Ph.D.—Renaissance and 18th-century literature

E. Knowlton, Ph.D.—history of the language

A. Moore, B.A.—Franco-German literary relations in 18th and 19th centuries

Intended candidates for the M.A. in French must present 24 semester hours of undergraduate credit in French, exclusive of introductory and intermediate courses, or have had equivalent preparation. They must also demonstrate, by means of a personal interview or by a tape recording, that they possess the ability to communicate orally in French with a French national.

Under plan A at least 6 semester hours of European history, taken as undergraduate or as graduate work are required. Some knowledge of Latin is desirable and a competence in a second foreign language is required. For the latter requirement the standard for a European language is the equivalent of that expected upon completion of the second year of University study in the language. A maximum of 8 semester hours may be elected from courses in related fields. Required courses are marked with an asterisk.

FRENCH

*411–412 Literature of the Golden Age (3-3)
*413–414 Eighteenth-Century Literature (2-2)
*415–416 Nineteenth-Century Literature (2-2)
417–418 Twentieth-Century Literature (3-3)
*601 Seminar in Modern French Literature (2)
*609 Literature of Renaissance (3)
*660 Advanced Composition and Stylistics (2)
671 History of the French Language (2)
672 Medieval Literature (2)
699 Directed Research (ar.)
800 Thesis Research (ar.)

EUROPEAN LANGUAGES

*630 Seminar in Research Methods (2)
Genetics

GRADUATE FACULTY
N. E. Morton, Ph.D. (Chairman)—human population genetics
L. Beckman, Ph.D.—human biochemical genetics
J. B. Smith, Ph.D.—human cytogenetics
L. H. Snyder, Sc.D.—medical genetics

AFFILIATE FACULTY
S. L. Halperin, Ph.D.—genetical psychology
L. M. Sprague, Ph.D.—immunogenetics

The M.S. and Ph.D. in Genetics are offered in human genetics, immunogenetics, plant genetics (see Horticulture) and quantitative genetics (see Animal Science). Intended candidates must have or acquire adequate preparation in zoology, biometrics, chemistry through organic chemistry, analytic geometry and calculus, genetics, and physics. For human genetics additional undergraduate requirements are anthropology and human genetics. For immunogenetics, the undergraduate preparation should include general microbiology, comparative anatomy and embryology. For quantitative genetics, the preparation should include vertebrate zoology and physiology. For plant genetics the undergraduate requirements include cytology, plant anatomy, taxonomy, and physiology, and plant breeding. The Graduate Record Examination and two letters of recommendation are required.

All candidates for the graduate degree in genetics must take Genetics 518, 618, 650, 4 semesters of 654 or its equivalent, Biochemistry 601–602, and any additional courses specified by the Thesis Committee. Related fields in which credit will normally be allowed toward the degrees in genetics include Animal Science, Anthropology, Botany, Biochemistry, Chemistry, Horticulture, Mathematics, Microbiology, Public Health, and Zoology. Departmental courses available for graduate credit are listed below:

GENETICS
518 Cellular Genetics
618 Cytogenetics
625 Advanced Topics in Genetics
650 Population Genetics
654 Seminar
699 Directed Research
800 Thesis Research

Geography

GRADUATE FACULTY
C. A. Manchester, Jr., Ph.D. (Chairman)—Japan, Asia, history of geography
AFFILIATE FACULTY

J. H. Chung, Ph.D.—climatology, east Asia

Undergraduate background should include the courses required for a geography major. However, students with majors in related disciplines are welcomed with the understanding that they may be obliged to take some essential courses on a noncredit basis. The student is expected to have adequate preparation in mathematics or statistics and to have a reading knowledge of a foreign language.

GEOGRAPHY

420  Weather and Climate (3)
430  Cartography (3)
450  Urban Geography (3)
501  Geography of North America (3)
507  Conservation and Utilization of Natural Resources (3)
521  Geography of Europe (3)
526  Geography of the Soviet Union (3)
541  Geography of Asia (3)
552  Geography of Japan (3)
553  Geography of China (3)
554  Geography of India and Southeast Asia (3)
561  Geography of Australia and New Zealand (2)
571  Geography of the Pacific Islands (3)
578  Geography of Hawaii (3)
580  Geography of the Tropics (3)
*601  History of Geography (3)
605  Historical Geography (3)
620  Studies in Economic Geography (3)
640  Quantitative Methods in Geography (3)
645  Field Methods (3)
660  Seminar in Geography of Japan (3)
665  Seminar in Geography of the Pacific (3)
*680  Seminar in Geography (3)
699  Directed Research (ar.)
*800  Thesis Research (ar.)

Geological Sciences

GRADUATE FACULTY

A. T. Abbott, Ph.D. (Chairman)—ore deposits, geomorphology
T. K. Chamberlain, Ph.D.—marine geology, sedimentology
D. C. Cox, M.A.—hydrology, ground-water geology  
A. S. Furumoto, Ph.D.—seismology, geophysics  
G. A. Macdonald, Ph.D.—volcanology, igneous petrology  
M. Manghnani, Ph.D.—geochemistry  
R. M. Moberly, Ph.D.—sedimentology, stratigraphy  
G. P. Woollard, Ph.D.—geophysics  

AFFILIATE FACULTY  
C. Johnson, M.S.—engineering geology  
J. Mink, M.S.—ground water geology

Intended candidates for the M.S. and Ph.D. in Geology must present a minimum undergraduate background of 20 credit hours in geology and solid-earth geophysics, including courses in physical and historical geology, mineralogy, petrology, and structural geology. One year each of college mathematics, chemistry, and physics also are required.

Courses available for graduate credit are listed below. Related courses in Chemistry, Physics, Mathematics, Oceanography, Soil Science, and Zoology are recommended, and may be used as credit toward the degree with approval of the supervising committees. Proficiency in one foreign language is required of candidates for the Master of Science.

<table>
<thead>
<tr>
<th>GEOL</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>430</td>
<td>Introduction to Solid Earth Geophysics</td>
<td>3</td>
</tr>
<tr>
<td>431</td>
<td>Elementary Seismology</td>
<td>3</td>
</tr>
<tr>
<td>440</td>
<td>Geology of Fuels</td>
<td>2</td>
</tr>
<tr>
<td>454</td>
<td>Economic Geology</td>
<td>2</td>
</tr>
<tr>
<td>455</td>
<td>Geology of Ground-water</td>
<td>3</td>
</tr>
<tr>
<td>456</td>
<td>Engineering Geology</td>
<td>2</td>
</tr>
<tr>
<td>470</td>
<td>Marine Geology</td>
<td>2</td>
</tr>
<tr>
<td>495</td>
<td>Geochemistry</td>
<td>3</td>
</tr>
<tr>
<td>500</td>
<td>Advanced General Geology</td>
<td>2</td>
</tr>
<tr>
<td>550</td>
<td>Intermediate Geophysics I</td>
<td>3</td>
</tr>
<tr>
<td>551</td>
<td>Intermediate Geophysics II</td>
<td>3</td>
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<tr>
<td>601</td>
<td>Seminar in Volcanology</td>
<td>2</td>
</tr>
<tr>
<td>602</td>
<td>Seminar in Igneous Petrology</td>
<td>2</td>
</tr>
<tr>
<td>603</td>
<td>Seminar in Metamorphic Geology</td>
<td>2</td>
</tr>
<tr>
<td>605</td>
<td>Seminar in Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>606</td>
<td>Seminar in Engineering Geology</td>
<td>3</td>
</tr>
<tr>
<td>610</td>
<td>Seminar in Solid-Earth Geophysics</td>
<td>3</td>
</tr>
<tr>
<td>612</td>
<td>Principles of Theoretical Geophysics I</td>
<td>3</td>
</tr>
<tr>
<td>613</td>
<td>Principles of Theoretical Geophysics II</td>
<td>3</td>
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<tr>
<td>615</td>
<td>Seismology</td>
<td>3</td>
</tr>
<tr>
<td>620</td>
<td>Seminar in Gravity of the Earth</td>
<td>3</td>
</tr>
<tr>
<td>621</td>
<td>Seminar in Geomagnetism</td>
<td>3</td>
</tr>
<tr>
<td>641</td>
<td>Seminar in Ore Deposits</td>
<td>2</td>
</tr>
<tr>
<td>651</td>
<td>Seminar in Geomorphology</td>
<td>2</td>
</tr>
</tbody>
</table>
German

GRADUATE FACULTY

Bertha Mueller, Ph.D. (Chairman)—Goethe, nineteenth-century literature

John Michalski, M.A.—medieval period, twentieth-century literature

Anneliese Moore, M.A.—Franco-German literary relations

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

The minimum requirement is 36 graduate credit hours. A maximum of 8 of the 36 hours may be elected from courses in related fields. Required courses are marked with an asterisk.

GERMAN

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>411-412</td>
<td>The Classical Period (3-3)</td>
<td></td>
</tr>
<tr>
<td>413-414</td>
<td>The Modern Period (3-3)</td>
<td></td>
</tr>
<tr>
<td>416</td>
<td>Renaissance and Baroque Literature (3)</td>
<td></td>
</tr>
<tr>
<td>417</td>
<td>The German Drama (3)</td>
<td></td>
</tr>
<tr>
<td>418</td>
<td>The Romantic Movement (3)</td>
<td></td>
</tr>
<tr>
<td>*601</td>
<td>History of the German Language (3)</td>
<td></td>
</tr>
<tr>
<td>*602</td>
<td>Composition and Stylistics (3)</td>
<td></td>
</tr>
<tr>
<td>*615</td>
<td>Middle High German Masterpieces (3)</td>
<td></td>
</tr>
<tr>
<td>*693</td>
<td>Seminar in German Literature (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Four cycles, one of which is required: (a) Novel, 18th &amp; 19th centuries; (b) Faust; (c) Lyric Poetry; (d) Novel, 20th century.</td>
<td></td>
</tr>
</tbody>
</table>

699 Directed Research (ar.)

800 Thesis Research (ar.)

EUROPEAN LANGUAGES

*630 Seminar in Research Methods (2)

History

GRADUATE FACULTY

D. D. Johnson, Ph.D. (Chairman)—United States diplomatic, Latin America, United States in the Pacific
Intended candidates for the M.A. or Ph.D. must present a minimum undergraduate preparation of 18 upper-division credits in history. Deficiencies in this regard or in preparation in the area of specialization may be made up before or during graduate study. Both thesis (plan A) and non-thesis (plan B) programs for the M.A. are offered according to graduate school regulations.

Courses in history are divided into three major geographic area classifications: Americas, Asia and Pacific, and Europe. Study in at least two of these areas is required in all graduate programs, and general examinations are based upon sub-fields within the area.

Students are encouraged to take advanced courses in other disciplines related to their program of study. For the Ph.D. a minimum of 12 credits in a minor discipline is required.

Reading knowledge of one foreign language related to the area of specialization is required of M.A. candidates.

Courses available for graduate credit are listed below:

### Americas

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>461-462</td>
<td>History of the United States to 1876 (3-3)</td>
</tr>
<tr>
<td>463-464</td>
<td>History of the United States since 1877 (3-3)</td>
</tr>
<tr>
<td>471-472</td>
<td>Diplomatic History of the United States (3-3)</td>
</tr>
<tr>
<td>475</td>
<td>Constitutional History of the United States (3)</td>
</tr>
<tr>
<td>481</td>
<td>American Thought and Culture (3)</td>
</tr>
<tr>
<td>491</td>
<td>The West in American History (3)</td>
</tr>
<tr>
<td>492</td>
<td>The South in American History (3)</td>
</tr>
<tr>
<td>511-512</td>
<td>History of Latin America (3-3)</td>
</tr>
<tr>
<td>633</td>
<td>American Social Reform Movements since 1865 (3)</td>
</tr>
<tr>
<td>635</td>
<td>The Colonial Period in American History (3)</td>
</tr>
</tbody>
</table>
Asia and Pacific

439 Australia and New Zealand (3)  
527 Russian Siberia and the Pacific (3)  
529–530 Southeast Asia (3–3)  
531–532 History of China (3–3)  
533–534 Cultural History of China (3–3)  
541–542 History of Japan (3–3)  
543 Constitutional History of Modern Japan (3)  
551 South Asia (3)  
552 Southwest Asia (3)  
553 Russian Central Asia and the Caucasus (3)  
555 Cultural History of Central Asia (3)  
571 Pacific Exploration and Discovery to 1779 (3)  
572 Pacific Islands from 1779 (3)  
575 The United States in the Pacific (3)  
577 History of the Hawaiian Islands (3)  
660 Early Civilization in the Far East (3)  
661 Seminar in Chinese History (3)  
663 Seminar in Indian History (3)  
664 Seminar in Southeast Asian History (3)  
665 Seminar in Japanese History (3)  
666 History of Thought in Japan (3)  
671 Seminar in Russian History (3)  
675 Seminar in Pacific History (3)  
713 Research Materials and Methods in Asian History (3)  

Europe

405–406 Medieval Europe, 300–1300 (3–3)  
409 Renaissance and Reformation, 1300–1600 (3)  
410 Early Modern Europe, 1600–1800 (3)  
419–420 European Ideas and the World Since 1800 (3–3)  
425 Europe in the Nineteenth Century (3)  
426 Europe Since Versailles (3)  
431–432 History of England (3–3)  
435 Constitutional History of England (3)  
441–442 East Central Europe (3–3)  
451–452 History of Russia (3–3)  
611 Seminar in European History (3)  
618 British Empire and Commonwealth (3)  
671 Seminar in Russian History (3)  

64
Historical Method and Individual Research

699 Directed Research (ar.)
711 Seminar in Historical Methods (3)
712 Seminar in Historiography (3)
800 Thesis Research (ar.)

History and Philosophy of Education

Graduate Faculty

Robert W. Clopton, Ph.D. (Chairman)—history and philosophy
Shiro Amioka, Ph.D.—philosophy, Japanese education
Ronald S. Anderson, Ph.D.—comparative education
F. Glenn Austin, Ph.D.—history, philosophy, social foundations
William H. Boyer, Ed.D.—philosophy, social foundations
Maurice P. Hunt, Ph.D.—history, philosophy, social foundations
William D. Lampard, Ed.D.—social foundations

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

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

Plan A: The program may include a maximum of 10 semester credits in approved courses other than History and Philosophy of Education, which are related to the candidate's announced goals.

Plan B: The program normally includes 21 semester hours of Education of which 15 are in the department of History and Philosophy, and 15 semester hours (a minimum of 12) in a planned and approved sequence of courses which carry graduate credit in other fields.

In both plan A and plan B, courses in Fields of Study other than History and Philosophy of Education will normally be concentrated in one or two of the following: Philosophy, History, Economics, Political Science, Sociology, Anthropology, Asian Studies, American Studies, or another graduate field in Education.

Graduate courses in History and Philosophy of Education not listed below, but which are offered in summer sessions or during the year by visiting professors, may be included in degree programs with the approval of the Chairman.

Candidates must take Ed EP 672, Ed EP 708, and at least two of the Ed HP courses marked with asterisks. Plan B candidates will take Ed HP 768 in their terminal semester or summer session.

History and Philosophy of Education

570 Anthropology and Education (3)
*650 History of Education (3)
Philosophy of Education (3)
The Church and the School (2)
Social Foundations of Education (3)
Interpersonal Relationships in Education (3)
Education in America (3)
Comparative Education: Europe and America (3)
Comparative Education: The Orient (3)
Directed Research (ar.)
History of American Education (3)
Seminar in the History of Education (2)
Educational Classics (2)
Japanese Philosophy of Education (2)
Educational Philosophy of John Dewey (2)
Seminar in Philosophy of Education (2)
Contemporary Educational Philosophers (2)
Seminar in Problems in Education (2)
Seminar in Comparative Education (2)
(not offered 1962-63)
Thesis Research (ar.)

Educational Psychology

Advanced Educational Psychology (3)
Educational Research Methods (3)

Horticulture

Graduate Faculty
J. C. Gilbert, Ph.D. (Chairman)—vegetable breeding
J. L. Brewbaker, Ph.D.—radiation genetics
R. A. Hamilton, Ph.D.—tropical fruit improvement
H. Kamemoto, Ph.D.—ornamental cytogenetics
T. Murashige, Ph.D.—plant physiology
H. Y. Nakasone, Ph.D.—tropical fruit breeding
R. R. Romanowski, Ph.D.—vegetable physiology
R. M. Warner, Ph.D.—tropical fruit ecology

Affiliate Faculty
R. L. Cushing, M.S.—plant genetics
J. C. Darroch, M.S.—agricultural statistics
D. P. Gowing, Ph.D.—plant physiology
N. S. Hanson, Ph.D.—weed control
G. A. Johannessen, Ph.D.—plant genetics
K. R. Kerns, M.S.—plant breeding
B. Krauss, M.S.—plant physiology
L. G. Nickell, Ph.D.—plant physiology
J. N. Warner, Ph.D.—sugar cane breeding
Intended candidates for the M.S. or Ph.D. in Horticulture must present a minimum of 24 hours of undergraduate credit in plant sciences (including botany, horticulture, agronomy, plant pathology) and related fields. Basic courses in chemistry and botany are required. Deficiencies must be made up without credit.

Courses available for graduate credit are listed below. Related fields in which credit will normally be allowed toward the degrees in Horticulture include Agronomy, Biochemistry, Biophysics, Botany, Entomology, Genetics, Microbiology, Plant Pathology, Soil Science, and Zoology. Required courses are marked with an asterisk.

**HORTICULTURE**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>453</td>
<td>Principles of Plant Breeding</td>
<td>3</td>
</tr>
<tr>
<td>463</td>
<td>Principles of Floriculture</td>
<td>3</td>
</tr>
<tr>
<td>464</td>
<td>Orchidology</td>
<td>3</td>
</tr>
<tr>
<td>471</td>
<td>Post-Harvest Physiology</td>
<td>3</td>
</tr>
<tr>
<td>494</td>
<td>Systematic Vegetable Crops</td>
<td>3</td>
</tr>
<tr>
<td>566</td>
<td>Advanced Tropical Pomology</td>
<td>3</td>
</tr>
<tr>
<td>603</td>
<td>Experimental Design</td>
<td>2</td>
</tr>
<tr>
<td>611</td>
<td>Advanced Plant Breeding</td>
<td>3</td>
</tr>
<tr>
<td>666</td>
<td>Radiation Biology</td>
<td>3</td>
</tr>
<tr>
<td>*667</td>
<td>Horticulture Seminar</td>
<td>1</td>
</tr>
<tr>
<td>668</td>
<td>Growth Regulators in Horticulture</td>
<td>3</td>
</tr>
<tr>
<td>691</td>
<td>Crop Ecology</td>
<td>3</td>
</tr>
<tr>
<td>699</td>
<td>Directed Research</td>
<td>(ar.)</td>
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<tr>
<td>711</td>
<td>Special Topics in Experimental Horticulture</td>
<td>(ar.)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research</td>
<td>(ar.)</td>
</tr>
</tbody>
</table>

**Japanese**

**GRADUATE FACULTY**

N. Fujioka, M.A. (Chairman)—grammar, history of the Japanese language

J. T. Araki, Ph.D.—literature, linguistics

H. Ikeda, Ph.D.—folk literature, Edo literature

M. K. McElrath, Ph.D.—linguistics, medieval literature (on leave 1964–65)

Y. Uyehara, M.A.—contemporary literature, poetry

K. Yasuda, D.Litt.—classical literature, poetry

Intended candidates for the M.A. degree must have a B.A. degree in Japanese or have had equivalent preparation in the discipline.

The minimum requirement for the M.A. (in Japanese) is 24 semester hours of course work and 6 semester hours of thesis research. A minimum of 18 credit hours of course work, for which graduate credit is given, must be selected from courses in Japanese and the rest in related fields. No
more than six credits from courses numbered in the 400's may be applied toward satisfaction of this requirement. In addition, a reading knowledge of some other language approved by the department is required.

Courses must be selected from those listed below. Required courses are either 611-612 or 615-616 and those marked with an asterisk. (Courses required for a B.A. in Japanese cannot be used toward the degree.)

**JAPANESE**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>401-402</td>
<td>Japanese Literature (2-2)</td>
</tr>
<tr>
<td>408</td>
<td>Structure of Japanese (3)</td>
</tr>
<tr>
<td>415-416</td>
<td>Japanese Grammar—Colloquial (3-3)</td>
</tr>
<tr>
<td>417-418</td>
<td>Fourth-Year Japanese (3-3)</td>
</tr>
<tr>
<td>421-422</td>
<td>Japanese Grammar—Classical (3-3)</td>
</tr>
<tr>
<td>611-612</td>
<td>Contemporary Japanese Literature (3-3)</td>
</tr>
<tr>
<td>613-614</td>
<td>Japanese Poetry (3-3)</td>
</tr>
<tr>
<td>615-616</td>
<td>Classical Japanese Literature (3-3)</td>
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<td>*693-694</td>
<td>Japanese Bibliography (3-3)</td>
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<td>699</td>
<td>Directed Research (ar.)</td>
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<tr>
<td>*701-702</td>
<td>Research Seminar in Japanese (2-2)</td>
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<td>*800</td>
<td>Thesis Research (ar.)</td>
</tr>
</tbody>
</table>

**Linguistics**

**GRADUATE FACULTY**

- H. P. McKaugh, Ph.D. (Chairman)—advanced linguistic analysis, Malayo-Polynesian and New Guinea languages
- F. M. Cammack, Ph.D.—Malayo-Polynesian languages and linguistics
- S. H. Elbert, Ph.D.—Malayo-Polynesian languages and linguistics
- G. W. Grace, Ph.D.—comparative and historical linguistics, Micronesian and New Guinea languages
- A. J. Schutz, Ph.D.—introductory analysis, field methods, South Pacific languages
- S. M. Tsuzaki, Ph.D.—introductory analysis, phonemics, morphology, languages in contact

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

Only the plan A (thesis) program is available. The regular Graduate School requirement of a general examination and a final examination (thesis defense) will be augmented by a comprehensive examination near the end of the candidate's residence work. A reading knowledge of French
or German, to be demonstrated at least one full semester before the candidate takes his comprehensive examination, is required. The substitution of another language may be made if there is sufficient linguistic literature in such language.

The program of courses will be planned to assure the candidate's competence in the following areas: phonetics and phonemics; morphology and syntax; comparative and historical linguistics; the structure of a specific language; methodology, including field methods and informant techniques; current linguistic research; additional work in linguistics and/or supporting areas such as anthropology.

LINGUISTICS

620 Introduction to Linguistic Analysis (3)
621 Phonemics (3)
622 Morphology and Syntax (3)
630 Field Methods (3)
641 Typology of Asian Languages (3)
645 Comparative Methods (3)
650 Advanced Linguistic Analysis (3)
699 Directed Research (ar.)
750 Seminar (3)
800 Thesis Research (ar.)

Mathematics

GRADUATE FACULTY

C. C. Gregory, Ph.D. (Chairman)—applied mathematics, differential equations, statistics, theoretical physics
R. H. Clark, M.A.—statistics
J. C. Kudar, Ph.D.—applied mathematics
E. H. Mookini, M.S.—calculus of variations, modern algebra, numerical analysis
F. M. Sioson, Ph.D.—analysis
S. B. Townes, Ph.D.—modern algebra, theory of numbers, topology
H. A. White, Ph.D.—statistics
H. Yamauchi, Ph.D.—applied mathematics

Intended candidates must present a minimum undergraduate preparation of 27 credits in mathematics, including analytic geometry and differential and integral calculus. College physics is recommended. One or more of the following courses are recommended but not required: differential equations, advanced calculus, theory of equations, vector analysis, statistics, and logic.

Courses for graduate credit are to be selected from those listed below. Required courses are marked with an asterisk. Additional courses may be elected from courses in logic, theoretical courses in mechanics, electricity and magnetism, atomic and nuclear physics, and electrical and mechanical engineering.
MATHEMATICS

401–402 Differential Equations (3–3)
410 Numerical Methods for Algebraic Equations (3)
411 Numerical Methods for Differential Equations (3)
421 Introduction to Modern Algebra (3)
422 Matrices and Theory of Equations (3)
*431–432 Advanced Calculus (3–3)
442 Vector Analysis (3)
444 Theory of Functions of a Complex Variable (3)
471 Probability (3)
472 Statistical Inference (3)
501–502 Theory of Sets and Metric Spaces (3–3)
601–602 Applied Mathematics (3–3)
611–612 Modern Algebra (3–3)
621–622 Topology (3–3)
631–632 Theory of Functions of a Real Variable (3–3)
644–645 Analytic Function Theory (3–3)
*650 Seminar (1)
*699 Directed Research (ar.)
*800 Thesis Research (ar.)

Meteorology

GRADUATE FACULTY

M. A. Estoque, Ph.D. (Chairman)—numerical analysis and prediction, atmospheric boundary layer phenomena

W. C. Chiu, Ph.D.—stratospheric meteorology, large scale atmospheric turbulence, atmospheric oscillations

C. S. Ramage, Ph.D.—tropical meteorology

AFFILIATE FACULTY

S. Price, B.S.—physical meteorology

Intended candidates for an advanced degree 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. A reading knowledge of one foreign language is required for the M.S. In addition to the examinations prescribed by the Graduate School, candidates for the M.S. must pass a comprehensive examination in the field.

Courses available for graduate credit are listed below. Courses may also be allowed in the fields of Oceanography, Physics, and Mathematics.
Microbiology

GRADUATE FACULTY

D. E. Contois, Ph.D. (Chairman)—general bacteriology and physiology
A. A. Benedict, Ph.D.—immunology
L. R. Berger, Ph.D.—general bacteriology and physiology
O. A. Bushnell, Ph.D.—medical and economic bacteriology
G. W. Chu, D.Sc.—medical bacteriology and parasitology
H. R. Hohl, Ph.D.—general microbiology and microbial cytology
P. C. Loh, PhD.—virology

AFFILIATE FACULTY

E. J. Anderson, Ph.D.—nematology
J. Kern, Ph.D.—virology
H. Klemmer, Ph.D.—economic bacteriology
J. Stephenson, M.D.—medical bacteriology
K. Wilcox, Ph.D.—medical bacteriology
P. Yoder, Ph.D.—virology

Intended candidates must present a minimum of 18 hours of undergraduate work in microbiology, a basic course in biology, botany, or zoology, and courses in general and organic chemistry, quantitative analysis, and college physics. Deficiencies in undergraduate preparation must be made up.

Courses for the graduate program are to be selected from those listed below and from others offered in the related fields of Biochemistry and Biophysics, Chemistry, Genetics, Plant Pathology, Public Health, Soil Science, and Zoology. Required courses are marked with an asterisk.
Music

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. For concentration in music education a record of teaching experience should be presented.

The M.A. in Music is offered with concentration in ethnomusicology, in musicology, and in music education. The M.F.A. in Music is offered with concentration in composition and in performance. Normally a maximum of 6 credit hours may be selected from advanced courses in other disciplines closely related to the field of thesis research as determined by the supervising committee. For concentration in musicology a reading knowledge of French or German is required, for concentration in other areas a foreign language appropriate to the field of thesis research may be required as determined by the supervising committee. The requirement of 12 or 18 credits of courses numbered 600 or above may be waived by the Graduate Faculty except for candidates in music education.

Candidates concentrating in music education may choose between the thesis program and the nonthesis program which normally includes 12 credit hours in education and music education, 18 credit hours in music, and 6 credit hours in related courses advised by the supervising committee. Requirements for the Hawaii State Department of Education Professional Certificate may be met in the M.A. Program in Music Education.

Courses for the graduate major must be selected from those listed below. A limited number of credit hours may be selected from advanced
courses in Anthropology, Drama, Education, literature in English, Asian, Pacific or European languages, Philosophy, Psychology, Sociology, or other pertinent fields. A seminar in the field of concentration is required of all candidates.

**MUSIC**

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>400</td>
<td>Concert Choir (1-1)</td>
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<tr>
<td>401</td>
<td>Ensemble Music (1)</td>
</tr>
<tr>
<td>405</td>
<td>Concert Orchestra (1)</td>
</tr>
<tr>
<td>409</td>
<td>Concert Band (1)</td>
</tr>
<tr>
<td>435</td>
<td>Individual Instruction (ar.)</td>
</tr>
<tr>
<td>451</td>
<td>Advanced String Methods (2)</td>
</tr>
<tr>
<td>452</td>
<td>Advanced Woodwind Methods (2)</td>
</tr>
<tr>
<td>453</td>
<td>Advanced Brass Methods (2)</td>
</tr>
<tr>
<td>461</td>
<td>Music of the Baroque Period (2)</td>
</tr>
<tr>
<td>462</td>
<td>Music of the Classic Period (2)</td>
</tr>
<tr>
<td>463</td>
<td>Music of the Romantic Period (2)</td>
</tr>
<tr>
<td>464</td>
<td>Contemporary Music (2)</td>
</tr>
<tr>
<td>470</td>
<td>Music of Asia (3)</td>
</tr>
<tr>
<td>471</td>
<td>Music of Nonliterate Peoples (3)</td>
</tr>
<tr>
<td>481</td>
<td>Advanced Orchestration (2)</td>
</tr>
<tr>
<td>483</td>
<td>Counterpoint (2)</td>
</tr>
<tr>
<td>484</td>
<td>Counterpoint (2)</td>
</tr>
<tr>
<td>485-486</td>
<td>Form and Analysis (2-2)</td>
</tr>
<tr>
<td>487</td>
<td>Composition (2)</td>
</tr>
<tr>
<td>488</td>
<td>Composition (2)</td>
</tr>
<tr>
<td>600</td>
<td>Seminar (3)</td>
</tr>
<tr>
<td>635</td>
<td>Advanced Individual Instruction (ar.)</td>
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<tr>
<td>650</td>
<td>Foundations in Music Education (2)</td>
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<tr>
<td>651</td>
<td>Seminar in Music Education (2)</td>
</tr>
<tr>
<td>654</td>
<td>Pacific and Asian Music in Education (2)</td>
</tr>
<tr>
<td>657</td>
<td>Advanced Conducting (2)</td>
</tr>
<tr>
<td>661</td>
<td>Bibliography and Research Methods in Music (3)</td>
</tr>
<tr>
<td>699</td>
<td>Directed Research (ar.)</td>
</tr>
<tr>
<td>800</td>
<td>Thesis Research (ar.)</td>
</tr>
</tbody>
</table>

**Nursing**

**GRADUATE FACULTY**

V. Jones, M.Ed. (Chairman)—public health nursing  
C. Canfield, M.P.H.—public health nursing  
Y. Gross, M.S.—psychiatric nursing  
L. Love, M.S.—psychiatric nursing  
F. Ozaki, M.A.—maternal-child nursing

*Graduate credit not available to candidates for a degree in composition.  
†Graduate credit not available to candidates for a degree in musicology.
Intended candidates must present a baccalaureate nursing degree, which includes public health and psychiatric nursing, or an acceptable equivalent. Prerequisite to all programs is a course in elementary statistics. In addition, a broad foundation of related courses in the social sciences, natural sciences, and the humanities is strongly recommended. The applicant must have active registration for the practice of nursing.

All students in nursing taking plan B (nonthesis) are required to take a minimum of 36 hours of graduate credits of which 18 credits will be in nursing courses and 18 credits in other fields of study.

**NURSING**

- 600-601 Methods of Research (2-2)
- 610 Curriculum Development (3)
- 620 Concepts of Leadership in Nursing (3)
- 630 Advanced Nursing Seminars (2)
- 640 Advanced Nursing Practicum (2)
- 655 Contemporary Psychiatric Theories (3)
- 699 Directed Research (ar.)

**Nutrition**

**GRADUATE FACULTY**

- D. M. Hilker Ph.D. (Chairman)—carbohydrate metabolism, enzymology
- I. J. Lichton, Ph.D.—fluid handling, endocrinology
- B. R. Standal, Ph.D.—protein, lipid metabolism

Intended candidates for the M.S. in Nutrition must present the following undergraduate preparation: general chemistry, qualitative analysis, quantitative analysis, organic chemistry, biology, general physics, college algebra, trigonometry, and an adequate preparation in nutrition. Courses for the graduate major are to be selected from those listed below. Additional graduate courses may be taken in Animal Science, Chemistry, Biochemistry, Food Science, Microbiology, Zoology, or other related fields.

**NUTRITION**

- 601-602 Human Nutrition (3-3)
- 621 Topics in Nutrition (2)
- 651 Dietary Studies (ar.)
- 652 Laboratory Methods in Nutrition (3)
- 699 Directed Research (ar.)
- 701 Seminar (1)
- 800 Thesis Research (ar.)

**Oceanography**

**GRADUATE FACULTY**

- V. E. Brock, M.A. (Chairman)—biological
- C. W. Adams, M.S.—physical
T. K. Chamberlain, Ph.D.—geological
W. H. Clayton, Ph.D.—physical
K. Wyrtki, Ph.D.—physical
H. Zeitlin, Ph.D.—chemical

AFFILIATE FACULTY
R. Barkley, Ph.D.—physical
J. C. Marr, M.A.—biological
G. R. Seckel, M.S.—physical

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

Biological, chemical, geological, and physical aspects of oceanography are covered in the program.

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
550 General Oceanography (3)
575 Regional Oceanography (2)
600 Physical Oceanography (3)
601 Oceanographic Forecasting (2)
675 Oceanographic Instrumentation, Laboratory Research and Field Work (2-4)
684 Problems in Oceanography (ar.)
800 Thesis Research (ar.)

BOTANY
586 Biological Productivity of the Sea (3)
682 Phycology—Phytoplankton (3)

CHEMISTRY
580 Oceanographic Chemistry (3)

GEOLOGY
470 Marine Geology (2)
671 Nearshore Marine Processes (2)
672 Seminar in Geology of Deep Ocean Basins (2)

ZOOLOGY
603 Zoogeography (2)
615-616 Advanced Invertebrate Zoology (3-3)
620 Marine Ecology (3)
629 Methods of Fisheries Investigation (3)
631 Population Dynamics (3)
732 Fisheries Management (3)
Overseas Operations Program

GRADUATE FACULTY

J. N. Stalker, Ph.D. (Chairman)—current Asian affairs
J. M. Allison, LL.D.—foreign affairs

The Overseas Operations Program is an individual study plan leading to the M.A. It is designed to prepare selected graduate students for service in Asia with international organizations, agencies of the United States government, and private institutions and industries which operate in the area.

In conjunction with the objectives of the program, courses of study are coordinated and utilized to fit the student better for his chosen profession. Asian language programs are particularly stressed, and the student must demonstrate a real proficiency in at least one of the Asian languages before the degree will be granted. Students will be expected to engage in intensive work connected with their individual specialities as these relate to Asia.

No thesis is required for the degree; however, the following basic requirements must be met by all students:

1) 36 semester hours, including an internship of 6 semester hours;
2) required seminars in Agriculture, Economics, History, Philosophy, and Political Science;
3) fluency in at least one Asian language;
4) oral and written comprehensive examinations.

Courses available for graduate credit are:

OVERSEAS OPERATIONS

601–602 Internship in Overseas Operations (6)
699 Selected Readings (3–3)

Pacific Islands Studies

FACULTY COMMITTEE

L. Mason, Ph.D. (Chairman) (Anthropology)
N. Meller, Ph.D. (Political Science)
T. D. Murphy, Ph.D. (History)
B. B. Smith, M.M. (Music)

The required undergraduate background is 18 hours of credit dealing with the Pacific Islands area in the following fields: anthropology, geography, history, literature, music, political science, and sociology. A basic course in either anthropology or geography of the Pacific Islands is required. Candidates are urged to acquire a reading knowledge of French, German, Hawaiian, Japanese, or Spanish and to utilize the chosen language in thesis research.
Courses are to be selected from those listed below in such manner as to provide an integrated program bearing upon a particular field of interest. At least three departments, other than language, must be represented. In valid instances, courses relating to the Pacific Islands in certain fields such as Agriculture, Botany, Chemistry, Microbiology, Nutrition, and Zoology, may be substituted. Required courses are marked with an asterisk.

### ANTHROPOLOGY

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tr>
<td>400</td>
<td>Hawaii (3)</td>
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<tr>
<td>600</td>
<td>Polynesia (3)</td>
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<td>Micronesia (3)</td>
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<td>699</td>
<td>Directed Research (ar.)</td>
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<tr>
<td>750</td>
<td>Seminar (in Oceania) (3)</td>
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### ENGLISH

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<td>Literature of the Pacific (3)</td>
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### GEOGRAPHY

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<td>561</td>
<td>Geography of Australia and New Zealand (2)</td>
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<tr>
<td>571</td>
<td>Geography of the Pacific Islands (3)</td>
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<tr>
<td>578</td>
<td>Geography of Hawaii (3)</td>
<td></td>
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<tr>
<td>580</td>
<td>Geography of the Tropics (3)</td>
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<td>665</td>
<td>Seminar in Geography of the Pacific (3)</td>
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<td>Directed Research (ar.)</td>
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### HISTORY

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<td>439</td>
<td>Australia and New Zealand (3)</td>
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<tr>
<td>571</td>
<td>Pacific Exploration and Discovery to 1779 (3)</td>
<td></td>
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<tr>
<td>572</td>
<td>Pacific Islands from 1779 (3)</td>
<td></td>
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<tr>
<td>575</td>
<td>The United States in the Pacific (3)</td>
<td></td>
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<tr>
<td>577</td>
<td>History of the Hawaiian Islands (3)</td>
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<tr>
<td>675</td>
<td>Seminar in Pacific History (3)</td>
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### MUSIC

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<tr>
<td>600</td>
<td>Seminar (in Ethnomusicology) (3)</td>
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<tr>
<td>654</td>
<td>Pacific and Asian Music in Education (2)</td>
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<td>Directed Research (ar.)</td>
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### PACIFIC ISLANDS

<table>
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### POLITICAL SCIENCE

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<th>Code</th>
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<td>422</td>
<td>Government of Hawaii (3)</td>
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### SOCIOLOGY

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<th>Code</th>
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<tr>
<td>450</td>
<td>Race and Culture Contacts in Hawaii (3)</td>
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<tr>
<td>452</td>
<td>Race Relations in the Pacific (3)</td>
<td></td>
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</table>

*Note: The asterisk indicates required courses.*
Philosophy

GRADUATE FACULTY
W. E. Nagley, Ph.D. (Chairman)—history of Western religious philosophy, existential philosophy
C. Y. Cheng, Ph.D.—Chinese philosophy, philosophy of language
A. J. Gimigliano, Ph.D.—social and political philosophy, dialectical and historical materialism
R. P. Haynes, Ph.D.—history and theory of Greek philosophy, ethics
K. K. Inada, Ph.D.—history and theory of Buddhist philosophy, Asian thought
H. E. McCarthy, Ph.D.—history and theory, metaphysics, philosophy of art
C. A. Moore, Ph.D.—Oriental and East-West philosophy
M. D. Resnick, Ph.D.—symbolic logic, foundations of mathematics
S. K. Saksena, Ph.D.—history and theory of Indian philosophy, comparative: Indian and Western

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

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

Full details of all programs are available in a special brochure.

**Western Philosophy**

<table>
<thead>
<tr>
<th>Course</th>
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<td>432</td>
<td>Symbolic Logic (3)</td>
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<td>433</td>
<td>Philosophy of Mathematics (3)</td>
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<td>434</td>
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<td>435</td>
<td>British Empiricism (3)</td>
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<td>436</td>
<td>Continental Rationalism (3)</td>
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<td>440</td>
<td>Political Philosophy (3)</td>
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<td>Philosophy in Literature (3)</td>
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<td>Seminar in Problems of Philosophy (3)</td>
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<td>Seminar in Greek Philosophy (3)</td>
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**Eastern**

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<td>450</td>
<td>Introduction to Indian Philosophy (3)</td>
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<td>451</td>
<td>Contemporary Indian Philosophy (3)</td>
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<td>Indian Social Philosophy (3)</td>
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<td>Indian Logic (3)</td>
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<td>460</td>
<td>Introduction to Buddhist Philosophy (3)</td>
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<td>Theravada Buddhist Philosophy (3)</td>
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<td>Mahayana Buddhist Philosophy (3)</td>
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<td>Zen Buddhist Philosophy (3)</td>
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<td>470</td>
<td>Introduction to Chinese Philosophy (3)</td>
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<td>471</td>
<td>Confucianism (3)</td>
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<td>650</td>
<td>Seminar in Indian Philosophy (3)</td>
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<td>Seminar in Buddhist Philosophy (3)</td>
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<td>Seminar in Chinese Philosophy (3)</td>
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**Comparative**

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<td>Philosophy, East and West (3)</td>
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<tr>
<td>690</td>
<td>Seminar in Comparative Philosophy (3)</td>
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</table>

*699 Directed Research (Greek, Modern Classical, Contemporary Western, Indian, Buddhist, Chinese, and Comparative) (ar.)

*800 Thesis Research (ar.)

**Physics**

GRADUATE FACULTY

J. R. Holmes, Ph.D. (Chairman)—optics, spectroscopy
R. J. Cence, Ph.D.—high-energy physics
J. C. Kudar, Ph.D.—theoretical physics
H. C. McAllister, Ph.D.—optics, spectroscopy
I. Miyake, M.S.—acoustics, electronics
V. Z. Peterson, Ph.D.—nuclear physics
W. Pong, Ph.D.—solid state physics
W. R. Steiger, Ph.D.—optics, atmospheric and solar physics
V. J. Stenger, Ph.D.—high-energy physics
K. Watanabe, Ph.D.—spectroscopy

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

Courses available for graduate credit are listed below. Required courses are marked with an asterisk. Additional courses may be selected, with approval, in Mathematics, Chemistry, Meteorology, Engineering, and Philosophy.

**PHYSICS**

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<td>Physical Electronics</td>
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<td>Analytical Mechanics I</td>
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<td>611</td>
<td>Analytical Mechanics II</td>
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<td>620</td>
<td>Physics of the Upper Atmosphere</td>
<td>3</td>
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<td>630</td>
<td>Statistical Mechanics</td>
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<td>*650</td>
<td>Electrodynamics I</td>
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<tr>
<td>651</td>
<td>Electrodynamics II</td>
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<td>*670</td>
<td>Quantum Mechanics I</td>
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<td>678</td>
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<td>685</td>
<td>Solid State Theory</td>
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<td>*690</td>
<td>Seminar</td>
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<td>699</td>
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<td>*800</td>
<td>Thesis Research (ar.)</td>
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**Plant Pathology**

**GRADUATE FACULTY**

R. B. Hine, Ph.D. (Chairman)—soil-borne fungal diseases
M. Aragaki, Ph.D.—fungus physiology, sporulation, bacterial diseases
S. Goto, Ph.D.—epidemiology, diseases of ornamentals
O. V. Holtzmann, Ph.D.—parasitic nematodes, diseases of fruits and nuts
M. Ishii, Ph.D.—virology, diseases of vegetable crops
R. D. Raabe, Ph.D.—ornamental diseases
E. E. Trujillo, Ph.D.—banana diseases, soil-borne fungal diseases
AFFILIATE FACULTY

E. J. Anderson, Ph.D.—soil-borne fungal and nematode diseases
W. J. Apt, Ph.D.—nematology, pineapple diseases
H. W. Klemmer, Ph.D.—soil microbiology
H. Koike, Ph.D.—sugar cane diseases, soil microbiology
C. A. Wismer, Ph.D.—diseases of sugar cane

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

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

Courses available for graduate credit are listed below. In addition, selected courses from Agronomy, Biochemistry, Botany, Chemistry, Entomology, Genetics, Horticulture, Microbiology, Soil Science, Zoology, and related disciplines may be approved to fit the needs of individual candidates. Courses marked with an asterisk are required of all thesis program candidates.

PLANT PATHOLOGY

610 Principles of Plant Disease Control (3)
620 Plant Pathology Techniques (3)
625 Advanced Plant Pathology (2)
*660 Plant Pathology Seminar (1)
699 Directed Research (ar.)
*800 Thesis Research (ar.)

Political Science

GRADUATE FACULTY

A. F. Saunders, Ph.D. (Chairman)—political theory, American government
R. S. Cahill, Ph.D.—politics, American government
H. J. Friedman, Ph.D.—public administration, comparative
R. H. Kosaki, Ph.D.—political theory, politics (on leave 1964–65)
W. Levi, Ph.D.—international relations, comparative
N. Meller, Ph.D.—public administration, public law
R. M. Miwa, Ph.D.—political theory, international relations (on leave 1964–65)
Intended candidates for the M.A. or Ph.D. must present a minimum of 15 hours of undergraduate credit in political science, or the equivalent. Evaluation of a student’s performance on his work for the master’s degree, which usually is prerequisite, will be used in considering applicants for doctoral candidacy.

Candidates for the master's degree are required to pass a written comprehensive examination in two of the subfields (theory, American government, comparative government, international relations, politics, public administration, public law). The doctoral candidate is required to pass four written comprehensive examinations: one in theory; one or two of the others must be international relations or comparative government (including American); one or two must be politics, public administration, or public law. After completing the written examinations, the doctoral candidate must pass an oral comprehensive administered by three or more members of the Graduate Faculty.

In addition to formal studies in political science, candidates are required to offer courses in related disciplines, as approved by the supervising committee.

Full details of the programs and procedures are obtainable from the Department.

**Political Theory**

404 Modern Political Ideologies (3)
405 American Political Thought (3)
*600 Contemporary Political Science (3)
602 Asian Political Thought (3)
700 Seminar: Classical Western Political Thought (3)
701 Seminar: Modern Western Political Thought (3)

**American Government**

420 State Government and Administration (3)
421 Municipal Government and Administration (3)
422 Government of Hawaii (3)
720 Seminar: American National Government (3)
721 Seminar: State and Local Government (3)

**Comparative Government**

443 Government and Politics of China and Japan (3)
444 Government and Politics of South and Southeast Asia (3)
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<td>Government and Politics of the USSR (3)</td>
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<td>640</td>
<td>Politics of National Development (3)</td>
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<td>740</td>
<td>Seminar: Far Eastern Politics (3)</td>
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<tr>
<td>741</td>
<td>Seminar: South and Southeast Asia (3)</td>
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<td>742</td>
<td>Seminar: Comparative Politics (3)</td>
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<td>461</td>
<td>American Foreign Policy (3)</td>
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<td>462</td>
<td>International Relations of the Far East (3)</td>
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<td>463</td>
<td>International Relations of South and Southeast Asia (3)</td>
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<td>466</td>
<td>Soviet Foreign Policy (3)</td>
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<td>467</td>
<td>Problems of European Organization (3)</td>
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<td>469</td>
<td>Problems in International Relations (3)</td>
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<td>631</td>
<td>American Foreign Service (3)</td>
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<td>632</td>
<td>Government Agencies Overseas (3)</td>
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<td>760</td>
<td>Seminar: International Politics (3)</td>
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<td>761</td>
<td>Seminar: International Organization (3)</td>
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<td>481</td>
<td>American Political Parties (3)</td>
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<td>483</td>
<td>Propaganda and Public Opinion (3)</td>
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<td>680</td>
<td>Political Behavior (2)</td>
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<td>Public Policy Development (3)</td>
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<td>Seminar: Politics (3)</td>
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<td>Seminar: Legislative Process (3)</td>
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<td>Principles of Management (3)</td>
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<td>502</td>
<td>Personnel Administration (3)</td>
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<td>651</td>
<td>Development Administration (3)</td>
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<td>Regional and City Planning (3)</td>
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<td>Thesis Research (ar.)</td>
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Special Program in Public Administration

A special program leading to the master's degree in Political Science in the field of public administration is available under plan B. A written examination in the several subfields of public administration must be passed in the semester prior to completion of the program.

No fixed curriculum is prescribed for students working for this degree. The seven courses in public administration listed below are basic to the program and all students are required to offer them or their equivalent. However, any of these courses completed as an undergraduate need not be repeated and may not comprise a portion of the 36-hour requirement for the degree. Basic courses in Public Administration are listed below:

GOVERNMENT

500 Public Administration (3)
501 Principles of Management (3)
502 Personnel Administration (3)
651 Seminar in Comparative Public Administration (3)
673 Administrative Law (3)
750 Seminar: Public Administration (3)
751 Seminar: Comparative Public Administration (3)

Additional courses for the program shall be selected in consultation with the Program Committee. The department will furnish candidates in this program with additional information, including a list of recommended courses in other subfields and disciplines.

Poultry Science

GRADUATE FACULTY

R. B. Herrick, Ph.D. (Chairman)—physiology
A. L. Palafox, M.S.—nutrition
M. M. Rosenberg, Ph.D.—poultry genetics
E. Ross, Ph.D.—nutrition

Intended candidates for the M.S. must present 18 semester hours of undergraduate credit in Poultry Science and related fields. The related subject matter fields are animal science, chemistry, bacteriology, and zoology. Courses are to be selected from those listed below and others in the Fields of Study of Agricultural Economics, Animal Science, Biochemistry, Chemistry, Entomology, Genetics, Microbiology, Nutrition, and Zoology.

Candidates may specialize in the areas of poultry management, nutrition or physiology.

POULTRY SCIENCE

601 Poultry Science Seminar (1)
699 Directed Research (ar.)
800 Thesis Research (ar.)
Graduate Faculty

W. F. Oakes, Ph.D. (Chairman) — learning, verbal behavior
A. Arkoff, Ph.D. — clinical
H. M. Bitner, Ph.D. — student counseling
D. H. Crowell, Ph.D. — infant responsiveness; exceptional children
A. L. Diamond, Ph.D. — psychophysics
J. M. Digman, Ph.D. — measurement; child personality
A. A. Dole, Ph.D. — individual differences; prediction
C. J. Herrick, Ph.D. — student counseling; history of psychology
C. A. Insko, Ph.D. — attitude change; communication
R. C. Johnson, Ph.D. — adolescence; cognitive process
J. Michel, Ph.D. — counseling
H. B. Weaver, Ph.D. — applied; tourist industry
W. R. Wilson, Ph.D. — small groups, communication

Affiliate Faculty

A. Connor, M.D. — infant behavior and growth
H. Gudeman, Ph.D. — clinical

Intended candidates for the M.A. or Ph.D. must present 18 hours of undergraduate credit in psychology, including general and experimental psychology and statistics. Related course requirements are mathematics, extending at least through intermediate algebra, and introductory zoology. No more than 6 credits in courses numbered in the 400-500 series may be counted toward the advanced degree. A maximum of 6 hours may be elected from closely related courses in anthropology, philosophy, physics, sociology and zoology. Additional elective courses will be dependent upon the candidate’s background.

The M.A. degree is offered in all traditional fields with special facilities available for social, developmental, industrial, counseling, and psychophysics. Candidates for the M.A. in counseling are expected to meet the standards set by the American Psychological Association including 48 semester credits. A special program in vocational rehabilitation counselling is available.

At least one from each of the following pairs of courses is required: 614–615; 620–621; and 630–631.

The Ph.D. is offered with specialization in the following fields: general-experimental, social personality, developmental and counseling psychology. Intended candidates for the doctorate may, under special circumstances, offer 24 course credits in lieu of the M.A. Additional details of programs are presented in a brochure available from the department.

Psychology

History of Psychology (3)
Intermediate Experimental Psychology (3)
Physiological Psychology (3)
Social Development of Children (3)
Abnormal Psychology (3)
Comparative Psychology (3)
Problems in Industrial and Business Psychology (3)
Seminar: Problems in Psychology (3)
Theory I (3)
Theory II (3)
Quantitative Methods I (3)
Quantitative Methods II (3)
Quantitative Methods III (3)
Experimental Psychology I (3)
Experimental Psychology II (3)
Developmental Psychology I
Developmental Psychology II (3)
Personality (3)
Social Psychology (3)
Applied Social Psychology (3)
Advanced Educational Psychology (3)
Psychology of Occupations (3)
Psychology of Vocational Rehabilitation (3)
Psychological Appraisal A (3)
Psychological Appraisal B (3)
Psychological Appraisal C (3)
Directed Research (ar.)
Directed Research (Experimental) (ar.)
Directed Research (Developmental) (ar.)
Directed Research (Social-Personality) (ar.)
Directed Research (Counseling) (ar.)
Psychological Counseling A (3)
Psychological Counseling B (3)
Psychological Counseling C (3)
Thesis Research (ar.)

Public Health

GRADUATE FACULTY

R. K. C. Lee, M.D., Dr. P.H. (Chairman)—public health administration
N. C. Burbank, Jr., Sc.D.—environmental health
V. Drenckhahn, M.S., M.P.H.—health education
E. D. Lovett, M.D.—school health programs
B. J. McMorrow, M.S.—sanitary engineering
G. Schnack, M.D.—mental health
F. Shepard, M.D.—medical disability
G. Tokuyama, M.P.H.—biostatistics
R. Worth, M.D., Ph.D.—epidemiology
AFFILIATE GRADUATE FACULTY

L. Bernstein, M.D., M.P.H.—public health administration
J. Paty, M.P.H.—health education
L. Rosen, M.D., Dr. P.H.—epidemiology

Intended candidates for the M.S. in Public Health will follow plan B. Six courses (marked with an asterisk) which present the basic concepts of public health and two seminars are required of all candidates.

Ordinarily, a minimum of two full academic years will be needed to complete the program. Students who have had little or no practical experience in public health must spend one summer session in laboratory or field work, or in some other form of on-the-job training.

Courses are to be selected from those listed below, and, with approval, the related fields of Microbiology, Education, Engineering, Nursing, Psychology, Sociology, Biology, Genetics, and Anthropology.

PUBLIC HEALTH

*610 Infectious Diseases of Man in the Pacific Area (3)
*625 Biostatistics (3)
626 Vital Statistics (3)
630 Public Health Nutrition (2)
636–637 Environmental Health (2–2)
640 Public Health Education (2)
*651 Principles of Epidemiology
660–661 Community Mental Health (2–2)
670 Medical Aspects of Disability (3)
*675 Effect of the Environment on Personal Health (3)
690 Seminar on Community Health Problems (1)
691 Seminar on International Health (1)
692 Seminar on School Health Services (1)
699 Directed Research (ar.)
*710 Advanced Public Health Practice

Secondary Education

GRADUATE FACULTY

A. W. S. In, Ph.D. (Chairman)—secondary education, administration, supervision, curriculum
R. S. Alm, Ph.D.—language arts and reading
C. H. Ewing, Ph.D.—trade and industrial education
R. M. Martin, Ph.D.—secondary education, administration, supervision, curriculum
G. Meyer, Ph.D.—secondary education, curriculum
T. Nelson, Ed.D.—secondary education, administration, supervision, curriculum
Intended candidates for the M.Ed. must present a minimum of 18 semester hours in professional education courses and, in addition, credit for supervised student teaching or teaching experience.

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

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

Plan A: The program usually includes a maximum of 10 semester credits in approved courses other than in fields of Education, which are related to the candidate's goals. At least one graduate seminar is required. Required courses are SE 636, 640, 708 and one of 650, 660, or 663.

Plan B: The program is a planned and approved sequence of courses and includes a minimum of 12 credits in Fields of Study other than Secondary Education. The program thus enables teachers to strengthen their teaching field majors. At least one graduate seminar is required. Required courses are SE 636, 640, 733 and one of 650, 660, or 663.

SECONDARY EDUCATION

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<td>Curriculum Development, Industrial Education</td>
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<td>631</td>
<td>Modern Language Arts Program</td>
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<tr>
<td>634</td>
<td>Extraclass Activities in Secondary Schools</td>
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<td>635</td>
<td>Junior High School Curriculum</td>
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<td>Art in Secondary Education</td>
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<td>640</td>
<td>Seminar in Special Methods</td>
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<td>672</td>
<td>Teaching Aids on Asia</td>
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<td>699</td>
<td>Directed Research</td>
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<td>733</td>
<td>Seminar in Curriculum</td>
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<td>737</td>
<td>Foundations in Art Education</td>
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<tr>
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**Social Work**

**GRADUATE FACULTY**

K. N. Handley, M.S.W. (Director)—social services
E. H. Cochran, M.A.—medical social work
H. A. Jambor, M.A.—social services, community organization administration
K. Kumabe, M.S.W.—casework, cultural factors
F. C. Merritt, M.S.W.—casework (on leave 1964–65)
R. Takasaki, M.P.A.—administration
W. A. Walsh, M.A.—casework, human growth and behavior
A. B. Zaloha, M.A.—group work
The School of Social Work offers an accredited two-year M.S.W. program. Inquiries for information and applications for admission should be sent to the office of the School of Social Work. The School publishes an annual bulletin.

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

**Social Services**

<table>
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<td>627</td>
<td>Social Services (2)</td>
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<td>Legal Aspects of Social Work (2)</td>
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<td>Social Welfare Organization and Administration (2)</td>
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<td>Seminar in Social Welfare Policy (2)</td>
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**Human Growth and Behavior**

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<tr>
<td>610-611</td>
<td>Human Growth and Behavior (3-3)</td>
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<tr>
<td>775</td>
<td>Advanced Social Psychiatry (2)</td>
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<td>790</td>
<td>Cultural Factors in Social Work Practice (2)</td>
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**Social Work Methods**

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<tr>
<td>605-606</td>
<td>Social Casework (2-2), or</td>
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<tr>
<td>608-609</td>
<td>Social Group Work (2-2)</td>
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<tr>
<td>612</td>
<td>Group Work Program Activities (1-1)</td>
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<td>615</td>
<td>Community Organization (2)</td>
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<tr>
<td>660-661</td>
<td>Supervised Field Work (3-3)</td>
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<td>760-761</td>
<td>Advanced Supervised Field Work (4-4)</td>
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<tr>
<td>765-766</td>
<td>Advanced Social Casework (2-2), or</td>
</tr>
<tr>
<td>770-771</td>
<td>Advanced Social Group Work (2-2)</td>
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<td>777</td>
<td>Community Development in Social Work (2)</td>
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**Research**

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<td>798-799</td>
<td>Seminar in Research (3-3)</td>
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<td>800</td>
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**Sociology**

**GRADUATE FACULTY**

C. K. Cheng, Ph.D. (Chairman)—social institutions, criminology and penology

O. Bartos, Ph.D.—theory, small groups
C. E. Glick, Ph.D.—race relations, collective behavior
B. L. Hormann, Ph.D.—modernization of peasant peoples, social disorganization
I. Krauss, Ph.D.—social stratification, urban sociology
A. W. Lind, Ph.D.—the community, emphasis on race relations
T. T. Wittermans, Ph.D.—social change in developing areas
G. Won, Ph.D.—industrial and urban problems
G. K. Yamamoto, M.A.—race and ethnic relations
D. S. Yamamura, Ph.D.—methods and statistics, demography and ecology

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

Courses available for graduate credit are listed below. A maximum of 6 hours may be selected from related courses in Anthropology, Economics, Political Science, Philosophy, or Psychology with the approval of the supervising committee.

**Sociology**

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<tr>
<th>Course No.</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>410</td>
<td>Population and Society (3)</td>
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<tr>
<td>418</td>
<td>Human Migration (3)</td>
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<td>420</td>
<td>Human Ecology (3)</td>
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<tr>
<td>434</td>
<td>American Rural Community (3)</td>
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<td>436</td>
<td>The Urban Community (3)</td>
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<td>440</td>
<td>Folk and Peasant Society (3)</td>
</tr>
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<td>444</td>
<td>People and Institutions of China (3)</td>
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<td>446</td>
<td>People and Institutions of Japan (3)</td>
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<td>450</td>
<td>Race and Culture Contacts in Hawaii (3)</td>
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<td>452</td>
<td>Race Relations in the Pacific (3)</td>
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<td>458</td>
<td>Race Relations (3)</td>
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<td>462</td>
<td>American Society (3)</td>
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<td>464</td>
<td>Social Institutions (3)</td>
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<td>472</td>
<td>The Family (3)</td>
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<td>480</td>
<td>Sociology of Religion (3)</td>
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<td>486</td>
<td>Industrial Sociology (3)</td>
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<td>490</td>
<td>Social Stratification (3)</td>
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<td>500</td>
<td>Social Disorganization (3)</td>
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<td>Juvenile Delinquency (3)</td>
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<td>506</td>
<td>Criminology (3)</td>
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<td>Social Control (3)</td>
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<td>Personality and Culture (3)</td>
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<td>Sociology of Small Groups (3)</td>
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<td>540</td>
<td>Collective Behavior (3)</td>
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<td>Social Movements (3)</td>
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544 Social Change (3)
546 Public Opinion and the Community (3)
560 Methods of Social Research (3)
570 Social Statistics (3)
572 Advanced Social Statistics (3)
580 Sociological Theory (3)
602 Graduate Seminar (3)
  (1) Human Ecology and Demography
  (2) Social Organization
  (3) Social Disorganization
  (4) The Group and the Person
  (5) Collective Behavior and Social Change
628 Seminar in Race Relations (3)
652 Seminar in Social Change in Developing Areas (3)
654 Seminar in Community Development (3)
656 Seminar in Culture and Communication (3)
660 Seminar in Methods of Research (3)
680 Seminar in Sociological Theory (3)
699 Directed Research (ar.)
800 Thesis Research (ar.)

Soil Science

GRADUATE FACULTY
L. D. Swindale, Ph.D. (Chairman)—soil genesis and classification, weathering, mineralogy, physical chemistry
P. C. Ekern, Ph.D.—soil physics
R. L. Fox, Ph.D.—soil fertility and chemistry
Y. Kanehiro, M.S.—soil chemistry, fertility
D. G. Moore, Ph.D.—soil chemistry, biotics, soil-plant relationships
L. A. Nelson, Ph.D.—soil classification
G. D. Sherman, Ph.D.—soil genesis and weathering, classification, chemistry, fertility (on leave 1964–65)
G. Uehara, Ph.D.—soil physics, mineralogy, physical chemistry, genesis
O. R. Younge, Ph.D.—soil management, fertility

AFFILIATE FACULTY
A. S. Ayres, Ph.D.—soil chemistry
L. D. Baver, Ph.D.—soil physics
D. H. Smith, Ph.D.—soil fertility and chemistry
G. Stanford, Ph.D.—soil fertility and chemistry

Intended candidates for the M.S. or Ph.D. in Soil Science must have completed a minimum of 18 hours of undergraduate credit in soil science and related subject matter fields and two years of college chemistry. The related subject matter fields are microbiology, chemistry, geography, geol-
ogy, mineralogy, physics, botany, plant physiology, agronomy, and agricultural engineering (irrigation).

Ph.D. candidates may be required to spend a year (24 semester hours) of course work on the graduate level in a mainland institution with a strong department of soil science.

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

SOIL SCIENCE

484 Soil Physics (3)
485 Soil Biotics (3)
*685 Soil Genesis and Formation (3)
686 Advanced Soil Classification (3)
*687 Soil Science Seminar (1)
   (a) Soil Chemistry
   (b) Soil Physics
   (c) Soil Genesis, Formation and Classification
   (d) Soil Fertility
688 Soil and Clay Mineralogy (3)
689 Advanced Soil Fertility (4)
690 Advanced Soil Chemistry (ar.)
699 Directed Research M.S. (ar.)
799 Directed Research Ph.D. (ar.)
800 Thesis Research (ar.)

Speech

E. B. Carr, Ph.D. (Chairman)—phonetics, phonemics, research methods, oral English for foreign students
M. Ansberry, Ph.D.—speech pathology, audiology
S. Batkin, M.D.—audiology
L. F. Bentley, M.A.—voice, drama
E. J. Bilsborrow, Ph.D.—public speaking, speech education, semantics
L. N. Breneman, M.A.—interpretation, speech improvement, speech education
M. J. Gordon, M.A.—speech improvement, speech education
J. P. Highlander, Ph.D.—radio-television speech, research methods
J. P. Hoshor, Ph.D.—leadership and discussion, semantics
D. W. Klopf, Ph.D.—forensics, debate
V. G. Larson, M.A.—speech education, speech improvement, choral speaking
O. S. Lefforge, Ph.D.—rhetoric, public address
J. R. L. Linn, M.A.—interpretation, speech improvement
Intended candidates for the M.A. degree must present a minimum of 27 semester hours of undergraduate credit in speech (including several required courses), selected from the following areas: public address, forensics, discussion and semantics; interpretation of literature; radio-television speaking; speech science; speech pathology and audiology; phonetics and oral English for the foreign student.

Courses available for graduate credit are listed below. Required courses are indicated by an asterisk. In addition, candidates may be required to demonstrate a satisfactory level of speech skill in a platform appearance before a faculty committee.

**SPEECH**

421 Organic Disorders of Speech (3)
424 Auditory Training and Speech Reading (3)
430 Advanced Interpretative Reading (3)
440 Semantics (3)
470 Broadcasting and the Public (3)
475 Television Program Planning and Production (3)
480 Group Leadership and Discussion (3)
485 Argumentation and Debate (3)
550 Speech Composition (3)
598 Special Problems (ar.)
610 Seminar in Phonetics and Speech Science (3)
615 Phonetics and Phonemics of American English (3)
616 Special Problems in Phonetics and Phonemics of American English (3)
621 Language Development for Children with Hearing Deficiencies (3)
622 Advanced Audiology (3)
623 Advanced Practicum in Speech Pathology (3)
624 Advanced Practicum in Audiology (3)
625 Seminar in Speech Pathology (3)
626 Seminar in Audiology (3)
630 Seminar in Interpretation (3)
650 Seminar in Rhetoric and Public Address (3)
651 History and Criticism of British Oratory (3)
652 History and Criticism of American Oratory (3)
Teaching of English as a Second Language

Graduate Faculty

H. P. McKaughan, Ph.D. (Chairman)—Malayo-Polynesian and New Guinea languages and linguistics
F. M. Cammack, Ph.D.—Malayo-Polynesian languages and linguistics
E. B. Carr, Ph.D.—phonetics and phonemics; research methods
R. H. Crymes, M.A.—English grammar; methods of teaching English as a second language
S. H. Elbert, Ph.D.—Malayo-Polynesian languages and linguistics
A. J. Schutz, Ph.D.—South Pacific languages and linguistics
Y. Shen, Ph.D.—English and Asian languages and linguistics
T. L. Summersgill, Ph.D.—Elizabethan literature; Chaucer
S. M. Tsuzaki, Ph.D.—Romance languages and linguistics

The Master of Arts in the Teaching of English as a Second Language is an interdepartmental graduate program contributed to by the departments of American Studies, English, Linguistics, and Speech. This program is available to both foreign and native graduate students, and is a 36-semester hour, nonthesis program with major emphasis on linguistics and linguistic methods of teaching English. Competence in understanding, speaking, reading, and writing English is prerequisite, and for foreign students must be certified by English language experts in the student’s own country at the time of application for admission. Native students are required to pursue competence in the language and culture of their chosen area of teaching English as a second language. The MATELS curriculum for foreign students follows. Native students may be exempted from courses marked with an asterisk which will be replaced by language and culture courses of their chosen area.

American Studies

*690 Introduction to Contemporary America (3)

English

425 Modern English Grammar (3)
*601 Teaching of English Composition (3)
*602 Teaching of English Literature (3)
622 Teaching English as a Second Language (3)
625 History of the English Language (3)
723 Textbook and Test Construction (3)
LINGUISTICS
620 Introduction to Linguistic Analysis (3)
621 Phonemics (3)
622 Linguistic Morphology (3)

SPEECH
615 Phonetics and Phonemics of American English (3)
616 Special Problems in Phonetics and Phonemics (3)

Zoology

GRADUATE FACULTY
A. L. Tester, Ph.D. (Chairman)—fishery biology, biometry, behavior
J. E. Alicata, Ph.D.—parasitology
A. H. Banner, Ph.D.—invertebrate zoology, systematics
V. E. Brock, M.A.—fishery biology, oceanography
G. W. Chu, Ph.D.—parasitology
H. W. Frings, Ph.D.—sensory physiology, behavior
W. A. Gosline, Ph.D.—ichthyology, zoogeography and evolution
P. Helfrich, Ph.D.—ichthyology, ecology
R. W. Hiatt, Ph.D.—ecology, marine biology
S. C. Hsiao, Ph.D.—experimental embryology, comparative anatomy
F. I. Kamemoto, Ph.D.—physiology, endocrinology
E. A. Kay, Ph.D.—malacology
D. C. Matthews, Ph.D.—invertebrate zoology, protozoology
B. S. Muir, Ph.D.—fishery biology, population dynamics
E. S. Reese, Ph.D.—behavior, ecology, invertebrate zoology
T. A. Rogers, Ph.D.—vertebrate physiology
S. J. Townsley, Ph.D.—invertebrate zoology, ecology, radiobiology
P. B. van Weel, Ph.D.—physiology, physiological ecology

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

Intended candidates for the M.S. or Ph.D. in Zoology (marine aspects in the latter case) must present a minimum of 18 hours of undergraduate preparation in zoology, including courses in vertebrate zoology (including comparative anatomy), embryology, and physiology. M.S. candidates should have completed two years of chemistry (inorganic and organic), and courses in college algebra and botany. In addition, Ph.D. candidates should have completed one year of physics. Deficiencies in undergraduate preparation must be made up.

Courses available for graduate credit are listed below. One seminar each year is required. Other required courses are marked with an asterisk
(602 is not required for the M.S. under plan B). For the M.S. under plan A a maximum of 6 hours, and under plan B a minimum of 6 hours may be elected from related courses in Botany, Chemistry, Entomology, Genetics, Mathematics, Meteorology, Oceanography, and Physics. Under plan B a minimum of 2 credits of directed research is required. For the Ph.D., additional work will be stipulated by the supervising committee.

### Zoology

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<td>410</td>
<td>Parasitology (3)</td>
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<td>416</td>
<td>Histology (3)</td>
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<td>425</td>
<td>Microtechnique (3)</td>
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<td>431</td>
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<td>432</td>
<td>Advanced Biometry (3)</td>
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<td>441</td>
<td>History of Zoology (2)</td>
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<td>504</td>
<td>Animal Evolution (2)</td>
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<td>505</td>
<td>Endocrinology (2)</td>
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<td>525-526</td>
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<td>Physiological Bases of Animal Behavior (3)</td>
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<td>611</td>
<td>Principles of Systematic Zoology (3)</td>
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<td>615-616</td>
<td>Advanced Invertebrate Zoology (3-3)</td>
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<td>620</td>
<td>Marine Ecology (3)</td>
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<td>621</td>
<td>Physiological Ecology (3)</td>
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<td>622</td>
<td>Isotopic Tracers in Biology (3)</td>
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<td>Methods of Fishery Investigation (3)</td>
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<td>Population Dynamics (3)</td>
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<td>645</td>
<td>Advanced General Physiology (3)</td>
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<td>692</td>
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**Other Faculty**

**Graduate Faculty at Large**

- J. S. Holton, Ph.D.—Spanish
- F. K. Nunn, M.S.—Land Study Bureau
- K. J. Orr, M.S.—Cooperative Extension Service
- R. Pavlantos, Ph.D.—Classics
- W. Stuiver, Ph.D.—Mechanical Engineering
- E. Wiswell, B.A.—Russian