

Department of Oceanography

**GRADUATE STUDENT
HANDBOOK**

2009 – 2010

University of Hawaii
School of Ocean and Earth Science and Technology

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INTRODUCTION

This handbook sets forth the basic policies, requirements and procedures for graduate students pursuing degrees in oceanography. You should read this very carefully so that you are clear about your responsibilities as a student and the responsibilities of the program to you. If you have any questions about any of the information presented herein, please ask the Department Chair or the Student Services Specialist. The earlier you clarify any matter of concern to you, the less likely it will create any problems for you later. We wish you great success in pursuing your educational goals and hope that this handbook provides you with a useful tool in meeting those goals.

PROGRAM OVERVIEW

The Department of Oceanography is located on the University's largest campus (about 20,000 students), overlooking Waikiki and downtown Honolulu, the State Capitol and business and cultural center. As a designated "area of excellence", the marine and earth sciences enjoy strong support at the State and University levels. This has led to rapid expansion of faculty, facilities, and programs over the past several years, and the establishment of the School of Ocean and Earth Science and Technology (SOEST) in 1988. SOEST integrates the Departments of Oceanography, Geology and Geophysics, Meteorology, and Ocean and Resource Engineering, the Hawaii Institute of Geophysics and Planetology, the Hawaii Institute of Marine Biology, the Hawaii Natural Energy Institute, the Sea Grant and Space Grant College Programs, the Hawaii Undersea Research Laboratory, and the Joint Institute of Marine and Atmospheric Research. With a combined faculty and staff of almost 700, SOEST is a leading institution of multidisciplinary research and education on the ocean, earth, and atmosphere.

Including Cooperating and Affiliate members, approximately 50 Graduate Faculty teach and/or advise graduate students in the Oceanography field of study. The collective research expertise and programs of the faculty provide a diversity of potential projects and employment opportunities for students. Departmental Faculty are organized into three Divisions which coordinate educational and research programs for sub-disciplines, maintain shared equipment, and provide secretarial and other services (e.g., student access to computers and workstations) through division offices. Na Kama Kai is the Oceanography Department graduate student organization that serves both an academic and social function and formally represents the interests of students to the faculty.

FACILITIES

SOEST operates three ocean-going research vessels, the R/Vs Kilo Moana, the Ka'imikai-o-Kanaloa and Klaus Wyrski from its marine operations center in Honolulu Harbor. Smaller nearshore vessels are operated by the Hawaii Institute of Geophysics and Planetology and the Hawaii Institute of Marine Biology. Two three-person research submersibles, the Pisces IV and V (2,000 m), and a remotely operated vehicle (ROV) are operated under the aegis of HURL (Hawaii Undersea Research Laboratory). The School maintains machine, electronics, and engineering shops, a library, and graphics, publication, photography, and other support facilities.

SOEST has its own 10/100/1000 Mbps network with a gigabit connection to the University of Hawaii campus network. Solaris, Linux, Windows and Mac operating systems are supported on this network. The three buildings of SOEST, Hawaii Institute of Geophysics (HIG), Marine Science Building (MSB), Pacific Ocean Science and Technology (POST), are interconnected with gigabit fibers. Departments maintain classroom/lab facilities for student access. Graphic peripherals include BW & color laser printers and high quality color printers and plotters. MHPCC, Maui High Performance Computing Center, is managed by the University of Hawaii.

Precision instruments include stable isotope and isotope-ratio-monitoring mass spectrometers; a dual-laser analytical flow cytometer; CHN analyzers; gas and high-pressure liquid chromatographs; SEM and STEM electron microscopes with an energy dispersive X-ray fluorescence micro-elemental analyzer; an electron microprobe; a plasma/atomic emission spectrometer; atomic absorption system with graphite atomizer; liquid scintillation counters, spectrometers, and nutrient autoanalyzers.

RESEARCH DIVISIONS

Biological Oceanography

The Division of Biological Oceanography offers a broad range of exciting research opportunities in diverse marine habitats and ecosystems around the globe, from tropical to polar oceans and from the air-sea interface to the deep-ocean floor. Upper water-column programs include studies of primary productivity and bio-optics, color satellite imagery, plant pigments as tracers of biogeochemical processes, microbial food-web interactions, phytoplankton and zooplankton community structure, and the roles of biota in vertical transport and remineralization of particulate and dissolved organic matter. Mid-water column studies focus on the community ecology and dynamics of meso-pelagic shrimp, squid and small fishes unique to oceanic island systems. Benthic research programs involve coral reef ecology and evolution, effects of environmental disturbances on deep-sea community dynamics and recruitment, chemical cycling, burial, and bioturbation in the sediments, and the microbial ecology of tube-building animals and hydrothermal vent systems. Both water-column and benthic investigators are actively involved in high-profile Global Change programs in the Pacific - including coastal margin, open ocean, and equatorial upwelling studies.

Divisional programs emphasize basic research, but many are relevant to applied problems and societal concerns such as the fate of "green-house" gases, ecological impacts of ozone depletion and deep-sea mining, mechanisms of pollutant transport and cycling, and fisheries recruitment. The interdisciplinary nature of these and other problems fosters strong collaborative interactions between Division biologists and geochemists and physicists in the Department and at other institutions.

Marine Geology and Geochemistry

The members of the Marine Geology and Geochemistry Division have research programs ranging from field studies of deep-sea processes to theoretical analyses of elemental distributions in the universe. A major theme underlying much of the research concerns past and postulated future changes in the global environment, and the effects of these changes on the planet Earth as an integrated geophysical system. Much of the research addresses processes at the boundaries of the major plates which comprise the Earth's crust; these studies include analysis of trace metal

distributions, mineral formation and diagenesis, circulation and reaction of hydrothermal fluids, and geomicrobiology. Open ocean studies include research on the use of geochemical tracers of oceanic circulation and chemical reactions in the sea, the formation of ferromanganese deposits on the sea floor, and isotopic and organic geochemistry. Nearshore research programs involve biogeochemical cycling, especially in coral reefs and estuaries, and human effects on this cycling. Atmospheric studies include the analysis of gas and aerosol distributions, and the effect of these materials on the Earth's radiation budget. All of these studies combine field measurements with laboratory experimentation and conceptual modeling.

Physical Oceanography

The faculty and staff of the Physical Oceanography Division are dedicated to providing superior graduate education and are involved in leading edge research in physical oceanography and on the physical impact of the oceans on the atmosphere. The Division's graduates have gone on to successful careers in academia, government and industry.

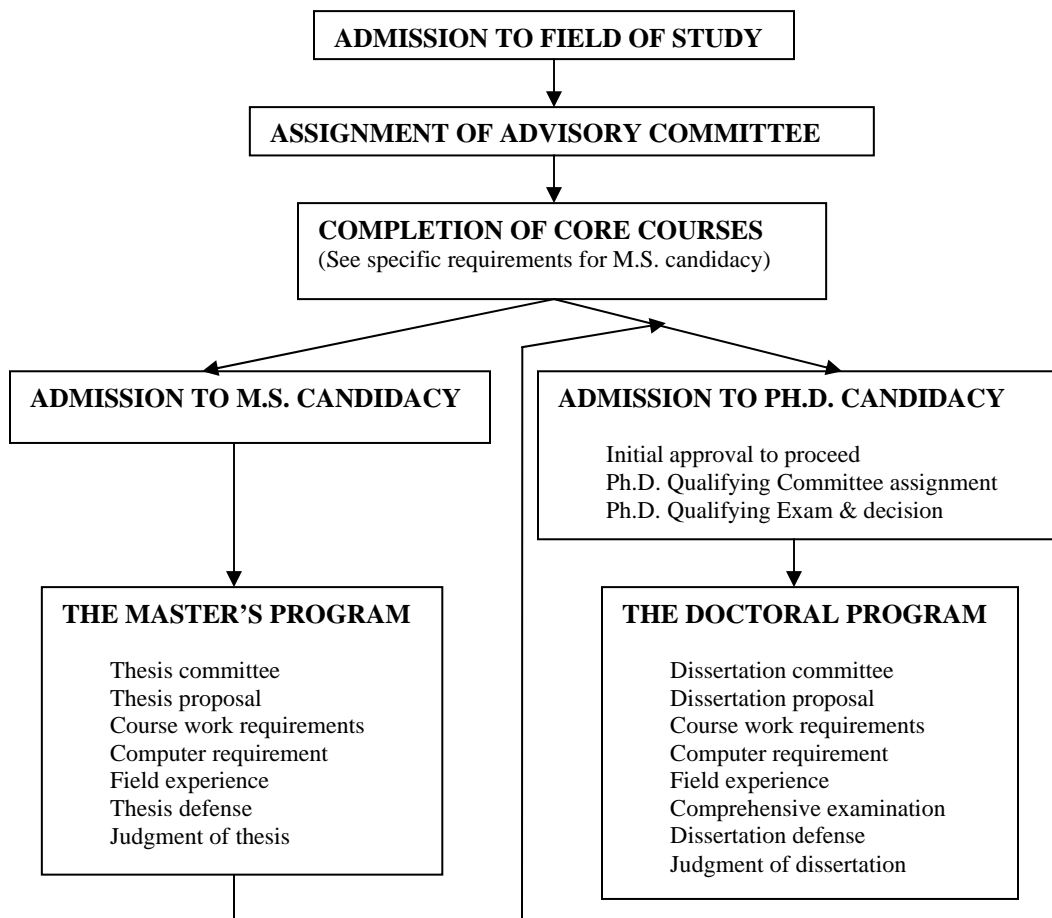
The Division's members include internationally recognized leaders in physical oceanographic research. Research activities range from small-scale internal waves to the general circulation of the oceans and its effect on climate, and from seagoing observation programs to theoretical modeling and computer simulations. The Division includes a nationally-mandated Sea Level Center (UHSLC) that maintains tide gauges and sea level archives from the Pacific, Indian and Atlantic Oceans. Division members are studying the complementary uses of tide gauge and satellite altimetry data, and their application to problems concerning ocean circulation variability. Satellite imagery is collected and archived locally by the Satellite Oceanography Laboratory (SatLab) for worldwide distribution and for studies by Division and Department faculty and students. The Division boasts the first archive in the world for shipboard Acoustic Doppler Current Profiler (ADCP) measurements of the ocean's currents; this is a joint effort with the U.S. National Oceanographic Data Center. ADCP current measurements have become derigueur on research cruises where accurate estimates of currents from the surface to the sea floor are required byproducts of standard hydrographic observations.

Research on climate variability and prediction is growing rapidly. Division researchers have been participating in the climate-oriented World Ocean Circulation Experiment (WOCE) field and analysis phases, and were instrumental in establishing the WOCE Hawaii Ocean Time-Series (HOT) program for long-term monthly monitoring of temperature, salinity, and biogeochemical variables at a site north of Oahu. Division researchers provided critical leadership and field experiments in the Coupled Ocean-Atmosphere Response Experiment (COARE) component of the Tropical Ocean-Global Atmosphere (TOGA) program. Through funding from the U.S. National Oceanic and Atmospheric Administration's (NOAA) Climate and Global Change Program, Division researchers established the Klaus Wyrtki Center for Climate Research and Prediction (WCCRP) to study the role of the Asian-Australian monsoons in the seasonal to interannual variability of climate in the Indian and Pacific Ocean sectors. Currently being established is the International Pacific Research Center (IPRC) that will focus on climate variability and prediction in eastern Asia. Funding for this center is being provided by Japan and the U.S. NASA and NOAA.

DEGREE REQUIREMENTS AND PROCEDURES IN OCEANOGRAPHY

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The University of Hawai'i at Manoa's website <<http://www.hawaii.edu/graduate/sitemap.htm>> should be consulted for general university regulations and advanced degree requirements. The present document focuses on additional requirements and procedures for the "field of study" of oceanography. Major milestones in the process are outlined in the flow diagram below; details are provided in the sections of the text corresponding to the Roman numerals and letters in this outline. Timelines for expected progress to degree are given in Table 1. **Students are responsible for meeting all field of study and University requirements and deadlines.**



As long as they are not general university rules, students have the right to request that exceptions be made to field of study rules in unusual situations or under extenuating circumstances. The procedure for such requests is a formal petition to the Oceanography Graduate Faculty. Petitions should be approved by the student's Interim Advisory Committee and submitted to the Department Chair for consideration by the Graduate Faculty. **All exceptions should be documented and a copy placed in the student's file.**

The Oceanography field of study offers master's and doctoral programs in three sub-disciplines – physical oceanography, marine geology and geochemistry, and biological oceanography. The programs are designed to prepare students for challenging careers in academia, industry, and government. Consequently, they are academically demanding, with high standards and expectations.

PROGRAM PREREQUISITES

Applicants to the department must have intensive, rigorous training in one of the basic sciences or engineering. Regardless of major, an applicant must have completed mathematical training including calculus through ordinary differential equations and vector calculus. Students lacking such training are considered to have a deficiency in mathematics and are required to take OCN/GG 312. Entering students who have had such formal training must demonstrate a working knowledge of calculus by taking a mathematics proficiency examination. Students who are judged to have a mathematical deficiency based on their performance on this examination must take OCN/GG 312. An applicant must also have a year each of physics and chemistry. The well-prepared student will have covered classical thermodynamics and will have had a semester each of biology and geology. Graduate students who are required to take UH undergraduate courses to make up for deficiencies in their undergraduate training or math proficiency must earn at least a grade of B- (2.7) in those courses.

INTERIM ADVISORY COMMITTEE

All degrees require independent research as well as basic and specialized courses. Students admitted to the Oceanography field of study will be assigned an Interim Advisory Committee by the Department Chair. The Interim Advisory Committee will initially consist of three oceanography graduate faculty members from at least two of the sub-disciplines of oceanography. When the student is being supported by a research assistantship, the faculty member supporting the student will usually be a member of the initial Interim Advisory Committee, and generally be its chair and the student's interim advisor. Otherwise, the committee will select a chairperson from among its members.

The committee must formally meet with the student as soon as possible after the student arrives, at the end of the student's first semester of residency, and subsequently at least once per semester. It is the student's responsibility to convene these important meetings. The committee will submit a written report following each meeting. These reports will be read and signed by the committee members and the student, circulated among the faculty of the student's sub-discipline, and included in the student's file.

It is a requirement that the students inform their Committee of the courses they intend to take, prior to registering for them. The size of the Interim Advisory Committee may be increased and

its composition changed with the approval of the Department Chair prior to the official formation of the student's M.S. Thesis or Ph.D. Dissertation Committees. When formed, the student's M.S. or Ph.D. Committee will assume all of the responsibilities of the former Interim Advisory Committee.

Admission of Student with Interim Advisor in Another Division

When a student applies to the graduate program in the Department, the decision may be made for the student to be in a division with an advisor outside of the division. The following steps need to be completed during the admission process for this to occur:

1. Approval by the proposed advisor
2. Approval of the student by the division (for admission into division)
3. Approval of the advisor by the division. (The appointment of a co-chair, residing in the division into which the student is applying, is encouraged.)
4. Notification of the department chair

All steps must be in writing, with a copy to the Graduate Student Services Specialist, and undertaken in the order listed above. After the approvals are received, the subsequent notification must occur within one week.

MASTER'S DEGREE PROGRAM

A minimum of 36 semester credit hours, including 24 credits of course work and 6 credits of OCN 699 (Directed Research) and 6 credits of OCN 700 (Thesis Research), demonstrated competence in computer programming, and 30 days of field experience. All requirements for the M.S. degree should usually be completed within three years of admission (Table 1).

Admission to M.S. Candidacy

Depending on the career goals of individual students, attaining the M.S. degree may either be the ultimate objective of their enrollment in the Oceanography Degree Program or part of the normal progression from undergraduate education to the Ph.D. Students who do not enter the Program with an M.S. degree in Oceanography generally earn an M.S. en route to the Ph.D., although this does not preclude pursuing the Ph.D. directly. The prerequisite for admission to M.S. candidacy is successful completion of the core course in the student's specialization and one other core course. Formal admission to M.S. candidacy occurs with the filing of **Form I**. Admission to Ph.D. candidacy is described separately, below.

Selection of Thesis Committee

Assisted by his/her Interim Advisory Committee, the student will select a thesis topic and an appropriate Thesis Committee to replace the Interim Advisory Committee. The Thesis Committee must consist of at least three members of the Graduate Faculty, one of whom may be from outside the field of study in oceanography. **At least 50% of the committee members must be Oceanography Graduate Faculty, exclusive of affiliate and cooperating faculty.** The chairperson of the Thesis Committee will be the student's official advisor. Selection of the Thesis Committee is officially recognized when **Form II** is filed.

Under special circumstances, the Department Chair has the authority to waive the above requirements. Requests for these exceptions need to be submitted at least one semester prior to forming the committee and the filing of Form II.

Approval of Thesis Proposal

The M.S. thesis topic should be a narrowly defined project which demonstrates the student's potential to bring a research idea from concept to completion. The appropriate scope of an M.S. project is approximately that of a refereed journal publication, but the end result does not have to be published to earn the M.S. degree. As part of the mentoring process and to facilitate progress toward the degree, faculty advisors are encouraged to take an early and active role in defining suitable project opportunities.

The M.S. thesis does not require a fully developed research proposal. However, the student must submit an acceptable thesis prospectus to his/her Thesis Committee within one year of admission to the Oceanography Field of Study. The prospectus is to be about three pages of text and should follow the format outlined below. Approval of the thesis topic is official when **Form II** is filed.

Outline of Research Prospectus

- A. TITLE
- B. INTRODUCTION (Problem statement, rationale)
- C. OBJECTIVES/HYPOTHESES (Concisely written list)
- D. APPROACH (Brief overview with references to established methods)
- E. EXPECTED RESULTS (What the research should achieve and its significance)
- F. RESEARCH SCHEDULE (Dates for reaching project and degree milestones)

Course Work Requirements (Credit Hours, Distribution and Grades)

Of the four core courses (OCN 620, OCN 621, OCN 622, and OCN 623), each student must successfully complete at least the three courses outside his/her sub-discipline. For students in non-biological disciplines the core sequence is completed by taking OCN 621. Students specializing in Biological Oceanography complete the core sequence by taking OCN 626, OCN 627 and OCN 628 instead of OCN 621.

Prior to completion of their graduate degree, students specializing in Biological Oceanography must have satisfactorily completed either an undergraduate or graduate course in statistics. Students specializing in Marine Geology and Geochemistry must take CHEM 351 (if they have not already successfully completed a college-level course in physical chemistry) and receive a grade of B- (2.7) or better. Students specializing in Marine Geology and Geochemistry must also take at least one, and preferably more, advanced biogeochemistry course.

The M.S. program requires a minimum of 36 credit hours, including 24 credits of course work as defined below, 6 credits of **OCN 699** (Directed Research) and 6 credits of **OCN 700** (Thesis Research). Directed Research (OCN 699) may only be taken on a credit/no credit basis. **Students can register for OCN 700 only after a thesis proposal is approved and Form II is filed.** The 24 semester hours of course work must be in courses numbered 600 or greater, but excluding Ocean 699, Ocean 700, and seminar courses. At least 12 of those semester hours must

consist of courses taken from at least three of the groups listed in Table 3. Courses may be added or deleted from these lists upon the recommendation of the Oceanography Curriculum Committee and with the approval of the Oceanography Faculty. Equivalent courses taken at other accredited institutions may be used for Group I-VI courses. The actual transfer of credits requires the approval of the Graduate Division. In most cases, a waiver of the requirements is preferred, as long as some other course is used to meet the minimum credit requirements. Students may request these waivers/substitutions of course requirements using the Request to Substitute/Waive Course(s) form (Table 4).

A student's grades in the core courses must average at least 3.0, using only the higher grade for any repeated course. **All students must receive a grade of C (2.0) or better to receive credit for a core course, but can receive a grade less than B- (2.7) for only one core course.** With the consent of the Advisory Committee, a student may repeat, at most, one core course in which his/her grade was less than B (3.0). A student with an unsatisfactory record in the core courses will be automatically dismissed from the program. Students who have made satisfactory grades in equivalent courses at other accredited institutions may use those credits to fulfill all or part of this core course requirement. See Division Requirements, below, for summaries of each Division's Requirements.

The Oceanography Department requires that a student's cumulative grade point average (GPA) in the core courses and in Group I - VI courses (including equivalent courses from other accredited institutions) must be at least 3.0 in order to graduate. This requirement is exclusive of those courses taken outside these areas, such as research credits (OCN 699). If the cumulative GPA in the core courses and in Group I-VI courses remains below 3.0 for two consecutive semesters, the student will be dismissed from the program. The Graduate Division requires that a cumulative GPA of 3.0 be maintained for *all* graded courses. Students with a cumulative GPA below 3.0 risk losing their tuition waiver, or may be dismissed from the University.

According to Grad Division rules for incomplete ("I") grades: "I" grade remains on the student's record. May be converted to a letter grade on a case by case basis, **within one full academic year following the end of semester in which the "I" grad was issued.**"

Second-Year Student Presentations

Each second-year graduate student will present a public seminar of at least ten minutes covering his/her thesis/dissertation topic. The seminar will be announced beforehand with the research topic listed. The purpose of the presentation is to provide an opportunity for the students to define their research and to practice speaking to an audience, and for faculty to learn about students and their research. Acceptable forums are: Physical Oceanography Division talks in the fall, MGG Biogeochemistry Brown-Bag Seminars, Biological Oceanography Grand Rounds, OCN 780 Seminar, STAR Symposium, and Zoology TESTER Symposium. Other forums will need to be approved by the student's committee and the Department Chair.

Seminar Requirement

All students must successfully complete a seminar course in oceanography during their residence at the University of Hawai'i. Students may meet the requirement in either of two ways:

Attend a total of fifteen individual seminars. These may be seminars sponsored by oceanography, HIG, HIMB, or any other department, as long as the material is appropriate to the student's oceanographic studies. The student will obtain a log sheet on which to note dates, speakers, and topics of seminars attended. **When the student has attended fifteen seminars, he/she will present the log to his/her advisor for inclusion in his/her file and shall register for 1 credit of Ocean 780 on a CR/NC (credit/no credit) basis.**

Enroll in one of the occasionally offered seminar courses such as Ocean 750, Topics in Biological Oceanography, provided that the main function of the course is to expose the student to current research. Since this type of course is offered irregularly, a student must not count on taking this option unless he/she has determined that an appropriate course will be available during his/her period of residence. Such courses can be taken on a CR/NC basis or for a letter grade. Successful completion of graded courses requires a grade of C (2.0) or better.

Computer Requirement

Students are required to demonstrate, to the satisfaction of the thesis/dissertation committee, competence in the technical use and management of computers. The specific knowledge and skills required are: 1) the ability to manage a personal computer or workstation, including a working knowledge of operating system basics, file structure, software installation, establishing network connections, and computer security; 2) a working knowledge of an algorithmic computer language; 3) knowledge of internet techniques including online searching and file transfer; 4) the ability to manage datasets including importing data to a program or database, exporting data in customized tabular and graphical formats, transforming or merging datasets, and securing data (i.e., back-up and long-term storage techniques).

Field and Ship-Time Requirement

At least 30 days of field experience, **including work aboard a research vessel**, is required. To meet this requirement, the student should document the dates and nature of field work on the form found on the Oceanography website. After completion, this log sheet must be approved and signed by the student's advisor and the department chair, and will be inserted in the student's file.

Final Exam (Thesis Defense)

The Master's degree in Oceanography requires a written thesis (Plan A). Upon completion of the proposed research, each student will submit a thesis draft to his/her Master's Committee. **Students should note that two to three months are often required for review and revision of the thesis. A final oral examination will be scheduled after the draft thesis is accepted by the Committee.** The examination will cover the thesis and related areas. After a period of presentation and questioning open to all students and faculty, the Committee will examine the candidate in private. The acceptability of the thesis defense will then be determined by majority vote of the Committee and officially recognized with the filing of **Form III**.

Judgment of Thesis

The acceptability of the final version of the thesis will be decided by majority vote of the Committee and officially recognized with the signing of the signature page.

Submission of Thesis

Theses are due at the Graduate Records Office by the deadline specified in the Academic Calendar (<http://www.catalog.hawaii.edu/about-uh/calendar.htm>). M.S. students may either submit a pdf file of the thesis on a CD with printed copies of the title and signature pages, or may submit a printed copy of the thesis. The Oceanography Department requires a pdf file of the thesis on a CD, a printed copy of the thesis (using acid-free or 100% cotton paper), and a copy of the signature page.

Exit Interview

All graduate students will be required to participate in an exit interview with the Student Services Specialist prior to graduation. The Graduate Division's Student Progress **Form III** will be signed by the graduate chair only upon completion of the exit interview. These required interviews are being conducted as part of the University of Hawaii's accreditation with the Western Association of Schools and Colleges (WASC).

ADMISSION TO PH.D. CANDIDACY

Initial Approval to Proceed

It is the faculty's experience that research and Thesis authorship leading to the M.S. significantly increase a student's scientific maturity and form an important foundation for more advanced independent work. In addition, since work done to satisfy M.S. requirements will also satisfy certain Ph.D. requirements, the average total time to the Ph.D. is not significantly different for students who gain an M.S. *en route* compared to those who do not (see Table 1). A student entering this department without a Master's degree will therefore normally be encouraged by his or her Interim Advisory Committee to work toward the M.S. even when the student's ultimate goal is the Ph.D. A student entering without a Master's in oceanography who would prefer to work directly toward the Ph.D. must obtain the unanimous written approval of his or her Interim Advisory Committee before notifying the Department Chair. Similarly, a student entering with a Master's in oceanography from outside the department or returning after leaving and reapplying must obtain the unanimous written approval of his or her Interim Advisory Committee that the Master's degree is largely comparable to those granted by the Oceanography Department. In either case, the student needs to meet with his or her initial advisory committee to remedy all undergraduate deficiencies.

A student working toward a Master's degree in this department who desires to be accepted as a Ph.D. candidate should take no official action until nearing the end of the M.S. program. At that time the student must obtain the unanimous written approval of his or her M.S. Committee on the "Approval to Proceed toward Ph.D. Candidacy" form before notifying the Department Chair. Whether or not unanimous approval is given, this form must be signed by M.S. Committee members and the student no later than at the signing of the M.S. thesis.

Assignment of the Ph.D. Qualifying Committee

Upon notification of a student's desire to enter the Ph.D. program (with approval of the appropriate committee; see above), the Department Chair will appoint a five-member Ph.D. Qualifying Committee (PQC). The PQC will normally be chaired by the student's prospective

Dissertation Committee chairperson. In selecting the other PQC members, the Department Chair must seek the advice and consent of the PQC chair, who should be aware of (but is not bound by) the student's preferences. All PQC members must be in the Oceanography Graduate Faculty, at least four being Regular Graduate Faculty. Normally, three of the five PQC members will be from the student's sub-discipline, with the others from the other sub-disciplines.

Ph.D. Qualifying Exam and PQC Decision

The student must submit a draft research proposal to the PQC and should seek guidance from the committee members during its preparation. When the proposal is acceptable to the committee, they will meet formally with the student to discuss the scope, format, and scheduling of the examination to be given. The PQC chairperson will summarize this preliminary discussion in a written report to be signed by all members of the committee, and copies will be given to the student and entered in the student's file. The Ph.D. Qualifying Exam is verbal, with the option of an additional written component. Verbal exams are by their nature somewhat flexible in scope and format in order that perceived areas of weakness can be probed, so only general guidelines can be given. The first part of the exam period is usually devoted to the student's presentation of his/her proposed research, and the rest of the time is used for questions from PQC members. Questions should focus on the student's research area, but the focus should be broad rather than narrow, and questions should also probe the student's knowledge of scientific connections between the proposed research and other oceanographic sub-disciplines.

The PQC is charged with evaluating the student's readiness for independent research at the doctoral level. This evaluation will be based on: (1) the student's performance in the Qualifying Exam; (2) the quality of the student's draft research proposal; (3) the student's academic record in formal coursework; and (4) the record of previous successfully conducted research (*e.g.*, the M.S. thesis, scientific publications, and OCN 699). Admission to Ph.D. candidacy requires approval of at least four of the five PQC members. There are only two possible outcomes: approval or denial of admission to candidacy. No conditions or qualifications may be attached to these outcomes, but the committee may make suggestions for the student's guidance. The PQC chairperson will prepare a written report, to be signed by all committee members, giving the outcome of the exam, summarizing reasons for the committee's evaluation, and describing suggestions (if any) given to the student. Copies will be given to the student and entered in the student's file.

Students who receive a first denial of admission to Ph.D. candidacy, and who do not have a Master's degree in oceanography, will enter the M.S. program and may seek approval to retake the Ph.D. Qualifying Exam when nearing the end of their M.S. work (see **Initial Approval to Proceed** above). Students receiving a first denial of admission who already hold a Master's degree in oceanography may retake the Qualifying Exam once at the discretion of the PQC.

Note: Graduate Division rules allow a student only two attempts to gain admission to Ph.D. candidacy. A second denial results in loss of status as a classified graduate student and dismissal from the program.

Upon successfully passing the PQE, Form I (Pre-Candidacy Progress) should be filed.

DOCTORAL DEGREE PROGRAM

Dissertation Committee

The Ph.D. Dissertation Committee consists of at least five members, one of whom, the "outside member", must be a member of the Graduate Faculty in a field of study other than Oceanography. **In addition, at least 50% of the committee members must be Oceanography Graduate Faculty, exclusive of affiliate and cooperating faculty.** The chairperson of the Dissertation Committee will be the student's official advisor. **Under special circumstances, the Department Chair has the authority to waive the above requirements. Requests for these exceptions need to be submitted at least one semester prior to forming the committee and the filing of Part 1 of Form II.**

Approval of Dissertation Proposal

A student admitted to Ph.D. candidacy should already have at least a draft proposal or prospectus (see ADMISSION TO PH.D. CANDIDACY). A final proposal must be formally approved by the Dissertation Committee within 6 months of the student's advancement to candidacy. Approval of dissertation topic is official when Part 1 of **Form II** is filed with the department.

Course Work Requirements (Credit Hours, Distribution and Grades)

Same as Master's Degree, except candidates need to be registered in OCN 800 (Dissertation Research) during the semester in which the degree is awarded. They are not subject to the minimum 6 credits of OCN 699 and 6 credits of OCN 700. Directed Research (OCN 699) courses may only be taken on a credit/no credit basis.

Second-Year Student Presentations—Same as Master's Degree.

Seminar Requirement—Same as Master's Degree.

Computer Requirement—Same as Master's Degree.

Field and Ship-Time Requirement—Same as Master's Degree.

Comprehensive Examination

Students admitted to Ph.D. candidacy must take the Comprehensive Examination within 18 months of their admission to candidacy. The Department Chairperson will schedule the Comprehensive Examination at the end of 18 months after admission if the student has failed to do so. The Comprehensive Examination may be oral or a combination of oral and written, and is administered by the student's Ph.D. Dissertation Committee. The purpose of the examination is to determine whether the student has a high level of competence in the general area of his/her proposed research, including both the major field of study and any appropriate other field. The student will pass the examination with the recommendation of at least four of the five members of the Dissertation Committee. The results of the examination will be documented on **Form IIA**. The examination may be repeated once at the discretion of the Committee.

Final Examination (Dissertation Defense)

Upon completion of the proposed research, a dissertation will be submitted to the Dissertation Committee. **Experience has shown that two to three months may be required for review and revision.** When the Committee is satisfied that acceptable research has been completed, a final oral examination will be scheduled. The examination will be conducted and evaluated in

the same manner as the M.S. thesis defense [see *Final Examination (Thesis Defense)*] and officially recognized with the filing of **Form III**.

Judgment of Dissertation

Once the final version of the dissertation has been submitted, its acceptability will be decided by a majority vote of the Dissertation Committee and officially recognized with the signing of the signature page.

Submission of Dissertation

Dissertations are due at the Graduate Records Office by the deadline specified in the Academic Calendar (<http://www.catalog.hawaii.edu/about-uh/calendar.htm>). Ph.D. students may either turn in two copies of a pdf file of the dissertation (on separate CDs) with two printed copies of the title and signature pages, or may submit two printed copies of the dissertation. The Oceanography Department requires a pdf file of the dissertation on a CD, a printed copy of the dissertation (using acid-free or 100% cotton paper), and a copy of the signature page.

Exit Interview

All graduate students will be required to participate in an exit interview with the Student Services Specialist prior to graduation. The Graduate Division's Student Progress **Form III** will be signed by the graduate chair only upon completion of the exit interview. These required interviews are being conducted as part of the University of Hawaii's accreditation with the Western Association of Schools and Colleges (WASC).

CHANGING ADVISORS AND/OR DIVISIONS

At some point during a student's academic career, the decision may be made for a student to change advisors and/or departmental divisions.

If the student is changing divisions and changing advisors, then the following steps need to be completed:

1. The student must receive approval from their new advisor.
2. The new advisor must receive approval from a majority of the new division.
3. The student must receive approval from the department chair.
4. The student must notify their old advisor.
5. The student must notify their old division chair.

If the student is changing divisions and keeping their advisor, then the following steps need to be completed:

1. The student must receive approval from their advisor.
2. The student must receive approval from a majority of the new division.
3. The student must receive approval from the department chair.
4. The student must notify their old division chair.

If the student is staying in their division, and changing advisors within the division, then the following steps need to be completed:

1. The student must receive approval from their new advisor.
2. The student must receive approval from the department chair.
3. The student must notify their old advisor.
4. The student must notify the division chair.

If the student is staying in their division, and changing to an advisor outside the division, then the following steps need to be completed:

1. The student must receive approval from their new advisor.
2. The new advisor must receive approval to advise a student in the division, by majority of division.
3. The student must receive approval from the department chair.
4. The student must notify their old advisor.

All approvals and notifications in the above scenarios must be in writing, with copies sent to the departmental Graduate Student Services Specialist, and must be undertaken in the order listed. In addition, subsequent notifications must occur within one week after each approval is received.

TABLE 1. Timelines of acceptable progress to degree for students with different career objectives and educational backgrounds. Column 1 is for students planning to achieve an M.S. only or the M.S. and Ph.D. in succession. Columns 2 and 3 apply, respectively, to students who pursue the Ph.D. directly after entering the program without or with a previous M.S. degree in Oceanography. Students who fail to make satisfactory progress -- hereby defined as falling more than 6 months behind any of the timelines (except under extenuating circumstances) -- risk loss of graduate assistant support and tuition waiver.

PROGRESS TO DEGREE			
TIME (month)	M.S., or Ph.D. with M.S. en route.	Ph.D. without M.S.	Ph.D. with Previous Ocean M.S.
9	Advancement to Candidacy (Form I) Select Thesis Committee (Form II)	Initial Approval to Proceed & Appoint PQC	Initial Approval to Proceed & Appoint PQC
12	Second-Year Student Presentation Approval of Research Prospectus (Form II)	Second-Year Student Presentation Research Prospectus/Draft Proposal Advisory Approval for PQE	Second-Year Student Presentation Prospectus/Draft Proposal
15	-----	-----	Pass PQE (Form I)
18	-----	Pass PQE (Form I)	Select Ph.D. Committee (Form II)
21	-----	Select Ph.D. Committee (Form II)	Approval of Ph.D. Proposal (Form II)
24	Complete Field, Seminar & Computer Requirements	Complete Seminar & Computer Requirements Approval of Ph.D. Proposal (Form II)	Complete Seminar & Computer Requirements
30*	Final Examination and Approval of Thesis (Form III) If continuing toward Ph.D., obtain unanimous approval from M.S. Committee on "Approval to Proceed toward Ph.D. Candidacy" form at the signing of the M.S. thesis. If admitted as M.S. candidate, petition for admission to Ph.D. candidacy (June 15 for fall admission, November 15 for spring admission).	-----	
33	Ph.D. Prospectus Pass PQE (Form I)		Pass Comprehensive Exam (Form II)
36	Select Ph.D. Committee (Form II)	Pass Comprehensive Exam (Form II)	-----
39	Approval of Ph.D. Proposal (Form II)	-----	-----
51	Pass Comprehensive Exam (Form II)	-----	-----
54	-----	-----	Complete Field Requirement Submit First Dissertation Draft Dissertation Defense (Form III)
57	-----	-----	Complete Dissertation
60	-----	-----	
66	Submit First Dissertation Draft	Complete Field Requirement Submit First Dissertation Draft	
69	Dissertation Defense (Form III)	Dissertation Defense (Form III)	
72	Complete Dissertation	Complete Dissertation	

*M.S. only.

TABLE 2. Division Requirements

Biological Oceanography

M.S. Requirements

I. Courses

A. Core Courses

OCN 620	Physical Oceanography
OCN 622	Geological Oceanography
OCN 623	Chemical Oceanography
OCN 626	Marine Microplankton Ecology
OCN 627	Ecology of Pelagic Marine Animals
OCN 628	Benthic Biological Oceanography

B. Distribution Courses (at least two courses from two different groups other than Group I) – see list of courses in Table 3.

C. Six credits of OCN 699 (Directed Research) and six credits of OCN 700 (Thesis Research).

D. Undergraduate or graduate course in statistics (Statistics Requirement Form).

II. Seminar, Computer and Field requirement

III. Defense of Thesis

IV. Submission of Thesis

Ph.D Requirements

I. Courses – same as above (except for “C”). No minimum number of OCN 699 credits, however, at least one credit of OCN 800 (Dissertation Research) during the semester in which the degree is awarded.

II. Pre-qualifying Exam (PQE)

III. Comprehensive Exam

IV. Defense of Dissertation

V. Submission of Dissertation

Marine Geology and Geochemistry

M.S. Requirements

I. Courses

A. Core Courses

OCN 620	Physical Oceanography
OCN 621	Biological Oceanography
OCN 622	Geological Oceanography
OCN 623	Chemical Oceanography

B. Distribution Courses (at least 12 credit hours of courses taken from at least 3 of the groups – see list of courses in Table 3.

C. Six credits of OCN 699 (Directed Research) and six credits of OCN 700 (Thesis Research).

D. CHEM 351 (unless student has successfully completed a college-level course in physical chemistry) and receive a grade of B- (2.7) or better.

E. At least one, and preferably more, advanced biogeochemistry course.

II. Seminar, Computer and Field requirement

III. Defense of Thesis

IV. Submission of Thesis

Ph.D Requirements

I. Courses – same as above. (except for “C”). No minimum number of OCN 699 credits, however, at least one credit of OCN 800 (Dissertation Research) during the semester in which the degree is awarded.

II. Pre-Qualifying Exam (PQE)

III. Comprehensive Exam

IV. Defense of Dissertation

V. Submission of Dissertation

Physical Oceanography

M.S. Requirements

I. Courses

A. Core Courses

OCN 620	Physical Oceanography
OCN 621	Biological Oceanography
OCN 622	Geological Oceanography
OCN 623	Chemical Oceanography

B. Distribution Courses (at least 12 credit hours of courses taken from at least 3 of the groups – see list of courses in Table 3.

C. Six credits of OCN 699 (Directed Research) and six credits of OCN 700 (Thesis Research).

II. Seminar, Computer and Field requirement

III. Defense of Thesis

IV. Submission of Thesis

Ph.D Requirements

I. Courses – same as above (except for “C”). No minimum number of OCN 699 credits, however, at least one credit of OCN 800 (Dissertation Research) during the semester in which the degree is awarded.

II. Pre-Qualifying Exam (PQE)

III. Comprehensive Exam

IV. Defense of Dissertation

V. Submission of Dissertation

TABLE 3. Course Distribution Groups

Group I Biological Oceanography

OCN 625	Aquatic Photosynthesis
OCN 626	Marine Microplankton Ecology
OCN 627	Ecology of Pelagic Marine Animals
OCN 628	Benthic Biological Oceanography
OCN 653	Methods in Microbiological Oceanography
OCN 750	Bio-optical Oceanography ("Topics")

Group II Geological Oceanography

GG 600	Equations of Geophysics
GG 602	Theoretical Petrology
GG 615	Micropaleontology
GG 650	Seismology
GG 653	Mantle Mineralogy
GG 674	Paleoceanography
GG 681	Continuum Mechanics
GG 711	Geological Evidence for Climate Change (“Special Topics”)
OCN 631	Ocean Minerals
OCN 641	Origin of Sedimentary Rocks
ORE 664	Nearshore Processes and Sediment Transport

Group III Chemical Oceanography

GG 639	Stable Isotope Biogeochemistry
OCN 633	Biogeochemical Methods in Oceanography
OCN 635	Isotopic Marine Geochemistry
OCN 635L	Radiochemical Techniques
OCN 638	Earth System Science and Global Change
OCN 642	Elemental Composition Changes
OCN 643	Topics in Marine Geochemistry
OCN 644	Sedimentary Geochemistry
OCN 645	Marine Organic Geochemistry

Group IV Physical Oceanography

OCN 640	Observational Physical Oceanography
OCN 660	Ocean Waves I
OCN 661	Ocean Waves II
OCN 662	Marine Hydrodynamics
OCN 663	Satellite Oceanography
OCN 664	Ocean Instrumentation and Technology
OCN/MET 665	Small-Scale Air-Sea Interaction
OCN/MET 666	Large-Scale Ocean-Atmosphere Interactions
OCN 667	Advanced Geophysical Fluid Dynamics I
OCN 668	Advanced Geophysical Fluid Dynamics II
OCN 760	Topics in Physical Oceanography

Group V Mathematical Methods and Statistics

GG 710, 711	Statistical Analysis of Geological Data
MET 631	Statistical Meteorology
OCN 650	Mathematical Techniques for Oceanographers
ORE 608	Probability and Statistics for Ocean Engineers (cross-listed as OCN 760)
PHYS 600	Methods of Theoretical Physics
ZOOL 631	Biometry
ZOOL 632	Advanced Biometry

Group VI Meteorology

MET 600	Atmospheric Dynamics I
MET 601	Atmospheric Dynamics II
MET 607	Mesoscale Meteorology
MET 610	Tropical Climate & Weather
MET 616	Monsoon Meteorology
MET 620	Physical Meteorology
MET 621	Cloud Physics
MET 636	Air Pollution Meteorology
MET/OCN 665	Small-Scale Air-Sea Interaction
MET/OCN 666	Large-Scale Ocean-Atmosphere Interactions
MET 745	Mid-latitude Dynamic Meteorology

TABLE 4. Forms and links

GRADUATE DIVISION FORMS

<http://www.hawaii.edu/graduate/download/list.htm>

Master's Forms

Student Progress Forms I, II, III
Petition to Enroll in GRAD 700F

Doctoral Forms

Petition for Admission to a Doctorate in Same Discipline
Student Progress Forms I, II, III

DEPARTMENTAL FORMS

<http://www.soest.hawaii.edu/oceanography/contgrads.html>

Computer Requirement
Ship Time Requirement
Seminar Requirement
Statistics Requirement for Biological Oceanography Students
Biogeochemistry Requirement for Geochemistry Students
Request to Substitute/Waive Course(s)

NA KAMA KAI WEBSITE

<http://www.soest.hawaii.edu/oceanography/nakamakai/index.html>

GRADUATE ASSISTANTS INFORMATION

Nature and Duties:	http://www.hawaii.edu/graduate/ga/nature.htm
Eligibility and Appointment:	http://www.hawaii.edu/graduate/ga/eligibility.htm
Compensation and Benefits:	http://www.hawaii.edu/graduate/ga/compensation.htm
Rules and Regulations:	http://www.hawaii.edu/graduate/ga/regulations.htm
Grievance Procedure:	http://www.hawaii.edu/graduate/ga/grievance.htm
Notice to New GAs:	http://www.hawaii.edu/graduate/ga/notice.htm

APPENDIX 1: Student Conduct and Ethics

The following text is from the University of Hawaii Graduate Division webpage:
<http://www.hawaii.edu/graduate/policies/html/code.htm>

The University of Hawai'i at Manoa exists for the pursuit of knowledge through teaching, learning, and research conducted in an atmosphere of physical and intellectual freedom. Members of the UHM academic community are committed to engage in teaching, learning, research, and community service and to assist one another in the creation and maintenance of an environment that supports these activities.

Members of the academic community may not violate the rights of one another nor disrupt the basic activities of the institution. Students who are disruptive are subject to a variety of disciplinary actions that may include reprimand, probation, restitution, suspension or expulsion. Continued enrollment at UHM is contingent on appropriate academic conduct.

Some graduate students are professionals or professionals-in-training in their respective fields, and as such, are subject to the ethical and conduct standards of their profession. Their continued enrollment at UHM is contingent on appropriate academic conduct as well as professional behavior.

It must be recognized that members of the academic community have the same privileges and responsibilities with respect to the law, as do members of the larger society. As a result, members of the UHM campus community must acknowledge that when the interests of the university are violated by a student, the student is accountable to the institution and may also be held responsible to civil authorities. These interests of the university are described in the University of Hawai'i at Manoa Student Conduct Code:
<http://www.manoa.hawaii.edu/students/conduct/>.

Any questions regarding the Student Conduct Code should be addressed to the Dean of Students.

APPENDIX 2: Safety in Research and Creative Activities

To ensure a safe and healthy working environment for faculty, students and staff, the University of Hawai'i at Manoa sets and enforces rigorous safety standards that meet and exceed local, state and federal law. The Environmental Health and Safety Office (EHSO) at the university sets a multitude of rules and regulations pertaining to common laboratory materials and other research related activities in Hawai'i, and they may be quite different from those at other institutions. The university has specific programs and requirements for:

- a. **Radioactive material**
- b. **Biological "commodities"** - including micro-organisms, plants, animals, biological toxins, cell or tissue samples, recombinant DNA, etc.
- c. **Compressed gas (SCUBA) diving**
- d. **Certain chemicals and hazardous materials**
- e. **Disposal of hazardous waste**

In addition, there are regulations governing the importation and shipment of these materials or types of equipment into the State and/or university. For more information, please visit the EHSO website at <http://www.hawaii.edu/ehso/>.

Students who work in a laboratory setting are required to attend and maintain health and safety training in skill areas that are relevant to their work. The EHSO offers a variety of training programs in laboratory safety, radiation safety, hazardous waste, scientific diving, fire extinguisher use, and shipping of biological commodities. Please contact EHSO to check on class schedules or to arrange for training. Labs and lab members must be certified in compliance with EHSO guidelines at all times.

EHSO Director's office: (808) 956-8660

Radiation Safety Program	(808) 956-8591
Biological Safety Program	(808) 956-3197
Diving Safety Program	(808) 956-9643
Fire Safety Program	(808) 956-4954
Hazardous Materials Management Program	(808) 956-3198
Laboratory Safety Program	(808) 956-5180
Environmental Compliance Program	(808) 956-9173