

SCIENCE OF THE SEA - LABORATORY

OCN 201 L

SPRING, 2013

Experiments, computer exercises and field trips demonstrating the geological, physical, chemical and biological principles of earth and ocean sciences.

1 credit hour; no prerequisites; co-requisite in OCN 201; no recommended special preparation; basic reading and computer skills required; partially satisfies natural science requirement for Assoc. in Arts degree in the community college and for the Bach. of Arts degree at the university; laboratory exercises require adherence to proper and safe procedures and techniques where equipment and chemicals are involved; field trips may involve wading or swimming in ponds and the ocean, or small boats, thus also requiring some physical prowess for these conditions and an awareness of appropriate safety concerns; concurrent registration in the Marine Option Program is highly recommended — see below.

Dr. Floyd W. McCoy

office: Hale 'Imiloa 115
laboratory: Hale 'Imiloa 117A;
office telephone: 236-9115*
e-mail: fmccoy@hawaii.edu
fax: 247-5362

* a message is recorded here, changed weekly, concerning field trips, assignments, etc.

Consultation Hours:

Mon. 3:00-5:30; Th. 2:30 – 3:30.
Other times by appointment.

(best to look for me first in the laboratory (room 117A), then in my office.)

Textbook: None

Class Location: Hale Imiloa room 117, unless otherwise noted on the schedule or announced.

Activities Outside of Class:

Assignments may require completion outside of class, particularly those processing data from fieldwork.

Extra credit may be earned through self-guided field trips with submission of appropriate report(s) – for information on these see < http://www.soest.hawaii.edu/oceanography/courses_html/OCN201/ >, and follow instructions noted there.

Extra credit may be obtained via documented attendance at Marine Option Program (MOP) talks on any UH campus, by visiting either of the UH oceanographic ships, or attending lectures/seminars in the Departments of Oceanography/Geology & Geophysics/Zoology at UH Manoa.

Ancillary Activities:

- Numerous seminars, talks, symposia and exhibits occur throughout the university system and at various museums, you are particularly encouraged and welcomed to these. Whenever possible, these will be announced in class.

- The Marine Option Program (MOP) is a certificate program at most campuses of the university that encourages direct participation in the science, sociology, art, management, engineering and literature of the oceans. MOP participation is essential to a career in oceanography within Hawaii. MOP is an especially viable and active program at WCC; as a university-wide program, you may easily transfer MOP credits, projects, contacts and friendships to any campus following graduation from WCC. Announcements concerning MOP events and programs are made in class and/or posted on bulletin boards in the MOP office, Hale 'Imiloa, room 118.

- Supplementary, non-required reading is in the library, both on reserve and on open shelves; these include magazines and books; you are encouraged to peruse this literature.

Mode of Instruction: Lectures, field trips, and exercises both in the laboratory and in the field that expand upon, and update, the information presented in lecture. Special emphasis is placed upon understanding and using oceanographic instrumentation both in the laboratory and in the field, thus realizing the limitations of data collected by that equipment. Focus for the latter will be on specific field sites where acquisition of data could add knowledge and have impact upon scientific, cultural and political decisions. Portions of field and laboratory work may be applicable for skill-projects with the Marine Option Program.

Course Objectives: To provide experience and familiarity with various field and laboratory techniques or methodologies that are used in oceanography. Additional objectives are to provide an understanding and appreciation of the equipment involved in the science, to recognize and measure oceanographic processes in the field, as well as to visit oceanographic facilities. From this will come an appreciation and familiarity for the application and limitations of both equipment and data. This course also adds to classroom lectures in Ocn 201, by providing exercises and projects in all aspects of the oceanographic sciences, with emphasis on the interrelationships between geological, chemical, physical and biological oceanography (Zoo 200, Marine Biology, provides additional emphasis on biological oceanography). Basic to these objectives is knowledge of the scientific method and how science is done. All objectives should allow better criteria for decisions about careers in the oceanographic sciences.

Field and Laboratory Conditions: Fieldwork may be from boats, in the water swimming or wading, or on beaches. It could be hot and sunny, or chilly and rainy. Offshore work by boat or swimming will be constrained to good weather and safe conditions. Expect fieldwork to often consume the entire class time. Work both in the laboratory and field will involve chemicals and mechanical equipment. Safety is paramount - you must understand the conditions under which exercises may be done by reading the attached “*Activities*”, and the responsibilities that accompany this activity by reading the attached “*Responsibilities of Students in the Laboratory*” and “*Responsibilities of Students in the Field*”. By participating in this course, you acknowledge that you have read and accept these conditions and responsibilities. Standard legal waiver forms must be signed and submitted to the instructor prior to your participation in the course. Class will meet in Hale Imiloa room 117 (Oceanography Laboratory) unless otherwise announced; laboratory work will also be in this room as well as in room 117A (Geology /Oceanography Storeroom & Preparation Lab.).

Examination Policies and Schedule: A final examination, a practicum, given during the last laboratory session will be a written exercise involving maps that involve an understanding of oceanographic processes both offshore (open ocean) and nearshore (littoral). Weekly or topical assignments will be submitted for grading at announced deadlines. Participation is critical. Accordingly, attendance is mandatory; completion of assignments is mandatory. Team coordination on exercises and reports will occur as announced in class.

Examination/Grading schedule:

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| <u>Attendance:</u> | 15 points |
| <u>Laboratory/Fieldwork assignments:</u> | 70 points |
| <u>Final exam./practicuum:</u> | <u>15 points</u> |
| Total points: 100 | |
| <u>Extra/special credit:</u> | see above. |

Grading scheme: numerical grades calculated from an average of all test scores, with the midterm = 35%, the final = 45%, and short essays = 20% of the total grade; total possible numerical grade = 100; letter grades assigned with:

A = 90 - 100

B = 80 - 89

C = 70 - 79

D = 60 - 69

F = < 60

CR/NC = credit/no credit

N = course not completed due to unforeseen difficulties; this grade assigned rarely

I = incomplete due to unusual circumstances and assigned only with permission of the instructor; no credit given until this grade is changed to an A-D letter grade - it is your responsibility to make this change.

OCN 201L Tentative Laboratory Schedule

Please note that this schedule is hugely tentative and will be subject to modification due to weather, ship's schedules, access problems, tsunami, megaeearthquakes, plague, etc. A recorded message will be available with an update for that week's laboratory at 236-9115. Lab = HI rm. 117.

Week Location Laboratory Focus

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| 1 | lab | Introduction (risks, dangers, field/laboratory conditions, safety issues, sign waiver forms, etc.) |
| 2 | lab | Bathymetry 1 |
| 3 | field | Bathymetry 2 Waikalualoko Fishpond (measure water depths in the pond) + Coring/Augering |
| 4 | lab | Bathymetry 3 Plotting fishpond bathymetry data; core/sediment processing |
| 5 | visit | TBA (HIMB Coconut Is./Tsunami Warning Center/UH oceanographic ships, Marine Center, Snug Harbor/ UH research submersibles, Makai Pier) |
| 6 | field | Surface current measurements, Waikalualoko fishpond + sampling plastic debris on beach at fishpond |
| 7 | lab | Plotting surface currents, calculating water flushing/residency time in pond |
| 8 | lab | Plastic debris in the marine environment, separation and analyses of plastics collected at fishpond and elsewhere, with B.E.A.C.H |
| 9 | visit | TBA (HIMB Coconut Is./Tsunami Warning Center/UH oceanographic ships, Marine Center, Snug Harbor/ UH research submersibles, Makai Pier) |
| 10 | field | Water sampling, Waikalualoki fishpond; use of remote sensing (RC helicopter? drone?) for limu imaging and TIR imaging for fresh water; use of submersible robots |
| 11 | visit | TBA (HIMB Coconut Is./Tsunami Warning Center/UH oceanographic ships, Marine Center, Snug Harbor/ UH research submersibles, Makai Pier) |
| 12 | lab | no class, Spring Recess, GG 212 Field Geology of Maui |
| 13 | visit | TBA (HIMB Coconut Is./Tsunami Warning Center/UH oceanographic ships, Marine Center, Snug Harbor/ UH research submersibles, Makai Pier) |
| 14 | lab | Water properties, processing, etc. |
| 15 | lab | Settling velocities |
| 16 | visit | TBA (HIMB Coconut Is./Tsunami Warning Center/UH oceanographic ships, Marine Center, Snug Harbor/ UH research submersibles, Makai Pier) |

OCEANOGRAPHY 201 LABORATORY AND FIELD ACTIVITIES

Students enrolled in Ocn 201 are advised that certain required course activities are inherently dangerous and may require normal physical abilities. Students are therefore required to read about the inherently dangerous activities described below. In addition, students must read and demonstrate knowledge of their responsibilities while engaged in these activities.

Some students may have physical conditions that restrict their participation in certain laboratory activities. Respiratory ailments, certain allergies, and pregnancy may be among these conditions. Students exhibiting any of these conditions, or any other condition that may be impacted adversely by participation in the activity, should consult a physician.

INHERENTLY DANGEROUS ACTIVITIES

Students in the science laboratory may be exposed to chemicals (e.g., formaldehyde, organic solvents, acids, and other caustic chemicals), chemical fumes, laboratory equipment and supplies (e.g., scalpels, razor blades, glass slides, coverslips, and electrical equipment), toxic or irritating properties of living and dead animals, human organic matter (e.g., saliva and blood), and other materials necessary to laboratory activities of this or other laboratory classes. Other possible hazards include broken glass on the floor or counters, combustible materials (e.g., bunsen burner gas), and slippery spills.

During field activities students face risks such as accidents while in route to and from field destinations, falling out of boats, slipping on wet surfaces, stepping on sharp objects, large waves, strong currents, and dangerous marine life.

RESPONSIBILITIES OF STUDENTS IN THE LABORATORY

1. Students should be familiar with safety procedures and take appropriate precautions at all times to insure the safety of every student in the lab.
2. Students should follow instructions carefully, especially when hazardous conditions occur or hazardous materials are being used.
3. Students should locate the placement of safety equipment and supplies in the laboratory: safety shower, eye wash station, fire extinguisher, and first aid kit. Students should understand the use of this equipment. Also note the locations of exits.
4. Anyone injured in the lab, should inform the instructor immediately and take immediate action to reduce the risk of further injury.
5. Students should familiarize themselves with the fire procedures. Extinguish small fires, but leave the building immediately should a major fire occur. Notify the appropriate authorities -- don't assume someone else remembered to do it. Meet with other students and your instructor outside the building before leaving so that an accurate headcount may be made.
6. Students should dress appropriately in the lab. Students may elect to supply their own gloves and protective aprons or laboratory coats. Some lab activities may require protective eyewear (provided for the activity by WCC).
7. Students should report all hazardous conditions to the instructor immediately.
8. Chemicals may be poisonous, corrosive, or flammable. No chemicals, even chemicals known to be safe, should be ingested, inhaled, or touched unless specifically directed to do so by your instructor.
9. All organisms, living or dead, should be treated with care and respect. Avoid direct handling when possible.

10. The safe use of specific equipment and tools (e.g., microscopes, slides, scalpels, and pipettes) will be demonstrated by the instructor during the laboratory sessions. Students should be sure they understand this usage.
11. Students should clean up any supplies used and should return materials where they belong as instructed. Any material spilled should be cleaned appropriately. Report and hazardous spills or breakages.
12. Broken glass and sharp metal waste should be placed only in those receptacles marked for such disposal -- do not put these materials in normal trash receptacles.
13. Some chemical wastes may not be dumped into laboratory sinks. In such circumstances an appropriate container will be provided for this waste in the lab.
14. Organic waste resulting from animal dissection activities should be disposed of in the appropriate receptacle, not the ordinary trash receptacles.
15. Human organic materials (e.g., saliva and blood) must be disposed of in such a way as to eliminate any possibility for contamination and the spread of disease. Appropriate handling and disposal procedures will be explained when human materials are involved in the laboratory exercise.
16. After completing laboratory activities and clean up, students should wash their hands in the restroom to avoid spreading contamination and hazardous chemicals.
17. The laboratory is a place for learning. Therefore, eating, drinking, and playing around is prohibited during the laboratory session. Students exhibiting unsafe or inappropriate behavior in the lab may be asked to leave and may be given an "F" grade for the course.

RESPONSIBILITIES OF STUDENTS IN THE FIELD

1. Field excursions may involve carpooling to field destinations. Drivers are expected to have valid Hawaii driver's licenses, drive safely, and follow all traffic laws. Passengers should not disturb drivers.
2. When in the field, students should use the buddy system. Partners should have comparable physical skills and should keep track of each other at all times.
3. Students should wear clothing appropriate for the activity and should anticipate all possible weather conditions. Land/shoreline activities require loose-fitting clothing that protects the extremities from sunlight and abrasions (note that this clothing may get wet). Footwear should allow stable walking on rough and/or slippery surfaces (slippers are not acceptable footwear). A hat and sunglasses are also highly recommended. For water activities, a wet suit, or long pants and sleeves, worn over swim suits, are recommended. Gloves and protective footwear are essential. Students should apply sunscreen to all exposed skin areas.
4. When looking under rocks or ledges, students should be prepared for encounters with dangerous marine animals, such as eels, lion fish, and sea urchins. Unless specifically instructed to do so, students should not touch any marine organism.
5. Students should familiarize themselves with potential hazards in an area before beginning an activity. Watch for large waves and dangerous currents. If conditions should become dangerous after the activity starts (e.g., waves pick up or dangerous marine life enters the area), the student should leave the area immediately. Students should inform the instructor immediately when dangerous conditions arise. A student should never feel compelled to do an activity that seems hazardous. A student should refuse to carry out an activity that exceeds his or her physical capabilities.

6. Anyone injured in the field, should inform the instructor immediately and take immediate action to reduce the risk of further injury. Before an activity begins, students will be informed of the location of the first aid kit (which will be taken on every excursion).
7. No one should operate a power boat without specific training. While in power boats, students should remain seated at all times. No power boat should be used without proper safety gear (i.e., first aid kit, life vests, oars, anchor, flares and other essential gear).
8. Consumption of alcoholic beverages is prohibited during any class activity, including field activities.