ZOOL 200L Marine Biology Laboratory
CRN 60293 - 01 Credits

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EFFECTIVE DATE:	Spring 2009

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College is committed to excellence in the liberal arts and career development; we support and challenge individuals to develop skills, fulfill their potential, enrich their lives, and become contributing, culturally aware members of our community.

CATALOG DESCRIPTION

Companion laboratory to ZOOL 200, Marine Biology. Practical, hands-on experiences in marine biology. Laboratory/field trip class. (3 hrs lab) WCC DY

PREREQUISITES

Prior or concurrent enrollment in ZOOL 200 or consent of instructor.

STUDENT LEARNING OUTCOMES

The student learning outcomes are

1. Use the scientific method of inquiry to investigate biological phenomena.
2. Apply the concepts learned in ZOOL 200 to an experimental and hands-on observational setting.
3. Collect, reduce, and interpret biological data.
4. Prepare written objective reports describing and interpreting experimental and observational results.
5. Demonstrate the use of some of the standard tools of the biological scientist, such as microscopes, scales, spectrophotometers, computers, and other analytical tools.
6. Demonstrate the use of specialized tools and methods frequently used in the study of the marine environments and the organisms that live in these environments.

REQUIREMENTS SATISFIED BY THIS CLASS

- This class may satisfy the Windward Community College Associate in Arts Degree diversification requirement for a Natural Sciences laboratory class (DY).
- This class may partially satisfy requirements for the Windward Community College Academic Subject Certificate in Bio-Resources and Technology, Bio-Resources Development and Management Track (Elective Set II: Environment and Ecology).
- This class may partially satisfy requirements for the University of Hawaiʻi Marine Option Program Certificate as a marine-related course.

COURSE CONTENT

Concepts or Topics

- Collecting Data, Making Measurements, Descriptive Statistics and Presenting Data
- The Physical and Chemical Properties of Water and Seawater
- Marine Bacteria and Unicellular Protists
- Seaweed Collection Identification and Pressing
- Animal Body Plans and Dichotomous Keys
- Lower Marine Invertebrate Diversity and Anatomy
- Higher Marine Invertebrates Diversity and Anatomy
- Fish Diversity and Anatomy
- Fish Adaptations to Habitats and Life Styles
- Marine Mammals
- Marine Zooplankton
- Intertidal Zone Survey
- Estuary Survey
- Coral Reef Survey

Skills or Competencies

- Maintain a laboratory notebook that adequately documents laboratory and field activities
- Collect quantitative measurements and make calculations (including conversions) using the metric system.
- Calculate averages and standard deviations.
- Present quantitative data in the form of tables and graphs in the proper format.
- Draw figures illustrating observations and present these figures in the proper format.
- Write summaries of laboratory and field activities, documenting these activities and demonstrating an understanding about the significance of the results.
- Use common instruments of the biologist to make measurements and observations: rulers, scales, graduated cylinders, dissection tools, microscopes, spectrophotometers, etc.
- Use water quality instrumentation to measure the pH, oxygen concentration, salinity, conductivity, temperature, light extinction, and turbidity of the water.
- Use a dichotomous key to determine the species of an organism.
- Classify organisms into taxonomic groupings.
- Collect and prepare biological specimens for study in the laboratory.
- Use dissection to understand the anatomy and morphology of marine organisms.
- Identify external and internal anatomical features of marine organisms.
- Correlate morphology of coral reef fishes with habitat characteristics
- Carry out surveys of the following marine environments: intertidal zone, estuary, and coral reef.

COURSE TASKS, ASSESSMENT AND GRADING

LABORATORY NOTEBOOK. The student will maintain a laboratory notebook to record all notes, observations, and information gathered before and during laboratory and field activities. This notebook must be brought to every laboratory period. This notebook will be collected and graded twice during the semester (45 points for the first collection; 45 points for the final collection; 90 points total). The type of notebook and the kind of information required will be explained during the introductory lab session.

LABORATORY SUMMARIES. The student will complete a total of 14 written laboratory/field summaries (15 points each). Each summary must be completed and turned in no later than the beginning of the first laboratory meeting after the assignment was given (210 points total). The production of laboratory summaries should be considered an individual student task. These summaries will generally be due during the next lab meeting after the lab activity (official dues dates will be presented the day of the lab activity). Assignments received late (up to one week late) will be assessed a two-point penalty reduction. Late assignments will not be accepted if submitted more than one week past the due date.

PRE-LAB QUIZZES. The student will take a total of 14-15 pre-lab quizzes (15 points each) administered via Laulima before the laboratory meetings. These quizzes will test the student's knowledge of and preparation for the laboratory exercise planned for that day, as well as the student's understanding of the previous laboratory activity. In general, these quizzes will be posted on the Laulima site about one week prior to the lab meeting. Access to the quiz will be prohibited beginning 30 minutes before the lab meeting. Of the quizzes taken, only the 10 best scores will be included in the student's point total (150 points total). Since these quizzes may be taken using home computers connected to the Internet, students may refer to instructional resources while taking the quizzes. However, each quiz will be timed, the student having only 20 minutes to complete. Because the student will be able to drop several of the lowest quiz scores, ***no make-up quizzes for missed quizzes will be administered for any reason including computer/Internet crashes, illnesses, and emergencies (the student will receive no score for missed quizzes)***.

FINAL LABORATORY PRACTICAL EXAM. The student will take a final laboratory practical examination (100 points) to demonstrate acquisition of laboratory skills and an understanding of information presented during laboratories.

LABORATORY ATTENDANCE AND PARTICIPATION. Regular attendance and active participation are expected (10 points each lab activity; 150 points total). Because laboratories involve considerable set-up/take-down time and supervision, students will ***NOT*** be able to make up missed laboratory activities. A student missing a scheduled laboratory activity because of an illness or legitimate emergency may be given an alternative activity to make up lost lab summary points. In such a circumstance, the student is still responsible for the information presented during the missed laboratory session. Regardless of the reason, **A STUDENT MISSING MORE THAN TWO SCHEDULED LABORATORY SESSIONS WILL NOT RECEIVE CREDIT FOR THE COURSE.**

LAB ATTIRE, CONDUCT AND HYGIENE. Because biology labs often involve working with hazardous materials and living organisms, students must dress appropriately. Students must wear lab coats and closed-toe shoes in the lab. Students may purchase a lab coat at the college bookstore. In addition, some lab activities will require students to wear gloves and safety glasses (provided by the college). Students failing to dress appropriately for lab will not be permitted into the laboratory and will be considered to be absent for the missed lab activity. Students engaged in conduct that threatens the safety of themselves and others in the lab will be refused access to the lab for the remainder of the semester and will receive an “F” for the course. Students are also expected to clean up their workstations following the lab activities. Failing to do so will lead to a 5-10 point penalty depending upon the seriousness of the infraction.

The assignment of points will be according to the following protocol:

Attendance & Participation	150	points
Final Examination	100	points
Quizzes	150	points
Laboratory Notebook	90	points
Laboratory Summaries	210	points
TOTAL	700	points

Letter grades will be assigned as follows:

A	90% or above in total points and not missing more than one scheduled laboratory activity.
B	80-89.9% of total points and not missing more than one scheduled laboratory activity.
C	65-79.9% of total points and not missing more than one scheduled laboratory activity.
D	55-64.9% of total points and not missing more than one scheduled laboratory activity.
F	Below 55% of total points or informal or incomplete official withdrawal from course, or if a student misses more than one scheduled laboratory activity for reasons other than documented illness or emergency.
I	Incomplete; given at the **INSTRUCTOR'S OPTION** when student is unable to complete a small part of the course because of circumstances beyond his or her control. It is the **STUDENT'S** responsibility to make up incomplete work. Failure to satisfactorily make up incomplete work within the appropriate time period will result in a grade change for "I" to the contingency grade identified by the instructor (see catalog); may be issued if documented serious illness or emergency forces a student to miss more than one scheduled laboratory activity.
CR	65% or above in total points; the student must indicate the intent to take the course as **CR/NC** in writing by the end of the 10th week of classes (see catalog).
NC	Below 65% of total points; this grade only available under the **CR/NC** option (see above and see catalog).
N	**NOT GIVEN EXCEPT UNDER EXTREMELY RARE CIRCUMSTANCES** (e.g., documented serious illness or emergency that prevents the student from officially withdrawing from the course); may be issued if documented serious illness or emergency forces a student to miss more than one scheduled laboratory activity; never used as an alternative for an "F" grade.
W	Official withdrawal from the course after the third week and prior to the end of the 10th week of classes (see catalog).

Waiver of minimum requirements for specific grades may be given only in unique situations at the instructor's discretion.

Students involved in academic dishonesty will receive an "F" grade for the course. Academic dishonesty is defined in WCC's college catalog.

LEARNING RESOURCES

No textbook will be used in this laboratory course. Descriptions of laboratory assignments and activities will be made available at the course Laulima site and/or distributed in class.

STUDENT RESPONSIBILITIES

Students should carefully review the attached sheet detailing inherently dangerous activities of this course and sign the appropriate U.H. Assumption of Risk and Release and Medical Consent forms.

Students are expected to participate in all laboratory activities and complete all course assignments on time.

Students are expected to be prepared in advance when they arrive to class. Being prepared includes the following: having already read text materials (e.g., textbook readings and handouts) assigned for that day's activities, bringing required work materials (e.g., lab notebook, textbook, handouts, writing supplies, etc.), and having completed any assigned pre-lab tasks.

Any changes in the course schedule, such as examination dates, deadlines, etc., will be announced ahead of time in class. It is the student's responsibility to be informed of these changes.

It is the student's responsibility to be informed about deadlines critical to making registration changes (e.g., last day of erase period and last day for making an official withdrawal.

The student should understand that ZOOL 200L is a challenging course. Thus ZOOL 200L requires much time and serious dedication.

ZOOL 200L LABORATORY AND FIELD ACTIVITIES

Students enrolled in ZOOL 200L 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, cover slips, 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 en 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 any 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 time.

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 swimsuits, 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, lionfish, 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 powerboat without specific training. While in powerboats, students should remain seated at all times. No powerboat should be used without proper safety gear (i.e., first aid kit, life vests, oars, anchor, flares and other essential gear).

DISABILITIES ACCOMMODATION STATEMENT

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, lemke@hawaii.edu, or you may stop by Hale ʻĀkoakoa 213 for more information.