

ZOOL 200 Marine Biology

03 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

Biological, physical, and chemical characteristics, flora and fauna, and interactions of components of marine ecosystems; survey of marine environments; utilization, exploitation, pollution, and conservation of marine resources; with special emphasis on the Hawaiian marine environment. (3 hrs lecture) WCC DB

PREREQUISITES

No prerequisites. The student is recommended to take the companion laboratory course ZOOL 200L concurrently with ZOOL 200.

STUDENT LEARNING OUTCOMES

The student learning outcomes are

1. Explain the process and philosophical basis of scientific inquiry.
2. Distinguish between living things and inanimate objects.
3. Demonstrate an understanding of the physical and chemical characteristics of the marine environment, especially those of the Hawaiian marine environment, and how they impact marine life.
4. Communicate knowledge of the diversity of marine organisms, especially Hawaiian species.
5. Exhibit an appreciation of the interaction between structure and function of marine life and how marine organisms are taxonomically related.
6. Illustrate and provide examples of the ecological role of and relationships between marine organisms.
7. Describe the major life zones of the ocean and the adaptations of living things relevant to being a successful species in these zones.
8. Recognize and suggest solutions to the negative impacts of human activities on the marine environment.
9. Research and write, using the language of the field, about a marine biology topic.

REQUIREMENTS SATISFIED BY THIS CLASS

- This class may satisfy the Windward Community College Associate in Arts Degree diversification requirement for a Natural Sciences biological science class (DB).
- 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 Hawai‘i Marine Option Program Certificate as a marine survey course.

COURSE CONTENT

Course Content and Topics

- Science as a Way of Knowing
- Overview of the History of Marine Biology
- The Characteristics of Life: The Chemical Basis of Life
- The Characteristics of Life: Complexity and Organization
- The Characteristics of Life: The Cell Theory and Types of Cells
- The Characteristics of Life: Reproduction, Inheritance, Development
- The Characteristics of Life: Interaction with the Environment and Evolution
- Geography and Geology of Ocean Basins
- Geologic History of the Hawaiian Islands
- The Chemical and Physical Environment of the Ocean
- Overview of the Diversity and Classification of Living Things
- Marine Prokaryotes, Protists and Fungi
- Marine Plants
- Marine Invertebrates
- Marine Fishes
- Marine Reptiles and Birds
- Marine Mammals
- The Principles of Marine Ecology: Population Growth
- The Principles of Marine Ecology: Species-Species Interactions
- The Principles of Marine Ecology: Primary Productivity, Energy Flow, Biogeochemical Cycles: Food Chains and Webs
- The Principles of Marine Ecology: Ecological Succession
- The Littoral Zone
- Estuaries
- Life on the Continental Shelf
- Coral Reefs
- The Deep Ocean Floor
- Living in the Water Column: Planktonic Life
- Living in the Water Column: Nekton
- Human Interaction in the Sea: Resource Utilization and Management
- Human Interaction in the Sea: Pollution

Skills or Competencies

- Using the language and terms appropriate to the natural sciences, citing examples when appropriate, the student will describe and integrate basic biological principles and define basic biological terms presented in lecture and required texts, citing specific examples when asked for. These principles includes the following areas:
 - The philosophy and characteristics of science and the scientific method.
 - The difference between hypotheses, theories and laws in science.
 - The definition of life and how living things differ from inanimate objects.
 - How living things are classified and named and the characteristics used to classify living things.
 - The chemical architecture of living things and basic biochemistry (photosynthesis, respiration, fermentation) of organisms.
 - The parts, their structures and functions, of cells; how prokaryotic cells differ from eukaryotic cells; and how plant and animal cells differ.
 - Patterns of asexual and sexual reproduction and development.
 - In the most general way, how genetic information is passed from parents to offspring.
 - Evolution as the unifying principle of biological science; and the evidence supporting evolution and natural selection.
 - The characteristics, classification and basic biology of marine prokaryotes, protists, fungi, plants, invertebrates, and vertebrates
- Using the language and terms appropriate to the natural sciences, citing examples when appropriate, the student will describe and integrate basic information related to the marine environment and the organisms that inhabit it. This information includes the following:
 - The general characteristics of the ocean as a habitat (e.g., the origin & structure of ocean basins, chemical & physical properties of seawater, and the characteristics of waves, tides & currents) and how it differs from other environments (land, freshwater, & air); the classification of the marine environment.
 - The origin of the Hawaiian Islands and the special characteristics of Hawai'i in relationship to its marine flora and fauna.
 - The general adaptations of living things to life in the sea.
 - Population growth of marine species, including the factors that may limit this growth.
 - Interactions among marine species (competition, predation, symbioses, niche concept, keystone species, etc.).
 - The productivity of the ocean and the trophic relationships (e.g., nutrient recycling, energy flow, food chains & webs) of marine ecosystems.
 - The characteristics of the benthic environments (e.g., intertidal, shallow subtidal, abyssal benthos, hydrothermal vents & coral reefs), the organisms, and their respective adaptations, that inhabit these environments.
 - The characteristics, adaptations and ecology of marine planktonic forms.
 - The characteristics, adaptations and ecology of marine nekton forms (e.g., fish, whales, pinnipeds, marine birds and reptiles).
 - The potential of ocean resources and the influence of human activities involving the ocean (e.g., utilization and exploitation, ocean pollution problems).
 - Identification of common species of Hawaiian marine flora and fauna.
- Using the language of the field, and following the format appropriate for a scientific research review paper, research and write on an approved marine biology topic.

COURSE TASKS, ASSESSMENT AND GRADING

MARINE BIOLOGY RESEARCH PAPER. The student will complete a formal library research report on an approved marine biology topic in the form of a typical scientific review paper. Development of this report may involve submissions of drafts and personal interviews to discuss the development of these drafts towards the production of a final draft. Specific details on the format of this report will be presented in class (100 points total).

QUIZZES. The student will take a minimum of ten quizzes (15 points each; 150 points total) administered through the Internet (Laulima) during specified time periods. These quizzes will address the detailed content and major concepts presented in the lectures, lecture outlines, text readings, and study guide activities. If the student takes more than ten quizzes, only the best ten quiz scores will be used in calculating the student's total points. Since these quizzes may be taken using home computers connected to the Internet, students may refer to instructional resources (text, study guide, lecture notes, etc.) 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).*

EXAMINATIONS. The student will take one midterm examination (100 points) and a non-cumulative final examination (100 points) to demonstrate understanding of information presented primarily during lectures. Exams will be delivered through the Internet via Laulima at the student's respective learning resource center. These proctored exams will be closed-book exams and students will not be allowed to refer to texts, notes, nor other materials while taking the exam. **NO RETESTS** will be given. The student must take the exam during the scheduled time period. A student missing an exam because of an illness or legitimate emergency may take a make-up exam as soon as possible after the student returns from the illness and as determined by the instructor. In such a circumstance, the student should make every reasonable attempt to contact the instructor before the exam period is over (or as soon as possible). While make-up exams will cover the same content area as a missed exam, the exam format and specific questions may be different.

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

Research Paper	100 points
Quizzes	150 points
Midterm Examination	100 points
<u>Final Examination</u>	<u>100 points</u>
TOTAL	450 points

Letter grades will be assigned as follows:

A	90% or above in total points.
B	80-89.9% of total points.
C	65-79.9% of total points.
D	55-64.9% of total points.
F	Below 55% of total points or informal or incomplete official withdrawal from course.
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).
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); 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

Required Textbook: Castro, P., and M.E. Huber, 2008. Marine Biology. Seventh Edition. McGraw-Hill.

Handouts and selected readings from various texts will also be distributed in class or through the Internet.

STUDENT RESPONSIBILITIES

The student is expected to attend and actively participate in all course lectures and activities, and complete all assignments, quizzes and examinations on time.

The student is expected to be prepared in advance before the class sessions. Being prepared includes the following: having read text materials (e.g., textbook readings and other resources) assigned for that day's activities and bringing required work materials (e.g., textbook, handouts, writing supplies, etc.) to the session.

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).

Students should expect a level of difficulty comparable to other 200-level science classes intended for non-science majors. When difficult concepts and detailed information are presented, it is the student's responsibility to take the appropriate steps to learn and understand these concepts and information.

Science courses at W.C.C. generally require two to three hours of independent private study time for each hour in class. However, because of the nature of the material presented in ZOO 200, more study time may be required (depends upon the student's science/biology background). It is the student's responsibility to allocate the appropriate time needed for study in an environment conducive to quality study. The student must budget time efficiently and be realistic about all personal and professional commitments that consume time.

HOW TO SUCCEED IN THIS CLASS

Understanding biological science involves understanding many difficult concepts and vocabulary, not just knowing facts. The student should know that the details to these concepts are important. In addition, the student will be introduced to hundreds of new words. In some cases, words that are familiar in a context other than biology will be introduced in the context of biology. The student will need to understand and use these terms in a biological science context.

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

The student will not succeed in this class without taking careful lecture notes and reading the corresponding material in the textbook. As soon as possible (best if done on the same day), the student should copy over these lecture notes filling in gaps and missing information by referring to the textbook and other resources provided. The student should carefully review these rewritten lecture notes as often as possible.

In addition to copying over lecture notes, study activities should include drawing labeled diagrams or graphs that illustrate important biological phenomena (e.g., the internal structure of the cell, the stages of cell division, or the anatomy of the heart). These diagrams need not be works of art, but should clearly illustrate significant information. Before an exam, it would be useful to redraw these labeled diagrams and graphs from memory.

The student should make flashcards for each new vocabulary word presented (refer to lecture outlines for a lists of required terms). The student should use these card for self-testing as often as possible. The student should also practice using the words to explain biological concepts.

The student should do all of the recommended study guide activities and review all of the Internet resource materials provided.

The textbook and other resources may include useful study questions. The student should write out answers to all of these questions as though they were required assignments. Students could exchange these answers and provide constructive feedback to each other.

The student should read the textbook materials corresponding to a particular lecture before and after that lecture.

Students are recommended to establish study groups and study together. The students in these

groups may test each other's knowledge and understanding of the information. They may also take turns teaching each other.

The student should ask the instructor to explain the things that the student does not understand.

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 'Akoakoa 213 for more information.