BIOL 13: MARINE BIOLOGY

Foothill College Course Outline of Record

Heading	Value
Units:	5
Hours:	4 lecture, 3 laboratory per week (84 total per quarter) Three all-day field trips.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Area III: Natural Sciences
Transferable:	CSU/UC
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- The student can understand how to collect scientific data quantitatively and present those data graphically.
- The student can describe the theory of evolution.
- The student can make well informed decisions as a consumer based on their understanding of sustainable fishing practices and evaluate how their own behavior affects future fish conservation.

Description

An introduction to biology using marine animals, plants and ecosystems. Major emphasis given to the ecology and conservation issues with examples drawn from California marine life. Conceptual development of seashore, estuaries, coral reefs, kelp forests, and pelagic life as interrelated ecosystems.

Course Objectives

The student will be able to:
A. describe the scientific method and explain its uses and limitations.
B. explain the interrelationships between the biotic and abiotic environment.
C. explain physical features of the ocean.
D. identify the kingdoms and phyla of selected marine organisms.
E. recognize the composition and major dynamics of selected marine ecosystems.
F. explain the effect of global and personal human activity on marine ecosystems.
G. make informed decisions on biological issues that affect our world.

Course Content

A. Basic science
1. Rationale and application of the scientific method
2. Limitations of the scientific method
3. Attributes of living organisms
4. Cell theory, structure and function
5. Levels of organization from atoms to biosphere
B. Interrelationships between the biotic and abiotic environment
1. Nutrient cycling
a. Definition and types of nutrients
2. Producers
a. Primary production
b. Relationship to nutrient cycles and energy flow
c. Import marine producers
1) Bacteria
2) Protista
3) Plants - vascular and non-vascular
4) "Algae"
3. Consumers
4. Decomposers
5. Energy transfer
a. Kinds of energy
b. Laws of thermodynamics
6. Ecosystem function
C. Physical features of the ocean
1. Plate tectonics and continental drift
2. Zonation and stratification
3. Characteristics of water
4. Salinity and osmosis
5. Tides, currents and waves
6. Water cycle
D. Marine organisms
1. Types of cells prokaryotic vs. eukaryotic
2. Methods of reproduction, mobility, and feeding
3. Systematics: Classification of organisms based on genetic relatedness - overview of the 3 domain and 5 kingdom classification system
4. Evolution and adaptations of major phyla and of vertebrate classes, with introduction to representative organisms
5. Classification of organisms based on lifestyle - return to zonation and define plankton, nekton, and benthon, and provide examples
E. Marine ecosystems
1. Intertidal zone
2. Estuaries
3. Coral reefs
4. Continental shelf
5. Pelagic zone
a. Epipelagic
b. Deep ocean
F. Human impact on marine ecosystem
1. Population growth
2. Pollution
3. Endangered species
a. Habitat destruction
b. Over hunting or over fishing
c. Exotic species
4. Conservation efforts - successes and concerns
5. Current topics
a. Ozone depletion
b. Global warming

Lab Content

Collaborative laboratory and field exercises as developed by course instructors.
A. Laboratory Topics
1. Physical oceanography - the ocean as a habitat
a. Bathymetry
b. Salinity
c. Density
2. Properties of seawater
3. The Scientific Method
4. Phytoplankton and zooplankton - taxonomy and diversity
5. Invertebrate biology: Identification and classification of marine invertebrates
6. Vertebrate biology and ecology - chondrichthyes and osteichthyes

a. Identification of local species
b. Hydrodynamics and locomotion
7. Marine mammal biology
a. Ecological adaptations to marine environment
b. Diving physiology
8. Intertidal ecology - The Pacific Rocky Intertidal Zone
9. Marine conservation
B. Laboratory Skills
1. Identification of major marine phyla
2. Use of laboratory materials, such as general laboratory equipment
3. Ability to collect simple data in the field, analyze data, and present data using charts and graphs
4. Ability to make experimental observations and draw conclusions for experiments involving topics such as fish hydrodynamics

Special Facilities and/or Equipment

A. Fully equipped biology laboratory, lecture room, binoculars, marine aquaria, water test kits and pollution test kits.

Method(s) of Evaluation

A. Oral and/or written laboratory reports and projects.
B. Demonstration of mastery of lecture material by written quizzes, midterm exams, and/or a comprehensive final.

Method(s) of Instruction

A. Lecture
B. Discussion
C. Oral presentations
D. Laboratory
E. Field trips

Representative Text(s) and Other Materials

Castro, Peter, and Michael E. Huber. Marine Biology. 11th ed. McGraw-Hill, 2018.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

A. Students research and present on seafood consumption.

B. Students answer short essay questions about physical structure of ocean.

C. Students compare and contrast body shape, hydrodynamics and niches of two different species.

Discipline(s)

Biological Sciences