

COURSE OUTLINE

Biology 126 Field and Laboratory Investigations in Marine Biology

Catalog Statement

BIOL 126 is an introductory science laboratory offering a general survey of the diversity of life in the marine environment and the ecology of some of its major ecosystems. This course covers aspects of microscopy, pH, cell respiration, photosynthesis, biodiversity, ecology, and evolution. The laboratory exercises utilize the comparative method in order to study the anatomy, physiology, and evolution of some of the major phyla of marine organisms. This course requires the participation in three or more field trips, which introduce the student to research methods, marine biodiversity, evolution, and the ecology of marine ecosystems. Field trips total a minimum of 9 hours.

Total Lecture Units: 0.0

Total Laboratory Units: 1.0

Total Course Units: 1.0

Total Lecture Hours: 0.0

Total Laboratory Hours: 48.0

Total Laboratory Hours To Be Arranged: 0.0

Total Faculty Contact Hours: 48.0

Prerequisite: BIOL 125 (may be taken concurrently)

Course Entry Expectations

Prior to enrolling or while enrolled in the course, the student should be able to:

- explain concepts in general biology using examples from the marine environment;
- identify the basic geological, chemical, and physical characteristics of the marine environment;
- describe some the potential adaptations that allow organisms to survive and reproduce in the marine environment;
- identify the major phylogenetic groups of marine organisms and describe some of the evolutionary trends within them;
- compare and contrast the major marine ecosystems;
- identify the problems caused by human impact on the marine environment and its resources.

Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:

- utilize a microscope and measure cell sizes;
- prepare a culture of marine bacteria and stain samples for observation;
- explain the relation between pH, photosynthesis, and cell respiration;

- identify photosynthetic pigments using chromatography and spectrophotometry;
- identify the major groups of phytoplankton and macroalgae, their anatomical and physiological characteristics;
- identify the main anatomical and physiological characteristics of some of the major phyla of marine animals;
- describe some of the major concepts of marine biodiversity, evolution, and ecology.

Course Content

Total Faculty Contact Hours = 48.0

Microscopy, Prokaryotes, and Plankton (7 hours)

Parts and functions of a compound microscope
Measurement of cell sizes under the microscope
Preparation of cultures of marine bacteria
The Gram stain and preparation of slides of marine bacteria
Identification of the major morphological types of marine bacteria
Identification of major groups of unicellular eukaryotic marine plankton

pH, Photosynthesis, and Cell Respiration (4 hours)

pH scale and using pH meters
Buffering capacity of seawater
The relationship between photosynthesis, cell respiration, and pH
The effect of pH on marine organisms
Global warming, CO₂, and the pH of seawater

Phytoplankton, Macroalgae, and Photosynthesis (4 hours)

Anatomy and physiology of the major groups of marine phytoplankton and macroalgae
Separation and identification of photosynthetic pigments using paper chromatography
Identification of photosynthetic pigments using spectrophotometry

Mollusca (4 hours)

Identification of the major groups of marine molluscs
Anatomy, physiology, and evolution of molluscs
Squid dissection

Arthropoda (4 hours)

Identification of the major groups of marine arthropods
Anatomy, physiology, and evolution of arthropods
Crab dissection

Echinodermata (4 hours)

Identification of the major groups of marine echinoderms
Anatomy, physiology, and evolution of echinoderms
Sea star dissection
Fertilization of sea urchin eggs

Arthropoda (4 hours)

Identification of the major groups of marine arthropods
Anatomy, physiology, and evolution of arthropods
Crab dissection

Invertebrate Chordates, Cyclostomata, and Chondrichthyes (4 hours)

Identification of the major groups of marine invertebrate chordates, cyclostomes, and chondrichthyes

Anatomy, physiology, and evolution of invertebrate chordates, cyclostomes, and chondrichthyes

Shark dissection

“Osteichthyes” (4 hours)

Identification of the major groups of marine “osteichthyes”

Anatomy, physiology, and evolution of “osteichthyes”

Mackerel dissection

Field trips from the following choices to complement topics in biodiversity, ecology, evolution, and marine mammals **(9 hours)**

Natural ecosystems: rocky and soft intertidal, sandy beach, open water, coral reefs, mangroves, and estuaries

Natural History Museums

Aquariums

Methods of Instruction

The following methods of instruction may be used in this course:

- classroom introductory lecture and discussions;
- laboratory experimentation and analysis of data;
- group dissections;
- observation of life and preserved specimens;
- fieldtrips to different ecosystems, museums, and aquariums;
- educational technologies including multimedia and Internet.

Out of Class Assignments

The following out of class assignments may be used in this course:

N/A

Methods of Evaluation

The following methods of evaluation may be used in this course:

- midterm examinations, each consisting of multiple choice, true/false, diagrams, short answers, and analytical questions;
- completion of laboratory and field trip handouts;
- active participation in laboratory activities, field trips, and discussions.

Textbooks

Gago, F. J. and S. L. Bower. *Biol 126. Laboratory Exercises in Marine Biology*. Glendale Community College. Print.

Student Learning Outcomes

Upon successful completion of the required coursework, the student will be able to:

- identify and compare some of the defining anatomical and physiological characteristics of dominant phyla of marine organisms;
- identify some of the main concepts in marine biodiversity, evolution, and ecology.