



SANT'ANNA
INSTITUTE
SORRENTO

Introduction to Marine Biology – MSC 113

(45 contact hours, 3 credits)

COURSE DESCRIPTION

This course focuses on the biology of organisms residing in the sea, from the diversity of planktonic communities to marine megafauna, taking into consideration the ecological principles that govern marine life. The course aims to provide a solid educational background in basic and applied marine biology. Emphasis will be placed on marine environment issues and the adaptive and evolutionary mechanisms of organisms that allow them to occupy marine habitats. In particular, the Mediterranean Sea and the conservation of marine environment will play a central role in the course subjects, profiting from the availability of unique ecosystems and a nearby renown marine protected area to conduct thematic field trips and practical tutorials.

REQUIREMENTS: bring a mask and a snorkel for Marine Bio field trips.

STUDENT LEARNING OUTCOMES

At the conclusion of this course, the student will be able to do the following:

1. Interpret how marine fauna and flora interact and identify their role in marine systems.
2. Describe the structure of marine communities and the transfer of energy and matter through marine food webs.
3. Describe the ways that oceans are created and destroyed.
4. Classify the various elements of the marine environment.
5. Analyze the factors adversely impacting marine ecosystems and possible ways to overcome them.
6. Critically evaluate evidence, arguments and ideas from different sources in a self-directed manner, leading to coherent and logical analysis.

Topics

Module One: The Marine Environment

A. Origin and geology of the ocean

- B. Properties of sea water
- C. The ocean in motion
- D. Classification of the marine environment

This module sets the scene by looking at how the oceans are created and destroyed by sea floor spreading and plate tectonics and provides some basic information on the oceanography and the structure of the physical ocean from the continental shelf to the abyssal plain. The chemistry of seawater, the physics of light and sound propagation in the ocean, the dynamics of tides and major currents and the large scale movements of seawater in the ocean basins are examined.

Module Two: Marine organisms

- A. Life in a fluid medium
- B. Marine organisms classification (spatial, taxonomic and trophic)
- C. The microbial world
- D. Primary producers: phytoplankton, seaweeds and plants
- E. Marine invertebrates
- F. Marine fishes
- G. Marine reptiles-birds

Marine mammals In module two, students look at the evolution of life in the ocean and the peculiar flora and fauna that inhabit the various marine habitats from the tiniest one-celled organisms to the largest marine mammals. The primary productivity and the trophic food webs which support all life in the sea will be examined. Students will learn the extraordinary evolutionary adaptation of the marine vertebrates as they evolved from bland animals, 200 million years ago to the fully adapted marine creatures we see today. This module includes a visit to the Marine Protected Area of Punta Campanella with a special program to study benthic primary producers on-field, with marine excursion (snorkeling with mask and fins) and microscope laboratory.

Mid-term Evaluation

Module Three: Marine ecosystems

- A. Introduction to marine ecology
- B. Intertidal communities
- C. Estuaries
- D. Coral Reefs
- E. Continental shelf and neritic zone
- F. Open sea
- G. Deep ocean
- H. Polar Environments

In module three, students will deepen their knowledge of the various marine ecosystems and the peculiar relationships among the different species that inhabit these environments.

Module Four: Human and the Sea

- A. Harvesting of the ocean's resources
- B. Pollution and coastal development
- C. Biological invasion and global warming
- D. Case study: Mediterranean loggerhead turtle population

The final module looks at fisheries and the food we obtain from the sea and discusses the main food species along with the impacts of over-fishing. Students will learn about ocean pollution, toxic pollutants, sewage and marine debris which are degrading the ocean and how the animals of the sea are coping with the circumstances. This module includes a field trip in a special protected area of Punta Campanella where student will collect data on abiotic and biotic factors to produce a scientific report including the ecosystemic analysis of the site that will be part of the final examination.

Final Exam

TEXTS

- J. Morrissey, J. Sumich, Introduction to the Biology of Marine Life, Jones and Bartlett Publishers, Inc, latest edition.
- E. Norse, L. Crowder, Marine Conservation Biology: The Science of Maintaining the Sea's Biodiversity, Island Press, latest edition.
- M. Speight, Martin, P. Henderson, Marine Ecology: Concepts and Applications, Wiley-Blackwell, latest edition.

ASSESSMENT

- 20%: Mid Term Evaluation
- 25%: Presentations
- 25%: Attendance and Participation
- 30%: Final Exam

SANT'ANNA INSTITUTE ABSENCE POLICY

You are allowed two unexcused absences. Documentation for any other absence **MUST** be produced and **APPROVED** by the professor or the Director. For absences due to illness, please provide the professor with a doctor's note upon returning to class as well as inform them and/or the school the first day of illness. Each unexcused absence after the second will reduce your grade by 3 percentage points.

Note: when the missed lesson is a field-trip, it counts as 2.