Universitat Autònoma de Barcelona

2017/2018

Marine Biology

Code: 100830
ECTS Credits: 6

Degree	Type	Year	Semester
2500251 Environmental Biology	OB	3	1

Contact

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Use of languages

Principal working language: spanish (spa)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: No

Other comments on languages

The subject is taught in Catalan and Spanish

Teachers

Francesc Xavier Munill Bernardich

Anna Soler Membrives

Prerequisites

There are no specific prerequisites, although it would be desirable for the students to have already studied and passed subjects in Zoology, Ecology, Propection of the Natural Environment, Extension of Zoology and Botany.

Objectives and Contextualisation

The objective of this course is to provide a basic training in the knowledge of the marine environment from the point of view of basic concepts and physical laws that are used in the study of the oceans, as well as living beings and their interrelationships. Introduce the student in the knowledge of the structure of the marine ecosystem and its biodiversity, and in the study of the most remarkable cases of the interaction of the activity of the man on the marine environment. So that they are able to intuit its consequences.

The specific formative objectives of this subject are:

- Give the student some fundamentals of the main physical and chemical processes that take place in marine aquatic ecosystems.

- Introduce the student to the physical bases or principles that are used to describe the dynamics of aquatic systems.

- Provide basic training in the knowledge of the marine environment from the point of view of living beings and their interrelationships.

- To initiate the student in the structure of the marine ecosystem and in its biodiversity.

- Introduce the student in the processing of energy in the marine environment, both at the individual and ecosystem level.

- To offer to the student the most remarkable cases of the interaction of the activity of the man on the marine environment and that are able to intuit its consequences.

- Develop critical and innovative sense, as well as interest in continuing professional development.

Content

INTRODUCTION

1. Introduction. What is Marine Biology? Historical perspective of marine biology. An oceanic world. Differences for life between the terrestrial and marine environment. Classification of marine organisms and environments.

II. THE MARINE ENVIRONMENT

2.- Sea water: chemical factors. Composition of sea water. Chemical elements present major and minor. Nutrients. Dissolved gases (O_2, CO_2). Particle and dissolved organic matter (MOP and MOD). Sediments. Type of sediment. Sedimentation on the continental shelf and in deep marine basins.

3.- Physical factors of the sea water. Salinity, temperature (thermocline), density, viscosity, light. Vertical structure of the ocean: masses of water, diagrams T / S. Orography. Structure of the margins of the ocean basins and the bottoms of the oceans (zoning and profiles).

4.- The dynamics of the water masses. The atmosphere and the ocean. The force of Coriolis. Geostrophic currents. Wind currents: Ekman's spiral, convergences and divergences. Thermohaline circulation. Global circulation: surface currents, deep currents, circulation in the Mediterranean. Marine waves: capillary, gravitational, wave interference, internal waves, seismic waves. The tides. Coastal upwelling.

III. MARINE ECOSYSTEM STRUCTURE: Marine communities

5.- Primary production to the sea. Primary production. Methods to measure primary production. Methods to measure phytoplankton biomass. Factors that control and condition primary production. Factors that control the percentage of nutrient salts in the Mediterranean. Variations in global productivity: latitudinal, seasonal, regional and bathymetric.

6.- Marine communities: pelagic domain I. Plankton. Generalities. Classification of plankton. Phytoplankton: composition and distribution. Methodology of sampling and study of plankton.

7.- Pelagic domain II. Zooplankton: generalities. Composition of zooplankton. Adaptations of plankton to pelagic life. Distribution of zooplankton: Vertical migrations. The plankton indicator.

8.- Pelagic domain III. Necton: Generalities. Composition. Adaptations to pelagic life. Distribution of the necton: horizontal migrations. Methodology of sampling and study. Current status of exploited stocks.

9.- Marine communities: benthic domain I. Generalities, benthic habitats, type of benthos. Comparison between benthos and plankton. Composition and distribution (rocky and sandy substrate, coastal and deep). The community of Posidonia oceanica. Adaptations of benthic animals. The organization of space: succession. Sampling methodology.

10.- Benthic domain II. Estuaries and coral reefs. Origin and type of estuaries. Physico-chemical characteristics of estuaries. Estuaries as ecosystems. Human impact on estuaries. Coral reefs: Bioconstructive

organisms (corals and others). Types of coral reefs (coastal, barrier, atolls). Ecology of coral reefs. Threats to coral reefs.

IV. ENERGY PROCESSING

At the individual level

11.- Feeding. Introduction. Feeding behavior to the sea. Feeding in plankton. Feeding in coastal and deep benthos. Methodology of food study.

12.- Reproduction. Introduction: reproduction at sea (biomass renewal). Adaptations to ensure reproduction. Reproduction in plankton. Reproduction in benthos. Type of development at sea. Methodology of reproduction study.

At the ecosystem level

13.- The biotic interrelations. Introduction. Competition and coexistence. Predation in benthos and plankton, strategies to protect against predation. The symbiosis in the sea: parasitism, mutualism and commensalism.

14.- The transfer of energy. Trophic networks. Introduction. Trophic chains and energy transfer. Estimation of secondary production. Trophic networks. The microbial loop. Comparison between marine and terrestrial production.

V. ENVIRONMENT-MAN (INTERACTION OF MAN'S ACTIVITY ON THE MARINE ENVIRONMENT)

15.- The impact of man. Type of uses of the sea. Industrial and agricultural installations and activities. Exploitation of its abiotic and biotic resources.
Protection and conservation. Protection tools. Threats and threatened species. Conservation and management of the coastal strip.

PRACTICAL CLASSES:

Practice 1. To two different beaches, collection of biological samples and measurement of abiotic parameters of the coastal zone. Labeling and conservation.

Practice 2. (performed in 3 sessions of 4 h) Sample processing. Separation of samples, analysis, identification, data collection. Treatment of results. Elaboration of a written work.

Practice 3. Discussion of results of practical classes.

Parctice 4. Correction of the practice article.