escola superior de turismo e tecnologia do mar
instituto politécnico de leiria

SCIENCE AND MARITIME TECHNOLOGY AREA

SUBJECTS AVAILABLE FOR EXCHANGE STUDENTS

Science and Maritime Technology					
Winter Semester		**ECTS**	**Spring Semester**		**ECTS**
9014330	**Aquaculture**	6	9014317	**Animal Physiology**	6
9014331	**Fishery Biology**	6	9014335	**Maritime Resource Management**	6
9014322	**Environmental Biotechnology**	5	9014319	**Oceanography**	6
9014332	**Ichthyology**	6	9014336	**Pathology**	6
9014312	**Introduction to Biotechnology**	4	9014320	**Pollution and Ecotoxicology**	6
9014311	**Statistical Methods and Experimental Delimitation**	7	9014337	**Aquatic Production Technology**	6
9014315	**Ecology**	6	9014327	**Pharmaceutical Biotechnology**	6

Note: All subjects are thought in Portuguese. It depend on each teacher to give the class in English or other language. Students will be given material in English and evaluation will also be in English. Tutorial appointments can be schedule with each teacher.

Winter Semester

Aquaculture 6 ECTS

The aim of this subject is to give students a general training of the concepts of aquaculture. Presents the key content in the species selection, nutrition, engineering and economics.

Aims:

To acquire knowledge of the importance of aquaculture thought its implement in the world and in Portugal; To acquire knowledge of aquaculture development history, the actual state of Portugal and World aquaculture production, observing the necessities of different world regions; To obtain theoretical and practical knowledge of aquaculture systems of production, biology and nutrition of aquatic culture species; To acquire knowledge related to species selection and aquaculture nutrition, engineering and economy.

Fishery Biology 6 ECTS

Fisheries; characterization and identification of the most landed resources.

Aims:

To identify and characterize, from a bio ecological point, the main fisheries resources; To know the components of catch and methods for identifying stocks; To characterize the main components of populations dynamics from one resource; To know available tools for estimating population dynamics parameters; To know and assess the effects of fishing on marine environments.

Environmental Biotechnology 5 ECTS

The subject of the 3rd year of the degree for the students in BMB with particular interest in biotechnology, and aims to present the basic concepts, the wide applicability and the innovation opportunity associated with environmental biotechnology.

Aims:

To know biotechnological perspective and address the processes of wastewater treatment and waste and meet bioremediation processes; To know the main lines of research in the environmental area; Knowing the relevant environmental legislation; Ability to interpret scientific articles and selection of information according to the proposed goals; Development of communication skills (preparation and public presentation of a scientific paper).

Ichthyology 6 ECTS

Ichthyology is the branch of zoology devoted to the study of fishes

Aims:
To recognise fish classification, anatomy, physiology and distribution; To argue evolutional history and the morph-physiological adaptations that had determined the appearance of the present great groups; To comprehend fish biology in order to better understand the requirements of different species in the environment where they are integrated; To dominate basic vocabulary used in ichthyology; To identify the scientific and common names of the most frequent species, to know how to classify a fish in great groups (many until the family) and to locate and to use the available resources to create a classification until the species

Introduction to Biotechnology 4 ECTS
The subject fits into the 2nd year of the degree and in a generalist way seeks to introduce Biotechnology and its different areas of operation.
Aims:
Developing the capacity to search literature efficiently; Ability to interpret scientific papers and select information according to the objectives; Development of communication skills (preparation and public presentation of scientific work); Recognize the potential of biotechnology as an innovative mean in various fields of knowledge due to its interdisciplinary nature; Recognize the different application areas of biotechnology; Overview of the Biotechnology Market in the European Union.

Statistical Methods and Experimental Delimitation 7 ECTS
In today's society the amount of information, both in the form quantitatively and qualitatively, is huge and complex. In this respect, it is necessary to reflect on the processes of organization, systematization and summarization of data. Thus, in curricular unit of Statistical Methods and Experimental Design the students will have the opportunity to acquire skills in the analysis of biological data, obtained in observational studies as well as in studies with experimental design.
Aims:
Development of the ability to identify the logical components in research in marine biology; Developing the capacity of outlining, analyse and interpret experiments in marine biology using techniques of univariate and bivariate analysis; Development of critical spirit in order to discuss the adequacy of an experience to a specific biological problem and the interpretation of experimental results; Development of linguistic skills in English (through the reading of scientific articles), in computing (in the analysis of data) and agility in information and communication technologies; Developing the ability to work in team.

Ecology 6 ECTS
This is the initiation module to the science of Ecology that gives to the students the fundamental knowledge about the distribution and abundance of living organisms, and about the relationship between living organisms and their environment.
Aims:
To know and to understand the levels of organization in Ecology; To recognize the importance of the relationship between the organisms and the environment, namely of the biotic and abiotic environment as limiting factors; To understand the flux of energy and matter in ecosystems; To characterize and to distinguish the most important types of ecosystems; To understand the structure and the organization of populations and communities.

Spring Semester

Animal Physiology 6 ECTS
As the only subject concerning the science of Physiology in the course curricula, this subject intends to provide to the students solid baseline knowledge regarding Animal Physiology, particularly concerning marine animals.
Aims:
To know how to evaluate the relationship between the structure and the function of animals; To understand the importance of the maintenance of the ionic and osmotic equilibrium on the cells and body fluids of animals; To know how to explain the way in which the animals organ systems function, such as the circulatory and the respiratory systems; Understand the distinct ways of obtaining and using energy in animals; To be able to discuss the effects of temperature on animals.

Maritime Resource Management 6 ECTS
Understanding multiple strategies of fisheries and marine resource management and conservation.
Aims:

Knowing and understanding methods of stock assessment and monitoring; Acknowledging the relevance of production models in fisheries science and understanding how they work; Identifying biological reference points and telling the difference between target and limit points; Understanding the importance of upholding a strict code of ethics when working in fisheries biology.

Oceanography 6 ECTS

Oceanography studies the geologic, physical, chemical and biological processes which regulate the oceans.

Aims:

To recognize the main geologic, physical, chemical and biological processes which regulate the oceans; To describe the sea floor spreading process, the types of lithosphere plates boundaries and the oceanic provinces; To identify physical and chemical properties of the sea water and the processes of circulation; To explain the origin of waves and tides and its importance to the marine environment; To describe the biological structure of the ocean and its relation with the physical and chemical processes; To identify distribution patterns of plankton and marine benthos in space and time; To knowledge the main laboratory and field practices related to oceanography; To select techniques of sampling, treatment of samples and of data.

Pathology 6 ECTS

Disease outbreaks occurring in aquaculture are the bottleneck for production. Students will achieve skills to recognize disease, diagnose and prevention.

Aims:

To know pathological, immunological and environmental problems which affect aquatic organisms; To know diseases caused by virus, bacteria, parasites which affect fish, crustacean and molluscs, both wild and farmed; Diagnose and identify main diseases of fish, molluscs and crustacean; Perform and interpretation of parasitological, microbiological and histopathological analysis; To know prophylactic techniques and treatment of disease in aquatic organisms.

Pollution and Ecotoxicology 6 ECTS

The subject “Pollution and Ecotoxicology” aims to introduce the students to some basic concepts related to negative impacts derived from marine pollution, describe the diversity and sources of pollutants/contaminants and the fate of pollutants/contaminants. It also intends to address concepts related to Ecotoxicology with emphasis on marine ecosystems and biological populations by analysis of selected case studies.

Aims:

Understand the basic concepts related to Pollution and Ecotoxicology; Knowledge of the main methodologies applied on the evaluation of pollution and toxicology; Recognition of the main ecological impacts derived from marine pollution/contamination; Recognize situations of marine pollution and marine contamination; Identify the most frequent pollutants/contaminants of marine ecosystems; Describe the main negative impacts derived from the situations of marine pollution; Specify the biochemical effects of pollutants; Understand toxicology and detoxication mechanisms; Recognize ecological consequences resulted from marine pollution; Describe the key aspects related with ecotoxicology assays design in order to evaluate chronic and lethal effects on biological models.

Aquatic Production Technology 6 ECTS

The subject Aquatic Production Technology, framed in the 2nd semester of the 3rd year of the 1st cycle degree Marine Biology and Biotechnology, intends to frame technically and scientifically the aquatic production systems used to produce phytoplankton, zooplankton, shellfish, fish and crustaceans.

Aims:

Know and apply the appropriate methodology for the production of food chains in Aquaculture; Know and apply the appropriate methodology for the production of the main species of fish, molluscs and crustaceans, grown in Portugal and Worldwide; Develop practical skills in aquaculture planning.

Pharmaceutical Biotechnology 6 ECTS

It allows the students to recognize the importance of biotechnology in general industry and pharmaceutical industry in particular, allowing the acquisition of skills in pharmaceutical biotechnology.

Aims:

Acquire ability to percept the potential for development of new products, new therapeutic strategies and diagnostic associated with pharmaceutical biotechnology. Relate and apply acquired knowledge to the area of drug development and new therapies. Knowing the lines of investigation and types of basic compounds. Master the laboratory techniques applied to Pharmaceutical Biotechnology. Recognize the complexity and the time gap between the development process at laboratory level and the effective implementation of a therapeutic drug. Know the statutory and regulatory bodies. To know the future prospects of the sector.