Course guide
250566 - ECMAECOSPR - Marine Ecology, Ecosystems and Productive Processes

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.
Degree: BACHELOR'S DEGREE IN MARINE SCIENCE AND TECHNOLOGY (Syllabus 2018). (Compulsory subject).
Academic year: 2022
ECTS Credits: 6.0
Languages: Catalan

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
13388. To know and apply the lexicon and concepts of the Marine Sciences and Technologies and other related fields.
13390. Establish a good practice in the integration of common numerical, laboratory and field techniques in the analysis of any problem related to the marine environment.
13391. Participate and eventually lead multidisciplinary work teams in the field of Marine Sciences and Technologies to respond to the social challenges related to this field.
13394. Address the most relevant processes and their interactions related to their physical / chemical / biological / geological components, applying technical and scientific knowledge and criteria.
13395. To set, evaluate and propose solutions to the different conflicts of use and exploitation in the marine and coastal environment resources based on scientific and technical criteria.
13397. Carry out environmental impact, management and protection studies of the marine environment and adjacent coastal areas, including the corresponding infrastructures and their related impacts.
13403. Develop a conceptual framework to address the sustainability of the marine environment and the related socio-economic activities at different scales, explaining the effects of climate change.
13404. Set, plan and execute basic and applied research in the field of Marine Sciences and Technologies.
13405. Carry out calculations, assessments, surveys and inspections in coastal and marine environments, as well as the corresponding technical documents.
13406. Write technical reports and disseminate knowledge about the different components of the marine system, considering the applicable legal framework.
13407. Apply the necessary tools to analyze the economic and legal aspects of human actions and the related impacts on the marine environment, including technical advice and representation of companies and administrations.

Generical:
13380. Develop a professional activity in the field of Marine Sciences and Technologies.
13381. Address in a comprehensive manner the analysis and preservation of the marine environment with sustainability criteria.
13382. Apply state-of-the-art methods and techniques in oceanography and marine climate, jointly covering the physical, chemical, geological and biological aspects.

TEACHING METHODOLOGY
The course is based on theory sessions where main aspects of the course will be exposed. These sessions will be complemented with numerical exercises, analysis of case studies and assignments to complement the academic formation of the students.
LEARNING OBJECTIVES OF THE SUBJECT

In this subject, the basic aspects of biodiversity (of species, genetics and ecosystems), the concept of indexes (which relate the number of species of a community and other ecological magnitudes such as number, biomass, productivity, etc.), and how they are posed from a mathematical standpoint, will be introduced in a conceptual manner. Subsequently, a review of the management of the environment and natural resources will be made and finally aspects related to the Ecology and the interactions that determine the distribution, abundance, number and organization of the organisms in the ecosystems will be addressed. Emphasis will be placed on the ecology of marine aquatic populations, communities and ecosystems.

1.- Understand the concepts of system and ecosystem, ecology and evolution. Understand the adaptation of different organisms to their environment, as well as the close relationship that each link holds within an ecosystem.
2.- Understand the life cycle of marine species: the larval stages, growth, fertilization, mortality. Relate the different organisms in their ecosystems with reproductive and population strategies, dispersion, etc.
3.- Understand the interactions between species and the competence processes, as well as the state of maturity of an ecosystem as it adapts to the resource and evolves over time. Assimilate the concepts of zonation in the marine space, the processes that control the abundance and distribution of resources, cyclical perturbations over time and indirect interactions. Trophic cascade in the marine environment.

This is where students are expected to obtain a vision of real environmental problems in the marine environment from a perspective that combines, on the one hand, chemistry and biology, as well as the mathematical techniques to address these problems (Marine Ecology, Ecosystems and Productive Processes) and, on the other, the tools of chemistry, biology and physics (Marine Pollution, Origin, Transport and Impacts), which are needed to solve common problems in coastal and platform waters.

This subject also includes applied techniques in the visualization, interpretation and resolution of the problems addressed in this same subject.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Hours medium group</td>
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<td>10.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>15,0</td>
<td>10.00</td>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

Transfer of energy and matter

Description:
Models that describe the calculation of the transfer of energy and matter.
Numerical problems

Specific objectives:
Let the student become familiar with the numerical models of energy transfer and matter in ecosystems
Know how to solve numerical problem issues

Full-or-part-time: 24h
Theory classes: 8h
Practical classes: 2h
Self study: 14h
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Self study: 14h

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# Biogeochemical cycles

**Description:**  
Basic knowledge of the great cycles of terrestrial elements (carbon, nitrogen and phosphorus) and their relation with the oceanic and sea water.  

**Specific objectives:**  
Understand the particularities of the great cycles of terrestrial elements (carbon, nitrogen and phosphorus) and their relation with the marine environment  

**Full-or-part-time:** 14h 23m  
Theory classes: 6h  
Self study: 8h 23m

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**Full-or-part-time:** 14h 23m  
Theory classes: 6h  
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### Population ecology

**Description:**
The basic concepts will be given to understand the relationships between the ecological populations and their environment. Numerical activities will be complementary to the theoretical content of the ecology of populations.

**Specific objectives:**
That the student acquires the knowledge to understand the use of the populations like tool to determine the quality of the environmental systems. To have the numerical basis to understand and quantify the effects of man on environmental systems. To know how to solve numerical problems of population ecology.

**Full-or-part-time:** 33h 36m
- Theory classes: 12h
- Practical classes: 2h
- Self study: 19h 36m

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### Ecology of communities

**Description:**
The basic concepts will be given to understand the relationships between ecological communities and their environment. Numerical activities will be complementary to the theoretical contents of the ecology of communities.

**Specific objectives:**
That the student acquires the knowledge to understand the use of communities as a tool to determine the quality of marine environmental systems. To have the numerical basis to understand and quantify the effects of man on marine environmental systems. Knowing to solve problems about community ecology.

**Full-or-part-time:** 33h 36m
- Theory classes: 12h
- Practical classes: 2h
- Self study: 19h 36m
Ecology of communities

Description:
The basic concepts will be given to understand the relationships between ecological communities and their environment. Numerical activities will be complementary to the theoretical contents of the ecology of communities.

Specific objectives:
That the student acquires the knowledge to understand the use of communities as a tool to determine the quality of marine environmental systems. To have the numerical basis to understand and quantify the effects of man on marine environmental systems. Knowing to solve problems about community ecology

Full-or-part-time: 33h 36m
Theory classes: 12h
Practical classes: 2h
Self study: 19h 36m

Teamwork

Full-or-part-time: 28h 47m
Laboratory classes: 12h
Self study: 16h 47m

Examens

Full-or-part-time: 9h 36m
Laboratory classes: 4h
Self study: 5h 36m

GRADING SYSTEM

The mark of the course is based on the marks of one exam that will be based on multiple choice and numerical exercises (60% mark) and two assignments based on a report and oral presentation (40%).
EXAMINATION RULES.

If any of the laboratory or continuous assessment activities are not performed in the scheduled period, it will be considered as a zero score. Students who fail the ordinary assessment who have regularly taken the assessment tests of the suspended subject will have the option of taking a re-assessment test in the period set in the academic calendar. Students who have already passed it or students qualified as not presented in the continuous assessment tests will not be able to take the re-assessment test for a subject. The maximum grade in the case of reassessment will be five (5.0).

BIBLIOGRAPHY

Basic:

Complementary: