Course guide
250683 - 250683 - Environmental Oceanography

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2014). (Optional subject).
Academic year: 2022  ECTS Credits: 5.0  Languages: Spanish

LECTURER

Coordinating lecturer: MANUEL ESPINO INFANTES
Others: MANUEL ESPINO INFANTES, MARIA LISTE MUÑOZ

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
13340. Apply scientific concepts to environmental problems and their correlation with technological concepts.
13341. Analyze systems, environmental problems and their resolution using models and evaluate them.
13345. Ask practically, with an economic perspective and according to the applicable environmental legislation, environmental management tools and environmental risk assessment.

TEACHING METHODOLOGY

The course consists of 3 hours per week of classroom activity (large size group).

The 13 hours in the large size groups are devoted to lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.
LEARNING OBJECTIVES OF THE SUBJECT

The fundamental objective of this subject is to train the student in the fields of hydrodynamics, water quality and sediment transport at sea, as well as in environmental engineering and management activities in that area. In particular, the student is expected to acquire advanced knowledge of environmental agents and processes that act at sea. This training will be mainly focused on the training of the student in the quantification of the processes for which the main methods, models and techniques are introduced, emphasizing a range of application and validity.

Very aware of the structure of land, water and artificial ecosystems and their interactions. Meet the major environmental problems globally. Modeling process and quantifies the performance and efficiency of systems. Determines the basis of environmental hazards to human health and ecosystems. Apply material balances and energy to environmental problems. Interprets water-rock and water-air interactions using thermodynamic and kinetic methods. Conceptualized an environmental problem described by equations and poses analytical or numerical solution. Identifies the codes you need to solve a problem as conceptualized. Recognizes the spatial and temporal scales required to resolve the problem. To be familiar with solutions to problems relating to dynamical systems. Learn about simple solutions to problems advection - dispersion - reaction. Learn methods for information and action on various parameters or variables. Understand that any measure inherently carries an associated error and is able to work with them. It is critical to the values reported by others when the measurement method is not specified.


STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>63.95</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Hours small group</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Hours large group</td>
<td>19,5</td>
<td>15.59</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.80</td>
</tr>
</tbody>
</table>

Total learning time: 125.1 h

CONTENTS

Description:
Impact of human activities on the oceans

Full-or-part-time: 7h 11m
Theory classes: 3h
Self study: 4h 11m
## Coastal and Estuarine Hydrodynamics

**Description:**
waves and currents induced by waves  
Tides and tidal currents  
Wave and tides propagation

**Full-or-part-time:** 16h 48m  
Theory classes: 4h  
Practical classes: 3h  
Self study: 9h 48m

## Coastal Erosion

**Description:**
Sediment dynamics and coastal erosion  
Wave channel practices

**Full-or-part-time:** 12h  
Theory classes: 2h  
Laboratory classes: 3h  
Self study: 7h

## Open Water Hydrodynamics

**Description:**
Sea water temperature  
Ekman model. Wind-induced circulation  
Coastal upwelling and marine ecosystems  
Sea water salinity  
Residence time in estuaries  
Ocean currents

**Full-or-part-time:** 28h 47m  
Theory classes: 10h  
Practical classes: 2h  
Self study: 16h 47m

## Marine Pollution

**Description:**
Discharges from land to the sea  
Outfall Design  
Discharged from boats  
Practiques of discharges into the sea  
Oil spills

**Full-or-part-time:** 28h 47m  
Theory classes: 3h  
Practical classes: 3h  
Laboratory classes: 6h  
Self study: 16h 47m
GRADING SYSTEM

The mark of the course is obtained from the ratings of continuous assessment.

Continuous assessment consist in several activities, both individually and in group, of additive and training characteristics, carried out during the year (both in and out of the classroom).

The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the course with regard to knowledge or understanding, and a part with a set of application exercises.

The final mark of the subject will be calculated, with the indicated weighting, from the following marks:
- Course work. oral presentation (30%)
- Computer model practices. wrting report (30%)
- Final test (40%)

EXAMINATION RULES.

Failure to perform a continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

BIBLIOGRAPHY

Basic:

Complementary: