250683 - Environmental Oceanography

Coordinating unit: 250 - ETSECCPB - Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2019
Degree: MASTER’S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2014). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: Spanish

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.

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
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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.


<table>
<thead>
<tr>
<th>Study load</th>
<th>Theory classes:</th>
<th>Practical classes:</th>
<th>Laboratory classes:</th>
<th>Guided activities:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total learning time:</strong> 125h</td>
<td>19h 30m</td>
<td>9h 45m</td>
<td>9h 45m</td>
<td>6h</td>
<td>80h</td>
</tr>
<tr>
<td></td>
<td>15.60%</td>
<td>7.80%</td>
<td>7.80%</td>
<td>4.80%</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
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## Content

<table>
<thead>
<tr>
<th>Course</th>
<th>Learning time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td><strong>7h 11m</strong></td>
<td>Impact of human activities on the oceans</td>
</tr>
<tr>
<td><strong>Coastal and Estuarine Hydrodynamics</strong></td>
<td><strong>16h 48m</strong></td>
<td>waves and currents induced by waves, Tides and tidal currents, Wave and tides propagation</td>
</tr>
<tr>
<td><strong>Coastal erosion</strong></td>
<td><strong>12h</strong></td>
<td>Sediment dynamics and coastal erosion, Wave channel practices</td>
</tr>
<tr>
<td><strong>Open water hydrodynamics</strong></td>
<td><strong>28h 47m</strong></td>
<td>Sea water temperature, Ekman model, Wind-induced circulation, Coastal upwelling and marine ecosystems, Sea water salinity, Residence time in estuaries, Ocean currents</td>
</tr>
</tbody>
</table>
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. writing report (30%)
- Final test (40%)

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

Basic:

Complementary: