250241 - CONOBMAR - Maritime Constructions

Coordinating unit: 250 - ETSECCPB - Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2017
Degree: BACHELOR'S DEGREE IN PUBLIC WORKS ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 4,5
Teaching languages: Catalan, Spanish, English

Teaching staff

Coordinator: FRANCESC XAVIER GIRONELLA I COBOS
Others: FRANCESC XAVIER GIRONELLA I COBOS, VICENTE GRACIA GARCIA, OCTAVIO CESAR MÖSSO ARANDA

Opening hours

Timetable: Schedule consultation agreed with professors of the subject

Degree competences to which the subject contributes

Specific:
3081. Ability to construct and conserve maritime works
3088. Knowledge and understanding of the functioning of ecosystems and environmental factors
3089. Knowledge of the design of urban services and utilities to do with water distribution and sewage treatment

General:
3105. Students will learn to identify, formulate and solve a range of engineering problems. They will be expected to show initiative in interpreting and solving specific civil engineering problems and to demonstrate creativity and decision-making skills. Finally, students will develop creative and systematic strategies for analysing and solving problems.
3106. Students will learn to assess the complexity of the problems examined in the different subject areas, identify the key elements of the problem statement, and select the appropriate strategy for solving it. Once they have chosen a strategy, they will apply it and, if the desired solution is not reached, determine whether modifications are required. Students will use a range of methods and tools to determine whether their solution is correct or, at the very least, appropriate to the problem in question. More generally, students will be encouraged to consider the importance of creativity in science and technology.
3107. Students will learn to identify, model and analyse problems from open situations, consider alternative strategies for solving them, select the most appropriate solution on the basis of reasoned criteria, and consider a range of methods for validating their results. More generally, students will learn to work confidently with complex systems and to identify the interactions between their components.
3111. Students will learn to plan, design, manage and maintain systems suitable for use in civil engineering. They will develop a systematic approach to the complete life-cycle of a civil engineering infrastructure, system or service, which includes drafting and finalising project plans, identifying the basic materials and technologies required, making decisions, managing the different project activities, performing measurements, calculations and assessments, ensuring compliance with specifications, regulations and compulsory standards, evaluating the social and environmental impact of the processes and techniques used, and conducting economic analyses of human and material resources.
3112. Students will develop an understanding of the different functions of engineering, the processes involved in the life-cycle of a construction project, process or service, and the importance of systematising the design process. They
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Students will develop skills for the construction and preservation of maritime structures. Upon completion of the course, students will have acquired the ability to: 1. Carry out a wave analysis. 2. Design the basic elements of a port. 3. Carry out a coastal dynamics study that includes port-coast interaction.

The sea, environmental conditions and coastal hydraulics; Regular and irregular wave action; Wave formation, propagation and breaking; Currents and tides; Models; Testing beaches and breakwaters; Port engineering; Types; Areas of water and land; Rubble construction; Rubble breakwaters; Interaction between waves and structures; Stability of exposed and submerged rubble breakwaters; Stability of coatings; Vertical wall breakwater; Coastal engineering; Geomorphology; Coastal protection work; Longitudinal dynamics; Transverse dynamics; Port-coast interaction; Coastal response; Accretion in ports; Interaction in pocket beaches; Beach nourishment.

Transversal:
585. ENTREPRENEURSHIP AND INNOVATION - Level 1. Showing enterprise, acquiring basic knowledge about organizations and becoming familiar with the tools and techniques for generating ideas and managing organizations that make it possible to solve known problems and create opportunities.
586. ENTREPRENEURSHIP AND INNOVATION - Level 2. Taking initiatives that give rise to opportunities and to new products and solutions, doing so with a vision of process implementation and market understanding, and involving others in projects that have to be carried out.
589. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.
594. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.
584. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

Teaching methodology

The course consists of 3 (2 +1) hours per week of classes in a classroom.
In the lectures the teacher explains the concepts and basic materials of the topic, he presents examples and exercises.
In the practical classes are problem-solving approaches with greater interaction with students. Practical exercises to consolidate learning objectives.
It uses material support in the form of detailed teaching plan using the virtual campus ATENEA: content, scheduling of activities and a learning assessment and bibliography.

Learning objectives of the subject
Students will develop skills for the construction and preservation of maritime structures.
Upon completion of the course, students will have acquired the ability to: 1. Carry out a wave analysis. 2. Design the basic elements of a port. 3. Carry out a coastal dynamics study that includes port-coast interaction.
### Study load

<table>
<thead>
<tr>
<th>Total learning time: 112h 30m</th>
<th>Hours large group:</th>
<th>29h</th>
<th>25.78%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group:</td>
<td>10h</td>
<td></td>
<td>8.89%</td>
</tr>
<tr>
<td>Hours small group:</td>
<td>6h</td>
<td></td>
<td>5.33%</td>
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<tr>
<td>Guided activities:</td>
<td>4h 30m</td>
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<td>4.00%</td>
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<tr>
<td>Self study:</td>
<td>63h</td>
<td></td>
<td>56.00%</td>
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## Content

**Marine and Coastal Engineering**

<table>
<thead>
<tr>
<th>Learning time: 4h 48m</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Theory classes: 2h</td>
<td></td>
</tr>
<tr>
<td>Self study : 2h 48m</td>
<td></td>
</tr>
</tbody>
</table>

**Description:**
Basics

**Waves, Tides and Currents**

<table>
<thead>
<tr>
<th>Learning time: 19h 12m</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Theory classes: 5h</td>
<td></td>
</tr>
<tr>
<td>Practical classes: 2h</td>
<td></td>
</tr>
<tr>
<td>Laboratory classes: 1h</td>
<td></td>
</tr>
<tr>
<td>Self study : 11h 12m</td>
<td></td>
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</tbody>
</table>

**Description:**
Regular waves.
Random waves.
Wave climate
Wave propagation
Wave breaking and surf zone circulation
Tides and other long waves

**Port facilities**

<table>
<thead>
<tr>
<th>Learning time: 7h 11m</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Theory classes: 3h</td>
<td></td>
</tr>
<tr>
<td>Self study : 4h 11m</td>
<td></td>
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</tbody>
</table>

**Description:**
Design and operation of seaports
Port installations

**Rubble mound Breakwaters**

<table>
<thead>
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<th>Learning time: 14h 23m</th>
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</thead>
<tbody>
<tr>
<td>Theory classes: 5h</td>
<td></td>
</tr>
<tr>
<td>Laboratory classes: 1h</td>
<td></td>
</tr>
<tr>
<td>Self study : 8h 23m</td>
<td></td>
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</tbody>
</table>

**Description:**
Basic concepts and design parameters
Wave-structure interaction
Construction procedures
Maintenance and Monitoring
# Vertical breakwaters

**Learning time:** 12h  
Theory classes: 4h  
Laboratory classes: 1h  
Self study: 7h

**Description:**  
Basic concepts and design parameters  
Construction procedures  
Maintenance and monitoring

# Coastal dynamics & coastal zone management

**Learning time:** 12h  
Theory classes: 3h  
Practical classes: 1h  
Laboratory classes: 1h  
Self study: 7h

**Description:**  
Sediment transport  
Shoreline and beach profile evolution  
Coastal management  
Coastal erosion

# Rigid coastal protection works

**Learning time:** 16h 48m  
Theory classes: 3h  
Practical classes: 3h  
Laboratory classes: 1h  
Self study: 9h 48m

**Description:**  
Shore-normal structures. Groynes  
Shore-parallell structures. Detached breakwaters  
Shore-parallell structures at land. Seawalls and revetments  
Stability of protection works in the Catalan coast
The rating of the course is obtained from a system of continuous assessment which includes conducting a series of tests and a set of practices.

Continuous assessment includes the completion of two exams during the semester to help with a weight of 60% in the final and the completion of a set of practices of different issues that contribute to the remaining 40%.

Criteria for re-evaluation qualification and eligibility: Students that failed ordinary evaluation and have been regularly attending tests throughout the course will have the option to perform a re-evaluation test during the period specified in the academic calendar. The highest mark for the subject in the case of attending the evaluation exam will be five. In the case of justified absences to the regular evaluation tests that prevent the assessment of some parts of the contents of the subject, with prior approval of the Head of Studies, students may get evaluated by the re-evaluation test of the contents that have not been previously examined as well as the contents whose tests students have failed. The limitation on the maximum mark shall not apply to the parts assessed for the first time.

Qualification system

Regulations for carrying out activities

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

Basic:


Complementary:


