250433 - ENGPOROFF - Port and Offshore Engineering

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 CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Teaching unit Optional)
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ECTS credits: 5
Teaching languages: English

Teaching staff
Coordinator: JUAN PABLO SIERRA PEDRICO
Others: FRANCESC XAVIER GIRONELLA I COBOS, RAMON JUANOLA SUBIRANA, AGUSTIN SANCHEZ-ARCILLA CONEJO, JUAN PABLO SIERRA PEDRICO

Opening hours
Timetable: Schedule a consultation agreed with the teachers of the subject.

Degree competences to which the subject contributes

Specific:
8233. Knowledge of and the ability to understand dynamic phenomena of the coastal ocean and atmosphere and respond to problems encountered in port and coastal areas, including the environmental impact of coastal interventions. The ability to analyse and plan maritime works.

Transversal:
8559. ENTREPRENEURSHIP AND INNOVATION: Being aware of and understanding the mechanisms on which scientific research is based, as well as the mechanisms and instruments for transferring results among socio-economic agents involved in research, development and innovation processes.
8560. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.
8561. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.
**Teaching methodology**

The course consists of 1.8 hours per week of classroom activity (large size group) and 0.8 hours weekly with half the students (medium size group).

The 1.8 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 0.8 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

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**

Specialization subject in which knowledge on specific competences is intensified.

Knowledge and skills at specialization level that permit the development and application of techniques and methodologies at advanced level.

Contents of specialization at master level related to research or innovation in the field of engineering.

TEAMWORK - Level 3: Managing and dynamic working groups, resolving their potential conflicts, evaluating the work done with other people and to evaluate the effectiveness of the team and the general presentation of the results

**Study load**

<table>
<thead>
<tr>
<th>Total learning time: 125h</th>
<th>Hours large group: 19h 30m 15.60%</th>
</tr>
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<tbody>
<tr>
<td>Hours medium group: 9h 45m 7.80%</td>
<td></td>
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<td>Hours small group: 9h 45m 7.80%</td>
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</tr>
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<td>Guided activities: 6h 4.80%</td>
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<tr>
<td>Self study: 80h 64.00%</td>
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# Content

<table>
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<tr>
<th><strong>Introduction to the port and port management</strong></th>
<th><strong>Learning time:</strong> 4h 48m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description: Port. Functions. A brief history. Types of ports. Areas of influence. Types of boats. Types and classification of goods. Contracts for transportation and port organization.</td>
<td>Theory classes: 2h  Self study: 2h 48m</td>
</tr>
</tbody>
</table>

**Specific objectives:** Describe some basic concepts of port and port activities.

<table>
<thead>
<tr>
<th><strong>Port Planning</strong></th>
<th><strong>Learning time:</strong> 4h 48m</th>
</tr>
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<tr>
<td>Description: Port planning. Types of plans. Estimation of capacity. A cost / benefit. Applicable law.</td>
<td>Theory classes: 2h  Self study: 2h 48m</td>
</tr>
</tbody>
</table>

**Specific objectives:** Describe the different types of plans available in the port planning process.

<table>
<thead>
<tr>
<th><strong>Port terminals</strong></th>
<th><strong>Learning time:</strong> 26h 24m</th>
</tr>
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**Specific objectives:** Description of different types of port terminals.

<table>
<thead>
<tr>
<th><strong>Practical exercise on designing a port terminal.</strong></th>
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</table>

**Specific objectives:** Being able to design, broadly speaking, a port terminal and its main characteristics.
### Works indoors

**Description:**
Types of works. Docks. Jetties. Dolfina
Exercise on interio works in ports.

**Specific objectives:**
Understanding the different kinds and types of maritime works inside the ports.
Being able to design broadly, a pier or jetty and its main features.

**Learning time:** 7h 11m
- Theory classes: 2h
- Practical classes: 1h
- Self study: 4h 11m

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### Wave interaction / structure

**Description:**
Run-up
Visit the Maritime Engineering Laboratory tests to monitor different processes of interaction of waves - structure.

**Specific objectives:**
To study the phenomena
Observed in laboratory

**Learning time:** 7h 11m
- Theory classes: 1h
- Laboratory classes: 2h
- Self study: 4h 11m

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### The currents in the port engineering

**Description:**

**Specific objectives:**
Understanding the currents inside the port area and its influence on engineering port.

**Learning time:** 7h 11m
- Practical classes: 3h
- Self study: 4h 11m
## Water quality in ports

**Description:**
Types of pollutants. Sources of pollution. Processes involved in the dispersion of pollutants.
Practice on water quality in port areas or

**Specific objectives:**
Learn about the most common pollutants in port waters and what the processes involved in its dispersal.
Applying the theoretical knowledge acquired on water quality in ports.

**Learning time:** 7h 11m
- Theory classes: 2h
- Practical classes: 1h
- Self study: 4h 11m

## Climate Change

**Description:**
Climate change. Effects of climate change on the sea. Impacts on ports.
Make a practice to analyze the potential impacts of climate change on ports

**Specific objectives:**
- Know what effects climate change may have on the sea, and the impact these can have effects on the ports.
- Put into practice the knowledge acquired in the theoretical part of the topic.
- Raise awareness of potential impacts of climate change on ports

**Learning time:** 7h 11m
- Theory classes: 2h
- Practical classes: 1h
- Self study: 4h 11m

## Offshore Engineering

**Description:**
History of offshore structures. Types of offshore structures. Artificial islands
Solicitations and responses. Probabilistic design. Design of fixed structures. Design of floating structures

**Specific objectives:**
- Know that is a different structure and existing offshore.
- Review, a practical way, the different calculation methods of OFFSHORE structures
- Understanding the different aspects of the construction of offshore structures.

**Learning time:** 9h 36m
- Theory classes: 2h
- Practical classes: 2h
- Self study: 5h 36m
Marine renewable energies

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<tr>
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<tr>
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</tr>
<tr>
<td>Self study: 4h 11m</td>
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</table>

**Description:**
Estimation of energy resources. Systems for obtaining energy from tides, waves and currents
Analyze a case study of marine wind farm

**Specific objectives:**
Know that there are different systems for extracting energy from the sea

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Evaluation

<table>
<thead>
<tr>
<th><strong>Learning time:</strong> 4h 48m</th>
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<tbody>
<tr>
<td>Laboratory classes: 2h</td>
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<td>Self study: 2h 48m</td>
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**Qualification system**

The mark of the course is obtained from the ratings of continuous assessment and their corresponding laboratories and/or classroom computers.

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 teachings of the laboratory grade is the average in such activities.

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.

**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:


