Course guides
2500050 - GECENGPORT - Port Engineering

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.
Degree: BACHELOR'S DEGREE IN CIVIL ENGINEERING (Syllabus 2020). (Optional subject).
Academic year: 2021 ECTS Credits: 4.5 Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: FRANCESC XAVIER GIRONELLA I COBOS
Others: CORRADO ALTOMARE, FRANCESC XAVIER GIRONELLA I COBOS, JOSE LUIS MONSO DE PRAT, JUAN PABLO SIERRA PEDRICO

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
14412. Capacity for construction and conservation of maritime works. (Specific technology module: Civil Construction)

General:
14380. Scientific-technical training for the exercise of the profession of Technical Engineer of Public Works and knowledge of the functions of advice, analysis, design, calculation, project, construction, maintenance, conservation and exploitation.
14383. Ability to project, inspect and direct works, in their field.
14384. Capacity for the maintenance and conservation of hydraulic and energy resources, in its field.
14386. Capacity for maintenance, conservation and exploitation of infrastructure, in its field.
14389. Knowledge of the history of civil engineering and training to analyze and assess public works in particular and construction in general.
14391. Conceive, project, manage and maintain systems in the field of construction engineering. Cover the entire life cycle of an infrastructure or system or service in the field of construction engineering. (Additional school competition).

TEACHING METHODOLOGY

The course consists of 1.5 hours per week of classroom activity (large size group) and 1.2 hours weekly with half the students (medium size group).

The 1.5 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 1.2 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**


1. Capacity for the design of port structures.
2. Ability to understand port activity and exploitation.


Ability to design port structures.
Ability to understand port activity and operation

**STUDY LOAD**

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>22,5</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>18,0</td>
<td>16.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>4,5</td>
<td>4.00</td>
</tr>
<tr>
<td>Self study</td>
<td>63,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>4,5</td>
<td>4.00</td>
</tr>
</tbody>
</table>

**Total learning time:** 112.5 h

**CONTENTS**

**Introduction**

**Description:**
Approach of the subject and development of the course. Generalities. Review of basic concepts. Classification and typology of port works (dikes, docks, dredging, ...).

**Full-or-part-time:** 4h 48m
Theory classes: 2h
Self study : 2h 48m

**Hydrodynamic and structural parameters**

**Description:**
Definition of the main parameters involved in the design of external maritime structures. Waves-Structure Interaction. Main formulations of run-up, run-down, overtopping, reflection and transmission.

**Full-or-part-time:** 4h 48m
Theory classes: 2h
Self study : 2h 48m
Rubble mound breakwaters

Description:
Sections. Types of breakwaters. Stability of the main armour, the berm and the crown wall. Toe protections. Head breakwater design. Construction process.

Practices

Full-or-part-time: 20h 24m
Theory classes: 4h
Practical classes: 4h 30m
Self study : 11h 54m

Caisson breakwaters

Description:

Practices

Full-or-part-time: 20h 24m
Theory classes: 4h
Practical classes: 4h 30m
Self study : 11h 54m

Physical modeling in maritime engineering

Description:
Concepts of similarity. Scale and laboratory effects. Instrumentation, applications and examples.

Practices

Full-or-part-time: 7h 11m
Theory classes: 2h
Practical classes: 1h
Self study : 4h 11m

Probabilistic design

Description:
Introduction to probabilistic design. Concepts on probabilistic methods of levels III, II and I. Monte Carlo simulation.

Practices

Full-or-part-time: 14h 23m
Theory classes: 2h
Practical classes: 4h
Self study : 8h 23m

Plant layout design

Description:
Dimensions, orientation and draft of the harbour mouth.

Full-or-part-time: 4h 48m
Theory classes: 2h
Self study : 2h 48m
**Inner harbour structures**

**Description:**
Actions to consider in the design of quays, jetties. Flooring quays.

**Practices**

**Full-or-part-time:** 14h 23m  
Theory classes: 3h  
Practical classes: 3h  
Self study : 8h 23m

**Case studies**

**Description:**
Maritime engineering projects. Real cases.

**Full-or-part-time:** 7h 11m  
Theory classes: 3h  
Self study : 4h 11m

**Evaluations**

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

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**GRADING 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.

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**BIBLIOGRAPHY**

**Basic:**

**Complementary:**
- Ministerio de Obras Públicas y Urbanismo (MOPU). Dirección General de Puertos y Costas. ROM 0.2-90: acciones en el proyecto de