

Course guide

2500030 - GECCOBRMAR - Maritime Constructions

Last modified: 01/10/2023

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). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** Catalan, English

LECTURER

Coordinating lecturer: VICENTE GRACIA GARCIA

Others: FRANCESC XAVIER GIRONELLA I COBOS, VICENTE GRACIA GARCIA, JOSE LUIS MONSO DE PRAT

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

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

Generical:

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.

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.

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

Basic knowledge of the marine environment, environmental conditions, coastal hydraulics. Waves. Port facilities. Rubble breakwaters. Coastal dynamics and management of the coastal area. Rigid works of coastal protection. Beach nourishment and sediment management. Submarine emissaries.

- 1 Ability to conduct a wave analysis.
- 2 Ability to carry out the project of a port including basic elements.
- 3 Ability to conduct a study of coastal dynamics that includes the port-coast interaction.

Basic knowledge of the maritime environment, environmental conditions, coastal hydraulics. Regular and irregular wave action. Generation, propagation and breaking. Currents and tides. Models. Testing beaches and breakwaters. Port engineering. Types. Land and water areas. Rubble construction. Rubble breakwaters. Wave-structure interaction. 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. Submarine emissaries. Facilities in the open sea. The carbon footprint in the maritime work.

STUDY LOAD

Type	Hours	Percentage
Self study	63,0	56.00
Guided activities	4,5	4.00
Hours large group	22,5	20.00
Hours medium group	22,5	20.00

Total learning time: 112.5 h

CONTENTS

Introduction

Description:

Basic concepts

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

Tidal waves and currents

Description:

Regular waves

Random waves

Wave climate

Wave propagation

Wave breaking and currents

Tides and other long waves

Exercises

Full-or-part-time: 19h 12m

Theory classes: 5h

Practical classes: 2h

Laboratory classes: 1h

Self study : 11h 12m

Port facilities

Description:

Port design and operation
Interior works

Full-or-part-time: 7h 11m

Theory classes: 3h
Self study : 4h 11m

Rubble mound breakwaters

Description:

Basic concepts and design parameters
Wave-structure interaction
Construction procedures
Maintenance and monitoring
Exercises

Full-or-part-time: 14h 23m

Theory classes: 5h
Laboratory classes: 1h
Self study : 8h 23m

Vertical dikes

Description:

Basic concepts and design parameters
Construction procedures
Maintenance and monitoring
Exercises

Full-or-part-time: 12h

Theory classes: 4h
Laboratory classes: 1h
Self study : 7h

Coastal dynamics and coastal zone management

Description:

Sediment transport
Evolution in plan and profile of a beach
Cost management
Erosion in the coastal zone
Exercises

Full-or-part-time: 12h

Theory classes: 3h
Practical classes: 1h
Laboratory classes: 1h
Self study : 7h

Coastal protection structures

Description:

Perpendicular works. Breakwaters
Parallel works. Parallel dikes
Works parallel to the ground. Walls and coatings
Stability of protection works on the Catalan coast
Exercises

Full-or-part-time: 16h 48m

Theory classes: 3h
Practical classes: 3h
Laboratory classes: 1h
Self study : 9h 48m

Beach nourishment and sediment management

Description:

Basic concepts and design parameters
Design and execution of beach feeding works
Design and execution of a by-pass
Beach food on the Catalan coast
Exercises

Full-or-part-time: 14h 23m

Theory classes: 3h
Practical classes: 2h
Laboratory classes: 1h
Self study : 8h 23m

Submarine outfalls

Description:

Basic concepts and design parameters
Submarine outfalls

Full-or-part-time: 7h 11m

Theory classes: 1h
Practical classes: 2h
Self study : 4h 11m

GRADING SYSTEM

The mark 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.



EXAMINATION RULES.

If any of the laboratory or continuous assessment activities are not performed in the scheduled period, it will be considered a zero score.

BIBLIOGRAPHY

Basic:

- Bruun, P. Port engineering. 4th ed. Houston, TX: Gulf, 1989-1990. ISBN 0872018431.
- Herbich, J.B. (Ed.). Handbook of coastal engineering. New York: McGraw Hill, 2000. ISBN 0071344020.
- CIRIA, CUR. Manual on the use of rock in coastal and shoreline engineering. London ; Gouda: CIRIA, CUR, 1991. ISBN 0860173267.
- Dean, R.G. Beach nourishment: theory and practice. New Jersey: World Scientific, 2002. ISBN 9810215487.
- Pilarczyk, K.W. (ed.). Dikes and revetments: design, maintenance and safety assessment. Rotterdam: A.A.Balkema, 1998. ISBN 9054104554.
- Brunn, P. (ed.). Design and construction of mounds for breakwaters and coastal protection. Amsterdam: Elsevier, 1985. ISBN 0444423915.
- Tsinker, G.P. Handbook of port and harbor engineering: geotechnical and structural aspects. New York: Chapman & Hall, 1997. ISBN 0412087014.
- ROM 0.0: procedimiento general y bases de cálculo en el proyecto de obras marítimas y portuarias [on line]. Salamanca: Ministerio de Fomento. Puertos del Estado, 2001 [Consultation: 30/05/2012]. Available on: http://www.puertos.es/programa_rom/ROM_00_espa.html. ISBN 8488975309.
- Ministerio de Fomento - Puertos del Estado. ROM 1.0-09 : recomendaciones del diseño y ejecución de las obras de abrigo (Parte 1ª. Bases y factores para el proyecto. Agentes climáticos [on line]. Madrid: Puertos del Estado, 2009 [Consultation: 16/09/2016]. Available on: www.puertos.es/es-es/BibliotecaV2/ROM%201.0-09.pdf. ISBN 9788488975737.