

Course guide

2500042 - GECIAMBOMA - Environmental Impact on Maritime Works

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). (Optional subject).
Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** English

LECTURER

Coordinating lecturer: IVAN CACERES RABIONET
Others: IVAN CACERES RABIONET, JOSE LUIS MONSO DE PRAT, OCTAVIO CESAR MÖSSO ARANDA

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

14412. Capacity for construction and conservation of maritime works. (Specific technology module: Civil Construction)
14419. Knowledge and understanding of the functioning of ecosystems and environmental factors. (Specific technology module: Hydrology)

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.
14389. Knowledge of the history of civil engineering and training to analyze and assess public works in particular and construction in general.
14390. Identify, formulate and solve engineering problems. Pose and solve construction engineering problems with initiative, decision-making skills and creativity. Develop a systematic and creative method of analysis and problem solving. (Additional school competition).
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 1.5 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 1.5 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.

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.

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

Knowledge of the management of marine and coastal environment. Tools to study the environmental impact and the environmental management of the coastal zone and its sustainable development. Environmental impact of coastal and port protection structures. Environmental impact of port activities. Pollution problems of the marine environment.

- 1 Capacity for the functional design of the main coastal protection works, as well as the basic foundations of the coastal dynamics that allow it to evaluate its interaction with the engineering works in the coastal zone (physical impact generated on the adjacent coast).
- 2 Ability to understand the main physical processes that control the quality of coastal waters, as well as the main effects of it due to the presence of maritime works (this section includes the design of submarine emissaries and accidental processes).

Knowledge of the main environmental aspects related to maritime works (coastal defense works, and submarine emissary) from two points of view: (i) the impact on the physical environment generated by these works and (ii) aspects related to quality of coastal waters, always starting from the environmental importance of the territory in which the student will carry out his professional activity.

STUDY LOAD

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

Total learning time: 112.5 h

CONTENTS

Subject Description

Description:

It will proceed to describe the main aims and subjects of the asignatura
Impacts of effluents and the discharge of wastewater into the marine environment

Specific objectives:

Basic objectives of the subject, approach and presentation of the work to be developed during the subject. Definition of the concept of problem (processes * vs problems) and impact. Definition of the coastal zone as a multi-component system (physical, ecological and socio-economic). Concept of temporal and spatial scales for the definition of processes, problems and solutions. Basic typology of coastal problems and conceptual solutions. Submarine outfalls. Objectives of this type of work and basic design criteria. Possible impacts and basic solutions.

Full-or-part-time: 12h

Theory classes: 3h
Practical classes: 2h
Self study : 7h

Physical Processes in the Nearshore Zone

Description:

Review of the most relevant physical processes around the environmental impact of coastal protection structures
Review of the most relevant physical processes around the environmental impact of coastal protection structures

Specific objectives:

Processes that control the morphodynamic impact of coastal engineering works. Driving mechanisms. Coastal Hydrodynamics, Sediment transport. Coastal evolution.

Processes that control the morphodynamic impact of coastal engineering works. Driving agents. Sediment transport. Coastal evolution.

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

Theory classes: 6h

Practical classes: 2h

Self study : 11h 12m

Cross-shore Coastal Defences

Description:

Impact of breakwaters on the coastal marine environment

Impact of breakwaters on the coastal marine environment

Specific objectives:

Objectives of this type of work and basic design criteria. Possible impacts and basic solutions.

Objectives of this type of work and basic design criteria. Possible impacts and basic solutions.

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

Theory classes: 2h

Practical classes: 1h

Self study : 4h 11m

Longshore Coastal Defences

Description:

Impact of exempt dikes on the Coastal Marine Environment

Impact of exempt dikes on the coastal marine environment

Specific objectives:

Objectives of this type of work and basic design criteria. Possible impacts and basic solutions.

Objectives of this type of work and basic design criteria. Possible impacts and basic solutions.

Full-or-part-time: 9h 36m

Theory classes: 3h

Practical classes: 1h

Self study : 5h 36m

Other Longshore Structures

Description:

Impact of exempt dikes on the coastal marine environment
Impact of exempt dikes on the marine environment.

Specific objectives:

Objectives of this type of work and basic design criteria. Possible impacts and basic solutions.
Objectives of this type of work and basic design criteria. Possible impacts and basic solutions.

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

Theory classes: 1h

Practical classes: 2h

Self study : 4h 11m

Field trip

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

Laboratory classes: 6h

Self study : 8h 23m

Port Facilities. Typology and Impacts

Description:

Impact of port facilities on the coastal marine environment

Specific objectives:

Approach to the problem. Impacts associated with water quality. Impacts associated with interaction with the coast. Basic solutions.

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

Theory classes: 3h

Self study : 4h 11m

Dredging works. Types and Impacts

Description:

Impact of dredging works on the marine environment

Specific objectives:

Types of dredging. Characteristics of the dredging material. Extraction areas and deposits. Physical impact. Ecological impact. Impact on water quality. Basic solutions.

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

Theory classes: 3h

Self study : 4h 11m



Processes that Control Water Quality Associated with Coastal Works

Description:

Review of the main processes associated with dispersal in the marine environment
Review of the main processes associated with dispersal in the marine environment

Specific objectives:

Processes that control water quality associated with coastal works. Driving agents. Diffusion-advection processes. Pollutants.
Processes that control water quality associated with coastal works. Driving agents. Diffusion-advection processes. Pollutants.

Full-or-part-time: 12h

Theory classes: 3h

Practical classes: 2h

Self study : 7h

Marine Outfalls

Description:

Impacts of effluents and the discharge of wastewater into the marine environment

Specific objectives:

Objectives of this type of work and basic design criteria. Possible impacts and basic solutions.

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

Theory classes: 3h

Self study : 4h 11m

Exam

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

Laboratory classes: 2h

Self study : 2h 48m

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.

The course is divided into two main groups. The first has to do with the environmental impact of maritime coastal protection works , and the second , with port maritime works , and the dispersion of pollutants . Each block is evaluated separately , through an examination and work / individual practice (which contributes with 35% 15 % of the grade of each block respectively) and the final grade will result from the sum of both assessments. 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.

Criteria for re-evaluation qualification and eligibility: students that failed the ordinary evaluation and have regularly attended all evaluation tests will have the opportunity of carrying out a re-evaluation test during the period specified in the academic calendar. Students who have already passed the test or were qualified as non-attending will not be admitted to the re-evaluation test. The maximum mark for the re-evaluation exam will be five over ten (5.0). The non-attendance of a student to the re-evaluation test, in the date specified will not grant access to further re-evaluation tests. Students unable to attend any of the continuous assessment tests due to certifiable force majeure will be ensured extraordinary evaluation periods.

These tests must be authorized by the corresponding Head of Studies, at the request of the professor responsible for the course, and will be carried out within the corresponding academic period.

BIBLIOGRAPHY

Basic:

- Komar, P.D. Beach processes and sedimentation. 2nd ed. Upper Saddle River, N.J: Prentice Hall, 1998. ISBN 0137549385.
- Pilarczyk, K.W. Coastal protection : proceedings of the Short course on coastal protection. Rotterdam [etc.]: AA Balkema, 1990. ISBN 9061911273.
- Kamphuis, J.W. Introduction to coastal engineering and management. 2nd ed. Singapore: World Scientific, 2010. ISBN 9789812834843.
- CIRIA, CUR. Manual on the use of rock in coastal and shoreline engineering. London ; Gouda: CIRIA, CUR, 1991. ISBN 0860173267.
- Doerffer, J.W. Oil spill response in the marine environment. Oxford: Pergamon Press, 1992. ISBN 0800410006.
- Lewis, R. Dispersion in estuaries and coastal waters. Chochester: John Wiley and Sons, 1997. ISBN 0471961620.
- French, P. W. Coastal defences : processes, problems and solutions. London [etc.]: Routledge, 2001. ISBN 0415198453.