Universidad Zaragoza

**Academic Year/course: 2021/22**

# 28728 - Maritime and Coastal Engineering

## Syllabus Information

**Academic Year:** 2021/22
**Subject:** 28728 - Maritime and Coastal Engineering
**Faculty / School:** 175 - Escuela Universitaria Politécnica de La Almunia
**Degree:** 423 - Bachelor's Degree in Civil Engineering
**ECTS:** 6.0
**Year:** 4 and 3
**Semester:** Second semester
**Subject Type:** Compulsory
**Module:**

## 1. General information

### 1.1. Aims of the course

Give an overview of what ports and coasts are and represent, as well as providing a comprehensive basis, both theoretical-conceptual and practical, allowing a further specialization in any of the specific aspects of this field.

We can consider that the field of Maritime Engineering is subdivided into two others: port engineering and coastal engineering. Within port engineering, this syllabus is primarily oriented to the design of ports and dock works, based on existing standards and recommendations.

With respect to coastal engineering coasts and the different physical phenomena that occur in them are discussed. Also the design of protective measures (beach regenerating and / or coastal protection structures) is studied.

A common denominator for the study of port and coastal engineering has the study of marine climate, mainly the surf. This allows, among other things, determine the actions of marine works design, estimate the operation of port facilities, and study the physical processes produced on the coasts.

*These approaches and objectives are in line with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the course learning outcomes provides training and competence to contribute to their achievement to some degree.*

Goal 4: Quality Education

### 1.2. Context and importance of this course in the degree

The subject of Maritime and Coastal Engineering is part of the Degree in Civil Engineering offered by the EUPLA, included in the group of subjects in the so called Specific Training. It is a third-year course located on the sixth semester and mandatory (OB), with a teaching load of 6 ECTS.

The convenience of the subject in the curriculum of this degree is more than justified and it is understood that ideally, as a student, this course should be taken with clear ideas with regard to knowledge of mathematics and physics, and previous knowledge acquired in earlier courses.

### 1.3. Recommendations to take this course

Although passing mathematics is not required it is highly recommended to have acquired a certain skill in it.

## 2. Learning goals

### 2.1. Competences

E03. Ability for the building and maintenance of maritime works.

G01. Ability for organization and planning.

G02. Ability to solve problems.

G03. Ability to make decisions.

G04. Suitability for oral and written communication in their mother tongue.

G05. Ability for analysis and synthesis.

G06. Ability to manage information.

G07. Ability for teamwork.

G08. Ability for critical thinking.

G09. Ability to work in an interdisciplinary team.

G10. Ability to work in an international context.

G11. Ability to improvise and adapt themselves to face new situations.

G12. Leadership ability.

G13. Positive social attitude towards social and technological innovations.

G14. Reasoning ability, discussion and presentation of ideas.

G15. Communication skills through word and image.

G16. Ability to Search, analyze and select information.

G17. Ability for independent learning.

G18. Acquire knowledge and understanding in a field of study ranging from general secondary education to the forefront.

G19. Apply their knowledge to their work in a professional manner and get competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study.

G20. Ability to gather and interpret relevant data (usually within their field of study) to make informed judgments that include reflection on relevant social, scientific or ethical issues.

G21. Transmit information, ideas, problems and solutions to both specialist and non-specialist audiences.

G22. Develop those skills needed to undertake further studies with a high degree of autonomy.

G23. Learn and understand the respect to fundamental rights, equal opportunities between men and women, universal accessibility for people with disabilities, and respect for the values of the culture of peace and democratic values.

G24. Foster entrepreneurship.

G25. Knowledge on information and communication technology. Context and meaning of the subject in the degree

### 2.2. Learning goals

**1.** The student, at the end of the course, will learn the hydrodynamic basics of coastal regions, theory and properties of waves and knowledge about the most common sea works.

**2.** Determine the maritime climate which affects actions in coasts and ports from the wind to the waves and calculation levels.

**3.** Understand the interaction between coastal dynamics and morphodynamics of coastal shapes and their generation, so that they can deduce the consequences on coastal resources of the different forms of occupation of the coast and the actions in ports.

**4.** Understanding the nature and evolution of ports, their conditioning on the side of the ship and land transport and basic criteria for spatial management and planning, also introducing the operation, management and port planning and works and Port Engineering and offshore actions.

**5.** Achieve ability for functional and structural design of dams, docking port works and works and actions of protection and coastal development, and for the design of its construction procedures.

### 2.3. Importance of learning goals

This course has a strong engineering orientation, ie, it offers training with immediate application and content development in the labor and professional market. Through the achievement of relevant learning outcomes the required ability for understanding the performance of sizing sea works is obtained.

## 3. Assessment (1st and 2nd call)

### 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

Due to the characteristics of the syllabus of this subject with two clearly differentiated blocks, the evaluation will

be carried out independently for each of the didactic units, UD I and UD II.
Two forms of evaluation will be followed: a continuous one with two exams carried out throughout the semester and a final global evaluation, the latter with two calls (February and September). These evaluations (continuous and final global) are not exclusive, being able to opt for the second in case of not having passed the subject throughout the exams programmed during the course of the semester.
A student who passes the two continuous assessment exams will not have to take the final global exam.
Those students who do not reach this condition will have to sit the final exam of the two teaching units, even if they have passed one of them through continuous evaluation (regardless of the grade obtained).
The final grade to be recorded in the minutes, in case of being "suitable" in both exams, will be the result of averaging the qualifications obtained in both.
In both modalities of qualification, continuous and global final, the student must deliver the assignments that have been entrusted during the course. Failure to deliver any of these works will mean the loss of the right to correct the exam.

The works will be carried out in teams of 2 students expressly designated by the teacher and their content, definition and delivery conditions will be published through the Moodle platform.
A system of **continuous assessment**,

• Participation in Class 10%

• Mandatory Projects / work 10%

• Final Assessment Test 80%

- Ev I (40%):

| | |
|---|---|
| Theory | 30% |
| Practice | 70% |

- Ev II (40%):

| | |
|---|---|
| Theory | 30% |
| Practice | 70% |

**In global assessment test** the following points the approximate weights of the evaluation process are shown:

• Projects / Mandatory tasks 10%

• Final Assessment Test 90%

Parts or notes will not be saved from one academic year to another.

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as theory sessions, laboratory sessions, autonomous work and study, and tutorials.

The teaching methodology is based on a strong interaction teacher/student. This interaction is made a reality by a division of work and responsibilities between students and teachers. However, we have to be aware that to some extent the students can decide their pace of learning according to their needs and availability, following the guidelines set by the teacher.

*"If due to health reasons the in-person teaching-learning process is not possible, it shall be carried out telematically."*

### 4.2. Learning tasks

This course is organized as follows:

- **Lectures**: theoretical concepts of the course will be explained and practical examples will be developed.
- **Problem-solving:** Students will develop examples and solve problems or case studies concerning the theoretical concepts studied.
- **Reinforcement activities**: Through a virtual education portal (Moodle) several activities that reinforce the basic contents of the course will be conducted. These activities will be customized and monitored.

The course consists of 6 ECTS, which represent 150 hours of student work on the course during the term. 40% of this work (60 h.) will take place in the classroom, and the rest will be autonomous. A term consists of 15 teaching weeks. Each student must devote 10 hours to the study of the course per week.

### 4.3. Syllabus

This course will address the following topics:

- Unit 1. General Concepts
- Unit 2. The Wind
- Unit 3. Characterization of waves.
- Unit 4. Propagation of waves
- Unit 5. Geomorphology and coastal hydrodynamics.
- Unit 6. Slope Dams.
- Unit 7. Vertical Dams
- Unit 8. Maritime Work Project
- Unit 9. Implementation Analysis and Plan.
- Unit 10. Dredging.

### 4.4. Course planning and calendar

The contents to be taught in every teaching week are shown below. These correspond to the topics presented in the course content. (They may be subject to change to be adapted to unforeseen changes in the school calendar).

- Week 1: Unit 1. General Concepts
- Week 2: Unit 2. The Wind
- Week 4: Unit 3. Characterization of waves.
- Week 6: Unit 4. Propagation of waves
- Week 8: Unit 5. Geomorphology and coastal hydrodynamics.
- Week 10: Unit 6. Slope Dams.
- Week 11: Unit 7. Vertical Dams
- Week 13: Unit 8/9. Maritime Work Project Implementation Analysis and Plan.
- Week 14: Unit 10. Dredging
- Week 15: Assessment.

Final exams dates will be formally published in https://eupla.unizar.es/asuntos-academicos/examenes. The final calendar of the corresponding academic year can be viewed on the website of the school http://www.eupla.es.

Class schedules and the distribution of group practices will be transmitted to students by the teacher at the beginning of the academic year and will be published on the Moodle platform as well as on the university website (www.eupla.es).

Within the final tests, there will be obligatory exams for all the students. These dates will be published on the website of the university (www.eupla.es) at the beginning of the academic year.

The dates of other activities (such as assessing tests, seminars, compulsory practices, task deadlines ...) will be published at the beginning of the academic year, reported by the teacher to the students the first school day, and they will also be published through the Moodle platform.

### 4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28728