

# Coastal Flooding: Impacts, Conflicts and Risks (250912)

## General Information

<b>School</b>	ETSECCPB
<b>Departments</b>	Departament d'Enginyeria Civil i Ambiental (DECA) Departament d'Enginyeria Gràfica i de Disseny (DEGD) Laboratori d'Enginyeria Marítima (LIM)
<b>Credits</b>	3.0 ECTS
<b>Programs</b>	MÀSTER UNIVERSITARI EN ENGINYERIA DE L'AIGUA (pla 2025) MÀSTER UNIVERSITARI ERASMUS MUNDUS EN GESTIÓ DEL RISC D'INUNDACIÓ (pla 2024) MÀSTER UNIVERSITARI ERASMUS MUNDUS EN GESTIÓ DEL RISC PER INUNDACIÓ (pla 2019)
<b>Course</b>	2025/26

## Main teaching language at each group

- Group 10Q1 English (Q1)

## Faculty

Responsible Faculty: Jose Antonio Jimenez Quintana  
Faculty: Jose Antonio Jimenez Quintana, Marc Mestres Ridge

## Objectives of Education

In this subject, aspects related to Hazard, vulnerability and risk assessment in coastal areas under the action of waves and sea level acting at different scales will be addressed. From here, forecasting methodologies for these coastal events will be shown with the purpose of supporting decision-making.

The topics addressed cover most of the physical, environmental and ecological problems and challenges identified by the scientific community and the social agents that the coastal zone will face in the near future under different development scenarios and climate change.

## Total hours of student work

		Hours	Percentage
Supervised Learning	Large group	27.0 h	100.00 %
	Medium group	0.0 h	0.00 %
	Laboratory classes	0.0 h	0.00 %
	Guided Activities	0.0 h	0.00 %
Self Study		48.0 h	

## Contents

### Introduction

Introduction to the course  
Presentation of the key concepts related to coastal risk. Definitions  
Individual and collective assessment of the main types of coastal risks

### **Specific Objectives**

Course structure. Sources of information and data. Practical work.  
Presentation and definition of the key concepts related to coastal risk analysis.  
Identification and initial assessment of the importance of the main types of coastal risks by the students of the class. Assessment of the initial perception of risk in general, and of the Catalan coast in particular.

### **Coastal erosion risk**

Identification of the factors that determine coastal erosion at different scales. Using the SPRC analysis framework  
Medium and long term erosion  
Quantification of coastal erosion during storms  
Geomorphological vulnerability and resilience. Assessment of consequences  
Evaluation of the coastal risk of erosion in a coastal stretch

### **Specific Objectives**

Introduce the key drivers and processes governing coastal erosion across different spatial and temporal scales, along with methods for their evaluation.

### **Coastal flooding risk**

Coastal flooding during storms  
Long-term flooding. The effect of sea level rise  
Compound flooding  
Vulnerability and consequences.  
Flood modeling  
Flood risk analysis in a coastal stretch

### **Coastal risk assessment frameworks for the impact of extreme events**

The Coastal Risk Assessment Framework (CRAF)  
Risk estimation using CRAF in a stretch of real coast  
Risk prediction using nested models  
Forecast system for the impact of storms

### **Specific Objectives**

Introduction to large-scale systems for coastal risk prediction and assessment, with applications in spatial planning and the development of forecasting frameworks.

### **Presentations**

Presentation of the course assignments

### **Coastal risk management**

Risk management strategies  
Measures for erosion risks  
Measures for flood risks

### **Teaching Methodology**

The course will be organized in thematic blocks in which approximately 60%/40% of the time will be devoted to theoretical / practical classes, in which the teachers present the concepts, basic materials of the subject, tools to use and present examples and perform exercises.  
The rest of the time will be dedicated to the use of common techniques and tools in risk analysis from a

practical point of view. Specific exercises will be carried out with a greater participation of the students in order to consolidate the learning objectives.

Throughout the course, approximately 4 hours will be dedicated to carrying out the assigned course work under the supervision of the teaching staff.

Support material will be used in the format of a detailed teaching plan through the virtual campus ATENEA: contents, programming of evaluation and directed learning activities and bibliography.

## Grading Rules

*(\* The evaluation calendar and grading rules will be approved before the start of the course.*

The mark of the course is obtained from the qualifications of the tutored course work (30%) and two specific evaluation tests (35% each one).

The directed coursework consists of applying the concepts and tools seen during the course to assess the risk in a coastal area to be determined. Requires teamwork, preparation of a written report and a final presentation in front of the class.

Specific evaluation tests consist of a part with questions on concepts associated with the learning objectives of the course in terms of knowledge or understanding, and a set of application exercises.

## Test Rules

If any of the proposed activities or continuous assessment is not carried out in the scheduled period, it will be considered as a zero score.

## Office Hours

Anytime from 08:00 until 16:00 upon request and after confirmation

## Bibliography

### Basic

- Kim, Young C (ed). [Handbook of Coastal and Ocean Engineering](#). London: World Scientific, 2010. ISBN 9789812819291.
- Penning-Rowsell, Edmund C. [Flood and coastal erosion risk management : a manual for economic appraisal](#). London [etc.]: Routledge (Taylor and Francis Group), 2013. ISBN 9780415815154.
- Pugh, David; Woodworth, Philip. [Sea-level science : understanding tides, surges, tsunamis and mean sea-level changes](#). 2nd ed. Cambridge: Cambridge University Press, 2014. ISBN 9781107028197.
- Basco, David. [Design of Coastal Hazard Mitigation Alternatives for Rising Seas](#). New Jersey: World Scientific 2020, 2019. ISBN 981-12-0694-5.