Course guide
250563 - IMPMEDAMAR - Marine Environmental Impact

Last modified: 28/05/2025

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: BACHELOR'S DEGREE IN MARINE SCIENCE AND TECHNOLOGY (Syllabus 2018). (Compulsory subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: MARIANNA GARFI

Others: MARIANNA GARFI, KURT EDUARDO ZIEGLER RODRIGUEZ

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
13388. To know and apply the lexicon and concepts of the Marine Sciences and Technologies and other related fields.
13390. Establish a good practice in the integration of common numerical, laboratory and field techniques in the analysis of any problem related to the marine environment.
13391. Participate and eventually lead multidisciplinary work teams in the field of Marine Sciences and Technologies to respond to the social challenges related to this field.
13394. Address the most relevant processes and their interactions related to their physical / chemical / biological / geological components, applying technical and scientific knowledge and criteria.
13395. To set, evaluate and propose solutions to the different conflicts of use and exploitation in the marine and coastal environment resources based on scientific and technical criteria.
13397. Carry out environmental impact, management and protection studies of the marine environment and adjacent coastal areas, including the corresponding infrastructures and their related impacts.
13403. Develop a conceptual framework to address the sustainability of the marine environment and the related socio-economic activities at different scales, explaining the effects of climate change.
13404. Set, plan and execute basic and applied research in the field of Marine Sciences and Technologies.
13405. Carry out calculations, assessments, surveys and inspections in coastal and marine environments, as well as the corresponding technical documents.
13406. Write technical reports and disseminate knowledge about the different components of the marine system, considering the applicable legal framework.
13407. Apply the necessary tools to analyze the economic and legal aspects of human actions and the related impacts on the marine environment, including technical advice and representation of companies and administrations.

Generical:
13380. Develop a professional activity in the field of Marine Sciences and Technologies.
13381. Address in a comprehensive manner the analysis and preservation of the marine environment with sustainability criteria.
13385. Apply knowledge and academic experience to the biotic and abiotic resources of the marine environment, explaining their interactions with the socio-economic activities that take place in it.

TEACHING METHODOLOGY

The course consists of 4 hours per week of lectures.

Lectures are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The practical sessions are devoted to solve practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

Teaching material is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

The teaching material will be in Catalan, Spanish and/or English.

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

This subject presents the most important aspects related to the impacts that human activities have on the marine and coastal environment, such as the occupation (temporary or permanent) of the terrestrial maritime public domain and the exploitation of the resources of transitional aquatic ecosystems. The concepts related to life-cycle analysis will be introduced to the students, and the design, development and integral execution of environmental monitoring programs and the procedures to make an environmental impact statement will be addressed.

1.- Marine management: environmental, economic and social impact of all activities. Analysis of the DPSIR framework (Driving Force-Pressure-State-Impact-Response). The DPSIR framework in the marine field.
2.- Activities - environmental impact - response: Aquaculture, Extraction of resources, Transport - merchandise, Renewable and non-renewable energy, Dredging, Coastal infrastructure, Land industry, Agriculture, Tourism / recreation.
3.- Develop and design Environmental Surveillance Programs (ESP) adapted to aquatic transitional, coastal and oceanic ecosystems, including a contrast of the forecasts that allow to correct any deviation that may occur on the planned. Prepare Environmental Impact Assessments (EIA) adapted to the specific requirements and singularities of the marine environment.

This subject focuses on highlighting aspects related to the state of health of the marine environment, mainly oriented to two well differentiated but complementary aspects. On the one hand, the ecological, ecosystemic and environmental aspects, which will give the students a specific vision of the environmental problems present in the marine environment, produced by the use and exploitation of the resources that it provides.
On the other hand, this subject represents a transition of knowledge for students between the Extension of the subject of Basic Sciences, the subject of Applied Sciences and Techniques

STUDY LOAD

Type	Hours	Percentage
Hours large group	42,0	28.00
Hours medium group	18,0	12.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Introduction to the subject

Description:
Objectives, bibliography, evaluation methodology.

Full-or-part-time: 2h 24m
Theory classes: 1h
Self study : 1h 24m

Environment and sustainability

Description:
Management of the marine environment. Sustainable development and sustainability: background and historical development

Full-or-part-time: 2h 24m
Theory classes: 1h
Self study : 1h 24m

Social aspects

Description:
Social impact, stakeholders, environmental education,
Qualitative analysis of the impacts on different social areas and at different stages of the life cycle. Analysis of stakeholders.

Full-or-part-time: 38h 24m
Theory classes: 8h
Practical classes: 8h
Self study : 22h 24m

Economic aspects

Description:
Taxes, subsidies, monetization, externalities

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

Technical aspects

Description:
Pollution by oil, ballast water, solid waste (garbage) and air pollution (climate change): basic concepts, regulations, impact, technologies and strategies for mitigation. Impact of marine works: Basic concepts, Law of Coasts, landscaping and strategies for mitigation.
Field visit of a case study which include techical, environmental and social aspects. Report.

Full-or-part-time: 38h 24m
Theory classes: 8h
Practical classes: 8h
Self study : 22h 24m

Tools for the evaluation of environmental impact and measurement of sustainability

Description:
Regulations, certification, environmental verification, environmental management system (ISO, EMAS), Environmental impact assessment (EIA). Life cycle analysis (LCA), carbon footprint, water footprint, Social Life Cycle (S-LCA), Life Cycle Costing (LCC). Multi-criteria analysis and sustainability.
Scientific article, development of an EIA and/or an LCA. Presentation and/or report.

Full-or-part-time: 38h 24m
Theory classes: 8h
Laboratory classes: 8h
Self study : 22h 24m

Evaluation

Full-or-part-time: 14h 23m
Laboratory classes: 6h
Self study : 8h 23m

GRADING SYSTEM

The final mark of the course is obtained as follows:

First exam (20%) + Second exam (45%) + Coursework (35%).

Students who have failed the ordinary evaluation and who have regularly taken the evaluation tests will have the option of taking a re-evaluation test in the period set in the academic calendar. Students who have already passed the test or students qualified as not presented or who have not delivered all the coursework and reports may not take the reassessment test.

The reassessment will consist of a single exam that covers all the content of the course. The maximum grade in case of taking the reassessment exam will be five (5.00). If the student who appears in the re-evaluation does not pass, the highest grade between the result of the ordinary evaluation and that of the re-evaluation will be kept.

The non-attendance of a student to the re-evaluation test, held in the set period, may not lead to another test at a later date.
Extraordinary evaluations will be carried out for those students who, due to accredited force majeure, have not been able to take any of the continuous evaluation tests. These tests must be authorized by the head of studies, and will be carried out within the corresponding period.

EXAMINATION RULES.

Failure to perform the continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

The tests will be carried out individually, with multiple choice questions that can be theoretical or problem-type questions. The exams can include short questions to be developed by the students and exercises to be solved.

BIBLIOGRAPHY

Basic:
- Salomon, M.; Markus, T. (eds.). Handbook on marine environment protection: science, impacts and sustainable management [on line]. Cham, Switzerland: Springer International Publishing, 2018 [Consultation: 04/03/2021]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=5257778. ISBN 9783319601564.
- Crowe, T.P.; Frid, C.L.J. (eds.). Marine ecosystems: human impacts on biodiversity, functioning and services. Cambridge: Cambridge University Press, 2015. ISBN 9781107037670.
- Benoit, C.; Mazijn, B. Guidelines for social life cycle assessment of products [on line]. United Nations Environment Programme, 2009 [Consultation: 04/03/2021]. Available on: http://wedocs.unep.org/bitstream/handle/20.500.11822/7912/-Guidelines%20for%20Social%20Life%20Cycle%20Assessment%20of%20Products-20094102.pdf. ISBN 9789280730210.

Complementary:
- Sen, A. Collective choice and social welfare. 2nd ed. Penguin, 2017. ISBN 9780141982502.
- Pauly, D. 5 easy pieces: the impact of fisheries on marine ecosystems. New York, 2010. ISBN 9781597267182.
- Zielinski, T.; Weslawski, M.; Kulinski, K. Impact of climate changes on marine environments [on line]. Cham: Springer International Publishing, 2015 [Consultation: 08/03/2021]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=1974084. ISBN 9783319142838.