

Course guide

2500239 - GEAIAGRINF - Environmental Impact of Large Infrastructure

Last modified: 17/06/2025

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

Degree: BACHELOR'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2020). (Optional subject).

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

LECTURER

Coordinating lecturer: ANNA RAMON TARRAGONA

Others: ANNA RAMON TARRAGONA
Martinez Reguero, Adriana Haydee
Mösso Aranda, Octavio Cesar

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

14458. Apply the methodologies of studies and evaluations of environmental impact and, in general, of environmental technologies, sustainability and waste treatment and of the management of international standards of environmental quality. Life cycle analysis, carbon footprint and water footprint and assess natural hazards (river, coastal floods, droughts, fires, soil erosion and landslides).
14465. Identify renewable energy generation techniques and energy transition concept.

Generical:

14440. Identify, formulate and solve problems related to environmental engineering.
14441. Apply the functions of consulting, analysis, design, calculation, project, construction, maintenance, conservation and exploitation of any action in the territory in the field of environmental engineering.
14442. To use in any action in the territory proven methods and accredited technologies, in order to achieve the greatest efficiency respect for the environment and the protection of the safety and health of workers and users.
14443. Apply the necessary legislation during the professional practice of environmental engineering.
14444. Apply business management techniques and labor legislation.

TEACHING METHODOLOGY

The course consists of 2.3 hours per week of classroom activity (large size group) and 1.2 hours weekly with half the students (medium size group).

The 2.3 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 1.2 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.

The rest of weekly hours devoted to laboratory practice.

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

In this subject, the main impacts that various types of infrastructures (linear works, dams, ports, airports, tunnels, excavations, coastal protection structures, etc.) can have on the environment and the main actions for its mitigation will be studied, based on the analysis of real study cases.

1. Know the main effects of infrastructure on the environment.
2. Understand the modifying effect that infrastructures produce on the territory, potentialities and weaknesses of the cause-effect relationship.

Environmental Impact of Large Infrastructures. The main impacts that various types of infrastructures (linear works, dams, ports, airports, coastal protection structures, etc.) can exert on the environment and the main actions for their study will be studied in this subject from the practical study of real cases. mitigation.

STUDY LOAD

Type	Hours	Percentage
Hours small group	15,0	10.00
Hours large group	45,0	30.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Introduction to the subject

Description:

Object of the environmental impact, environmental impact of infrastructures and environmental impact of large equipment
Organization of the subject

Specific objectives:

Basic knowledge of the main types of problems that are raised and solved in the subject and of the general aspects of its organization (approach to the classes, programme, bibliography and assessment methodology)

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

Theory classes: 2h

Self study : 2h 48m

Introduction to Environmental Impact Assessment (EIA)

Description:

Introduction to EIA and basic concepts associated with EIA

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

Theory classes: 2h

Practical classes: 2h

Self study : 5h 36m

Environment

Description:

Environment and sustainable development goals (ODS) Physical environmental factors and indicators

Review of the legislation applicable to the EIA. Complementary and compensatory measures. Types of infrastructures subject to the EIA

Environment

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

Theory classes: 6h

Practical classes: 2h

Self study : 11h 12m

Infrastructures and large equipments

Description:

Impactful actions of infrastructures during construction, operation, demolition

Environmental protection and restoration measures

Linear infrastructures

Energy production plants

Hydraulic infrastructures

Ports and coastal protection works

Large transport infrastructures

Mining operations

Waste storage and management infrastructures

Infrastructures and large equipments

Infrastructures and large equipments

Full-or-part-time: 81h 36m

Theory classes: 18h

Practical classes: 11h

Laboratory classes: 5h

Self study : 47h 36m

Alternative approaches

Description:

Alternatives

Positive impacts

Alternative approaches

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

Theory classes: 2h

Laboratory classes: 4h

Self study : 8h 23m

Evaluation

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

Laboratory classes: 6h

Self study : 8h 23m

GRADING SYSTEM

The subject's grade is obtained from the continuous assessment grades and the corresponding laboratory and/or computer lab grades.

The continuous assessment consists of doing different activities, both individual and group, of an additive and formative nature, carried out during the course (inside and outside the classroom).

The grade for laboratory courses is the average for activities of this type.

The assessment tests consist of a part with questions about concepts associated with the learning objectives of the subject in terms of knowledge or understanding, and a set of application exercises.

$$\text{Mark} = 0.6 \times \text{MAX} ((\text{MPE} + \text{MOE}) / 2, \text{MOE}) + 0.4 \times \text{AMT}$$

MPE = Mark Partial Exam

MOE = Mark Overall Exam

AMT = Average Mark Tasks

Re-evaluation. Qualification and admission criteria for the re-evaluation:

Students who failed the ordinary evaluation and who have appeared regularly in the subject's evaluation tests will have the option to take a re-evaluation test in the period fixed in the academic calendar. Students who have already passed the subject or students qualified as not presented or who have not submitted all the activities/assignments will not be able to take the re-evaluation test of the subject.

The re-evaluation test will consist of an overall exam covering all the content of the course. The maximum grade of the re-evaluation will be five (5.0) and the final grade of the subject in the case of having submitted to the re-evaluation will be:

$$\text{Mark} = 0.6 \times \text{MRE} + 0.4 \times \text{AMT}$$

MRE = Mark Re-evaluation Exam

AMT = Average Mark Tasks

The non-attendance of a student called to the re-evaluation test, held in the fixed period, will imply that the student will not be able to give rise to the completion of another test with a later date. Extraordinary assessments will be carried out for those students who, due to an accredited reason, have not been able to take any of the continuous assessment tests. These tests must be authorized by the Head of Studies, at the request of the teacher responsible for the subject, and they will be carried out within the corresponding teaching period.

EXAMINATION RULES.

Fraudulent completion of an assessment will result in the numerical rating of zero for the entire subject without the possibility of re-evaluation.

If any of the laboratory or assessment activities are not carried out in the scheduled period, it will be considered with a mark of zero.

BIBLIOGRAPHY

Basic:

- Arce Ruiz, R.M. La evaluación ambiental en la ingeniería civil. Madrid: Mundi-Prensa, 2013. ISBN 9788484766445.
- Gómez Orea, D.; Gómez Villarino, M.T. Evaluación de impacto ambiental. 3. Madrid: Mundi-Prensa, 2013. ISBN 9788484766438.
- Gómez Orea, D. Evaluación de impacto ambiental: un instrumento preventivo para la gestión ambiental. 2a ed. rev. y ampl. Madrid: Mundi-Prensa, 2003. ISBN 8484760847.
- Gómez Orea, D.; Gómez Villarino, M.T. Consultoría e Ingeniería ambiental [on line]. 2007. Madrid: Mundi-Prensa, [Consultation: 20/11/2023]. Available on : <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=3176048>. ISBN 9788484763130.