

Course guide

2500224 - GEA0224 - Environmental Impact Assessment

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 ENVIRONMENTAL ENGINEERING (Syllabus 2020). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: DANIEL FERNANDEZ GARCIA

Others: MARIA DEL CARME BARBA FERRER, MANUEL ESPINO INFANTES, DANIEL FERNANDEZ GARCIA, ALBERT FOLCH SANCHO, MARIANNA GARFI, JUAN PEDRO MARTÍN VIDE, FRANCISCO JAVIER SANCHEZ VILA

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

14446. Solve mathematical problems that may arise in engineering by applying knowledge about: linear algebra, geometry, differential geometry, differential and integral calculus, optimization, ordinary differential equations.
14447. Obtain basic knowledge about the use and programming of computers, operating systems, databases and basic numerical calculation and applied to engineering.
14448. Manage the basic concepts about the general laws of mechanics and thermodynamics, concept of field and heat transfer, and apply them to solve engineering problems.
14450. Describe the global functioning of the planet: atmosphere, hydrosphere, lithosphere, biosphere, anthroposphere, biogeochemical cycles (C, N, P, S), soil morphology and apply it to problems related to geology, geotechnics, edaphology and climatology.
14453. Describe and apply the techniques of analysis of physical, chemical and biological parameters; Integrate the experimental evidence found in field and / or laboratory data with the theoretical knowledge and interpret its results.
14457. Identify the fundamentals of structure theory, sustainable procedures for construction and dismantling of buildings and civil works; and describe the technology bases of the materials used in construction.
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).
14459. Describe the components and modes of transport and the impact of their externalities on the environment; identify the principles of environmental management of transport systems and sustainable planning of the territory; and introduce the tools for the management and operation of transport systems.
14461. Analyze, design, simulate and optimize processes and systems with environmental relevance, both natural and artificial, and their resolution techniques, as well as recognize techniques for analysis and evaluation of climate change.
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.

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.

The qualification of the subject is the weighted average between the practices and exercises to realize (PR), a directed work (TD) and two examinations (EX1 and EX2).

Some classes will be taught in Spanish

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

The various methods of environmental assessments will be analyzed, according to the scale of the project, based on basic European, state and Catalan legislation and the management of international environmental quality standards. The different physical and environmental factors that control the environmental impact assessment will be described. The course will be exemplified with the study of practical cases (industries, power plants, landfills, civil works) and the concepts of life cycle analysis, carbon footprint and water footprint will be introduced.

1. Understand the structure and content of environmental impact studies, identifying and evaluating impacts qualitatively and quantitatively. Know the concepts of preventive, corrective and compensatory measures and being able to value them.
2. Apply possible types of environmental assessments according to the scale of the project based on basic European, state and Catalan legislation and international environmental quality standards.
3. Apply the concepts to practical cases and understand the analysis of the life cycle, carbon footprint and water footprint.

Environmental Impact Assessment. The different types of environmental evaluations will be proposed according to the scale of the project based on basic European, state and Catalan legislation and the management of international environmental quality standards. The course will be exemplified with the study of practical cases and the concepts of life cycle analysis, carbon footprint and water footprint will be introduced.

The objective of this course is to provide information about how environmental impact assessment (EIA) should be carried out. Formally, EIA can be defined as "the whole process whereby information about the environmental effects of a project is collected, assessed and taken into account in reaching a decision on whether the project should go ahead or not" (DCLG, 2006; Morris and Therivel, 1995). The course is structured as follows. We first introduce the general concepts of EIA. We then present the environmental components of a typical EIA (population, landscape, heritage, air, climate, soil, water, fauna and flora) and how these can be significantly affected by a proposed project. For each environmental component, we present definitions and concepts, legislative background, scoping and baseline studies, impact prediction, mitigation and monitoring strategies. We then introduce cross-cutting EIA methods based on risk assessment, GIS, quality of life capital, and life cycle analysis.



STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	20.00
Self study	90,0	60.00
Hours small group	15,0	10.00
Hours medium group	15,0	10.00

Total learning time: 150 h

CONTENTS

Introduction

Description:

Intriduction of the subject

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

Theory classes: 2h

Self study : 2h 48m

Environmental impact Assessment

Description:

Environmental Impact Assessment (EIA). Concepts. Environmental Impact Study. Legislative framework. Identification and evaluation of impacts. Corrective measures. Environmental monitoring plan.

Specific objectives:

Know the concepts and procedures of the EIA and AAE Describe the incorporation of the EIA and AAE in the decision-making process on the viability of policies, plans, programs and projects Identify the characteristics of the main methodologies developed for the realization of AAEs and EIAs.

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

Theory classes: 4h

Self study : 5h 36m

Impacts on physical environmental components

Description:

Air quality and climate

Soils, geology and geomorphology

Water

Coastal ecology and geomorphology

Problems

Full-or-part-time: 52h 48m

Theory classes: 18h

Practical classes: 4h

Self study : 30h 48m



Evaluation

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

Laboratory classes: 6h

Self study : 8h 23m

Social, economic and cultural impact

Description:

Socio-economic, cultural and landscape

Acoustic

Problems

Full-or-part-time: 24h

Theory classes: 8h

Practical classes: 2h

Self study : 14h

Environmental risk assessment and risk management

Description:

Environmental risk assessment and risk management

Introduction to the basic methodologies applied in the analysis of risks for human health and ecosystems, as well as the approach of the basic assumptions on which this risk analysis is based

Problems

Specific objectives:

Conocer los principales aspectos asociados a la identificación y caracterización de los receptores del riesgo ambiental. Estar familiarizado con las metodologías de análisis de riesgos: salud humana y los ecosistemas Comprender los elementos limitantes del análisis de riesgos

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

Theory classes: 6h

Practical classes: 2h

Self study : 11h 12m

Life cycle analysis and sustainability

Description:

Life cycle analysis

Sustainable development and sustainability appraisal

Problemes

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

Theory classes: 6h

Practical classes: 2h

Self study : 11h 12m

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 final grade is estimated as:

$$NF = 0.3 * TD + 0.35 * EX1 + 0.35 * EX2$$

Students who have not passed (NF)

Students who have already passed it or with a NF

EXAMINATION RULES.

The fraudulent realization of an act of evaluation will entail the numerical qualification of zero of all the asignatura without possibility of re-evaluation. The use of mobile phones and / or computers is not allowed during the exams.

BIBLIOGRAPHY

Basic:

- Morris, P.; Therivel, R. Methods of environmental impact assessment. 3rd ed. London ; New York: Routledge, 2009. ISBN 9780415441759.

Complementary:

- Gómez Orea, D.; Gómez Villarino, M.T. Evaluación de impacto ambiental. 3. Madrid: Mundi-Prensa, 2013. ISBN 9788484766438.
- Nogueira, A. (dir). Evaluación de impacto ambiental: evolución normativo-jurisprudencial, cuestiones procedimentales y aplicación sectorial. Barcelona: Atelier, 2009. ISBN 9788496758896.
- 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.
- Arce Ruiz, R.M. La evaluación ambiental en la ingeniería civil. Madrid: Mundi Prensa, 2013. ISBN 9788484766445.
- Pardo, M. La evaluación del impacto ambiental y social para el siglo XXI: teorías, procesos, metodología. 1. Madrid: Fundamentos, 2002. ISBN 8424509447.
- Conesa Fernández-Vítora, V. Guia metodològica para la evaluación del impacto ambiental. 4ª ed. rev. y ampliada. Madrid [etc.]: Mundi-prensa, 2010. ISBN 9788484763840.