Environmental Management (250717)

General Information

School	ETSECCPB
Departments	Departament d'Enginyeria Civil i Ambiental (DECA) Departament d'Enginyeria de Projectes i de la Construcció (EPC)
Credits	5.0 ECTS
Programs	MÀSTER UNIVERSITARI EN ENGINYERIA ESTRUCTURAL I DE LA CONSTRUCCIÓ (pla 2015)
Course	2024/25

Main teaching language at each group

- Group 10ES2 Spanish (Q2)

Faculty

Responsible Faculty: Marta Gangolells Solanellas
Faculty: Marta Gangolells Solanellas, Josep Manuel Sabate Ibañez

Objectives of Education

Subject to introduce the engineering in the field of environmental impact management in construction and bring it to the concept of sustainable construction.

- Knowledge of the basic concepts that make environmental principles an integral whole with complete lifecycle of structures and buildings . - Ability to quantify the environmental impact of building materials and waste thereof

Environmental concepts related to sustainable development. Environmental qualification systems . Life Cycle Analysis. Models TWIN BEDS , Eco - Cost / Value Ratio, Eco - Quantum, Eco-indicators . Flow analysis of building materials. Analysis of water flow . Bottlenecks. Solutions. Analysis of energy flow . Sustainable constructions . Objectives of the construction sector and its environmental consideration. Protection of soil and water. Waste, recycling and landfill.

The course aims to introduce the engineer within the field of construction environmental impacts management and sustainable construction. The course aims to provide the basic knowledge related to the life cycle impact of buildings taking into account raw materials consumption and waste management. It also aims to highlight the significance of energy consumption in buildings. This course also aims to provide students with the necessary knowledge on environmental management systems in construction companies and provide tools for assessing and monitoring the environmental impact of the construction sector.

Competencies

Especific

To apply innovative and sustainable technological aspects in the management and implementation of projects and works.
To analyze the multiple technical and legal conditions arising in the construction of public works, and use proven methods and proven technologies with the aim of achieving greater efficiency in construction while respecting the environment and protecting the safety and health of workers and users of public works.

Generic

To conceive, design, analyze and manage structures or structural elements of civil engineering or building, encouraging innovation and the advance of knowledge.
To develop, improve and use conventional materials and new construction techniques to ensure the safety requirements, functionality, durability and sustainability.
To define construction processes and methods of organization and management of projects and works.
To design plans for safety, quality and environmental and socioeconomic impacts related to the construction process.

Total hours of student work

		Hours	Percentage
Supervised Learning	Large group	25.5 h	56.67 %
	Medium group	9.75 h	21.67 %
	Laboratory classes	9.75 h	21.67 %
	Guided Activities	0.0 h	0.00 %
Self Study		80.0 h	

Contents

Environmental management of construction projects and sites

- Introduction to global environmental issues.
- Dimensions of sustainability in the construction industry.
- Concept of environmental impact
- Methodology and contents of the Environmental Impact Assessment
- Types, indicators and assessment of environmental impacts
- Analysis of the environment
- Prevention of the environmental impact
- Environmental monitoring program
- Communication of environmental impacts
- Introduction to Environmental Management Systems.
- Standards for Environmental Management Systems. UNE-ISO 14000 and Eco-Management and Audit Scheme System (EMAS).
- The implementation process of an Environmental Management System.
- Environmental Management System audits and verification / certification of the system.
- Integrated management systems.

Environmental management systems in construction companies - Case study
- The concept of Life Cycle Assessment
- Regulatory Framework
- Description of the methodology of Life Cycle Assessment

Life Cycle Analysis - Environmental Product Declaration

Specific Objectives

- To know the historical references and basic concepts related to sustainable development.
- To identify the building life cycle, agents and actions affecting the environment.
- To know the Environmental Impact Assessment methodology.
- To understand the basic aspects related to the implementation of environmental management systems in construction companies.
- To understand the basics of the methodology of Life Cycle Assessment

Construction material flow analysis

- Raw materials consumption
- Earthworks waste management
- Construction waste management
- Demolition waste management

Specific Objectives

- To understand the environmental impact related to the raw materials consumption and waste management in construction projects and sites and corresponding minimization strategies

Energy flow analysis in construction

- Energy consumption throughout the whole life cycle of the building
- Limitation of the energy demand in buildings
- Certification of the energy demand in buildings
Energy flow analysis in construction - Energy audit of a building
Presentation of the energy audit

Specific Objectives

- To understand the the environmental impact related to the energy consumption in construction projects and corresponding minimization strategies.

Teaching Methodology

The course consists of 3 hours per week of classroom activity (large size group).

The 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.

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.

Classes are taught in Spanish but some activities and resources can be in 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.

Grading Rules

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

The mark of the course is obtained trhough continuous assessment.

Continuous assessment consists 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 evaluation tests consist in questions about concepts related to the learning objectives of the course and a set of application exercises.

The final grade depends on the following assessment criteria:
- Activities (60%)
- Exam (40%)

Test Rules

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

Office Hours

To be agreed.

Bibliography

Basic

- Unión Europea. EMAS: Reglamento Comunitario de Ecogestión y Ecoauditoría.
- International Standard Organization. Gestión ambiental: UNE-EN ISO 14040:2006 Gestión ambiental: análisis de ciclo de vida: principios y marco de referencia. 2a ed. Madrid: AENOR, 2007. ISBN 9788481435214.
- Asociación Española de Normalización y Certificación (AENOR). Norma española : UNE-EN ISO 14001 : septiembre 2015 : sistemas de gestión ambiental : requisitos con orientación para su uso : ISO 14001:2015. Madrid: AENOR, 2015.