

## 28760 - Environmental Engineering

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 28760 - Environmental Engineering

**Faculty / School:** 175 - Escuela Universitaria Politécnica de La Almunia

**Degree:** 423 - Bachelor's Degree in Civil Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject type:** Optional

**Module:**

### 1. General information

This subject is focused on the training of engineers so that they are able to identify the aspects that may have an environmental impact on the industry in general, although special emphasis is placed on the activities that may have an impact on the construction and civil engineering activities, since there is a strong interaction and negative effects on the environment due to these activities, being necessary that the students are able to identify the possible impacts produced.

To this end, we begin by describing and studying the links between the company and the environment, followed by an analysis of the pollution vectors and the environmental technology available for each one of them, also showing the basic knowledge of environmental management (environmental regulations, environmental management systems, environmental impact assessment, etc.) so that the student knows the most useful and effective tools for environmental actions to be taken into account.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), to the extent that Environmental Engineering is a tool aimed precisely at achieving the goals of the SDGs.

### 2. Learning results

- Recognize and know how to assess the effect of pollutants on the receiving environment: atmosphere, water and soil.
- To know how to analyze an activity in the field of civil engineering and identify the environmental problems that may arise from it.
- Plan a pollution prevention and control strategy in specific cases.
- To know how to select the most appropriate technique for purification and/or contamination control according to the case.
- To be able to dimension simple water, atmospheric and soil pollution control installations.
- Analyze the impact of different civil engineering activities on the environment.
- Apply the fundamentals of an Environmental Management System in the activities within the field of civil engineering.
- To know the basic regulations related to environmental matters (discharges, atmosphere, waste, environmental impact and integrated pollution control), and the obligations deriving therefrom.
- Identify the Sustainable Development Goals that are directly recognizable and/or applicable through this subject.

### 3. Syllabus

TOPIC 1. Introduction to Environmental Engineering

TOPIC 2. Environment and business

0.- Introduction

1.- Environmental policy. Environmental policy of the European Union

2.- Liability for environmental damage in the European Union

3.- Environmental policy instruments

Regulatory standards and economic instruments

Environmental taxation and business

4.- The company and the environment

Current reality and factors of change

A new perspective.

The role of the different social agents.

5.- The environmentalization of the company

Eco-efficiency

Environment and competitiveness

The process to follow

Operational measures for eco-efficiency

6.- Measure, evaluate and communicate the company's environmental performance: Corporate Environmental Accounting

Measurement

Assessment

Communication

TOPIC 3. Waste

0.- Definition and terminology.

1.- Types of Waste.

2.- Minimization techniques. Audits.

The role of the different social agents.

3.- Ecodesign.

4.- Process changes.

5.- Recycling

6.- Valorization or recovery.

Solid-Solid Separation.

Solid-Liquid Separation.

Valorization of diverse materials.

7.- Treatments.

8.- Deposition.

TOPIC 4. Environmental Responsibility

0.- Definition and terminology

1.- Environmental Liability Law (Scope)

2.- Liability regime

3.- Obligations and guarantees of the operator.

4.- Sanctions

TOPIC 5. Air Pollution

1.- Structure and composition of the atmosphere.

2.- Episodes of atmospheric pollution.

3.- Atmospheric pollutants.

4.- Air quality control.

TOPIC 6. Sound Pollution

1.- Physical properties of sound.

2.- Noise measurement.

3.- Noise sources.

4.- Noise maps.

TOPIC 7. Light Pollution

1.- Properties of light sources.

2.- Measurement of light pollution.

3.- Sources of contamination.

4.- Control methods.

TOPIC 8. Soil contamination

1.- Risk analysis.

2.- Absorption.

3.- Adsorption

4.- Pre-operational status.

5.- Soil quality

6.- Soil contamination

7.- Decontamination.

8.- Desorption

## TOPIC 9. Environmental management systems

- 1.- Introduction.
- 2.- Environmental Management Systems (EMS).
- 3.- EMS implementation.
- 4.- Advantages and disadvantages of implementing an EMS.
- 5.- UNE-EN ISO 14001 Standard and European Regulation (EMAS).

### 4. Academic activities

#### **Theory lectures:** 15 hours

Sessions in which the general features of each topic will be explained in order to allow students to prepare for the contents to be presented.

#### **Tutored practices:** 35 hours

Elaboration of the different practices with a close follow-up to address and transfer to practical cases the different aspects addressed by the subject Environmental news related to engineering; Impact Study Environmental: Experiences in Construction and Demolition Waste; Air Pollution; Noise Pollution; Contaminated Soils; Conferences and technical seminars related to the subject.

#### **Teaching assignments.** 45 hours

Preparation of different theoretical contents of the subject and part of the practices, to be presented and discussed in class.

#### **Personal study:** 45 hours

#### **Assessment tests.** 10 hours

Performance of short evaluation tests and presentation and defense of contents elaborated by the students

### 5. Assessment system

#### **CONTINUOUS ASSESSMENT**

- **Active participation in the subject:** 10% of the grade
  - including attendance to seminars, conferences and visits to companies or construction sites, participation in debates during presentations, and the sharing of news of interest related to the subject. **Theoretical tests:** 40% of the grade
  - linked to the preparation of the topics, their presentation and defense in class **PRACTICAL TESTS:** 50% of the grade
  - of individual or group type, assigning a weight according to their complexity, evaluating separately the own presentation of their individualized defense in class. Planned to carry out 6-8 points

#### **GLOBAL ASSESSMENT. OFFICIAL CALLS**

- **Written test of THEORY:** 65% final grade
  - on the dates officially established in the call for proposals
- **PRACTICAL test:** 35% final grade
  - Completion of an individual work related to practical aspects of the subject. This work must be delivered necessarily at least 7 days before the official call of the subject. The exhibition and the defense of these works will be carried out as a priority on the same day of the official call of the subject, if this is not possible due to the high number of registrations, new dates will be agreed upon with the affected students, which must be close to the official call.

In both types of evaluation, in order to be able to compensate and pass the subject, it is a prerequisite to have obtained at least 3.5 points in any of the theory or practical sections.