

Academic Year/course: 2021/22

## 28760 - Environmental Engineering

### Syllabus Information

**Academic Year:** 2021/22

**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

### 1.1. Aims of the course

The subject and its expected results respond to the following approaches and objectives:

- Show the basic concepts of analysis of environmental factors and their interrelation among them.
- Show the concepts that allow the analysis of the interactions between the activity of the human being and the environment.
- Show tools for identification, assessment, mitigation of environmental impacts.
- Show the general principles of the tools available for good environmental management.
- Introduce the existing basic environmental regulations (European, state and regional).

### 1.2. Context and importance of this course in the degree

The Environment is a constant concern of our society.

The environmental factors, the interrelation between them, the interactions of the human species with their environment are the object of studies and analysis. One of the major interactions that occur between the human being and his environment is linked to the activity of Civil Engineering.

This course is primarily aimed at training engineers trained to identify the environmental aspects and impacts of the industry, in order to minimize them, prevent them and solve them. For this, it begins by describing and studying the links between the company and the Environment. All the vectors of pollution and environmental technology are studied below for each one of them.

Finally, basic knowledge of environmental management is given (Environmental regulations, Environmental Management Systems, Environmental Impact Assessment) so that the student knows the most useful and effective environmental tools for the industry.

The subject of Environmental Engineering, is part of the degree in Civil Engineering taught by EUPLA, framed within the group of subjects that make up the module called specific training: hydrology and which belongs to the subject of Environmental Engineering. It is a subject of third course located in the second semester and compulsory (OB), with a teaching load of 6 ECTS credits for the training course of Hydrology.

The need of the subject within the curriculum of the present degree is more than justified because being a subject with a strong transversal character influences the approach of the rest of the subjects taught, adding the environmental variable.

### 1.3. Recommendations to take this course

For the development of the Environmental Engineering course there is no regulatory requirement nor is it required previous specific complementary knowledge although it requires putting into play knowledge and strategies from subjects related to:

- Social Sciences.
- Natural Sciences

## 2. Learning goals

### 2.1. Competences

#### Mandatory competences

EH2. Knowledge and understanding of the functioning of ecosystems and environmental factors.

#### General competences

G01 - Organizational and planning capacity

G02 - Ability to solve problems

G03 - Ability to make decisions

G04 - Aptitude for oral and written communication in the native language

G05 - Capacity for analysis and synthesis

G06 - Information management capacity

G07 - Ability to work in a team

G08 - Capacity for critical reasoning

G09 - Ability to work in an interdisciplinary team

G10 - Ability to work in an international context

G11 - Improvisation and adaptation capacity to face new situations

G12 - Leadership aptitude

G13 - Positive social attitude towards social and technological innovations

G14 - Capacity for reasoning, discussion and presentation of ideas

G15 - Ability to communicate through words and images

G16 - Ability to search, analyze and select information

G17 - Ability for autonomous learning

G18. Possess and understand knowledge in an area of ??study that starts from the general secondary education base, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that involve knowledge from the avant-garde. from your field of study.

G19. Apply their knowledge to their job or vocation in a professional way and possess the competencies that are usually demonstrated through the elaboration and defense of arguments and problem solving within their area of ??study.

G20. Ability to collect and interpret relevant data (usually within their area of ??study) to make judgments that include reflection on relevant issues of a social, scientific or ethical nature.

G21. Transmit information, ideas, problems and solutions to a specialized and non-specialized audience

G22. Develop those learning skills necessary to undertake further studies with a high degree of autonomy.

G23 - Know and understand respect for fundamental rights, equal opportunities between women and men, universal accessibility for people with disabilities, and respect for the values ??of the culture of peace and democratic values

G24 - Promote entrepreneurship

G25 - Knowledge of information and communication technologies

### 2.2. Learning goals

The student, to pass this subject, must demonstrate the following results ...

- Recognizes and knows how to assess the effect of pollutants on the receiving environment: atmosphere, water and floors.
- Knows how to analyze an activity in the field of civil engineering and identify environmental problems that she can be derived.

- Knows how to plan a pollution prevention and control strategy in specific cases.
- He knows how to select the most appropriate technique for purifying and / or controlling contamination in specific cases.
- It is capable of dimensioning simple pollution control installations in waters, atmosphere and soils.
- Analyze the impact that different civil engineering activities have on the environment.
- It is capable of applying the foundations of an Environmental Management System in an activity in the field of civil Engineering.
- Know the basic regulations related to the environment (discharges, atmosphere, waste, impact environmental, and integrated pollution control) and the obligations derived from it.

### 2.3. Importance of learning goals

This course offers a holistic view of the environment. In its development, a global vision of the knowledge and the interrelation of environmental factors, allowing students to integrate the environmental variable into all the activities of the company, being able to determine and prevent the environmental impacts of the activity of the Civil Engineering before they occur, as well as using minimization and correction tools once produced.

## 3. Assessment (1st and 2nd call)

### 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The evaluation process will include two types of action:

- A **continuous evaluation system**, which will be carried out throughout the entire learning period.
- A **global assessment test** that reflects the achievement of learning results, at the end of the teaching period.

#### CONTINUOUS EVALUATION SYSTEM

The continuous assessment system will promote continuous work and the active participation of students in the subject, having the following group of qualifying activities:

- **Individual and group activities.**
  - It consists of the preparation, development, presentation and defense in class of the subjects of the subject.
  - Preparation and resolution of practical cases, as well as their presentation and defense.
- **Master classes and visits to companies and works**
  - Given that it is planned to be carried out, the contents will be equally evaluable through presentations or works that develop the contents of the classes and visits.
- **Active participation**
  - It is intended with this system to involve students in the search and debate of news related to the subject, as well as participation in the debates of the exposed topics, assuming such participation 10% of the grade

It is a fundamental requirement to be able to pass the subject by continuous evaluation to have participated as a minimum in the 80% of the face-to-face activities of the subject.

If the subject is not passed through the continuous evaluation system, the Final Global Evaluation will be accessed directly, without any of the marks previously obtained in continuous evaluation being transferred or saved to this evaluation system.

#### GLOBAL TEST OF FINAL EVALUATION

The global evaluation test will have the following activities

- **Written evaluation test** on the officially established dates. (70% of the grade)
- **Completion of a work** related to practical aspects of the subject, and which must have been delivered to the at least 7 days before the written evaluation test, and defended the same day as the written test. (30% of the note)

It is an essential requirement to be able to compensate and pass the subject having obtained at least 3.5 points in any of the sections.

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

The subject consists of 6 ECTS credits, which represents 150 hours of student work in the subject during the semester. 40% of this work (60 hours) will be carried out in the classroom, and the rest will be autonomous. To make the temporal distribution, the teaching week is used as a measure, in which the student must dedicate to the study of the subject 10 hours. "If classroom teaching were not possible due to health reasons, it would be carried out on-line."

## 4.2. Learning tasks

### Face-to-face activities and tutored autonomous activities:

1. Given the characteristics of the subject, it is intended that students have an active participation, using the flip teaching method or inverted class.
2. This means that based on the contents of the subject, the bibliography provided, and the tutoring of the teacher, the Students must prepare the classes and present them in public, promoting a greater number of competitions.
3. The exhibitions will in turn serve to foster interaction with the rest of the students and serve to discuss the topics covered and show different opinions.
4. Depending on the degree of complexity or extension, these works will be carried out individually, or in groups.
5. The exhibition and defense of the contents, as well as the participation of the other students, will serve for the evaluation in the continuous evaluation system.
6. This methodology is equally adapted to the more theoretical contents as to those that have a more practical development part.
7. At all times the preparation and development of the contents will be tutored by the teacher.

### Master Classes:

1. The participation of renowned professionals is planned to show from a point of view of the practical application, the contents of the subject in terms of application to the company, in the designs of engineering or in the execution of works.

## 4.3. Syllabus

This course will address the following topics:

**Topic 1. Introduction to the Environment and sustainable development. Normative Concepts.**  
 ? Introduction. Environment and sustainable development. Pollution.  
 ? Relationships between Environmental and Economic Social Development.  
 ? Urban Environment and Business.  
 ? Terminology. Concept of Environmental Impact Assessment and Environmental Impact.  
 ? Risk Society.  
 ? Environmental Compliance.

**Topic 2. Environment and company.**  
 ? The liability for environmental damage in the European Union  
 ? The instruments of environmental policy  
 ? The company and the environment  
 ? The greening of the company  
 ? Measure, assess and communicate the environmental performance of the company: The Environmental Accounting Business

**Topic 3. Waste.**  
 ? Definition and terminology.  
 ? Types of waste.  
 ? Minimization techniques. Audits.  
 ? Changes in the Ecodesign process.  
 ? Disposal or Recycling recovery.  
 ? Treatments.  
 ? Deposition.

**Topic 4. Environmental Responsibility.**  
 ? Definition and terminology.  
 ? Environmental Liability Act (Scope)  
 ? Obligations and guarantees the regime operator.  
 ? Sanctions

**Topic 5. Air Pollution.**  
 ? Structure and composition of air the atmosphere.  
 ? Episodes of air pollution.  
 ? Air of air pollutants.  
 ? Control of air quality.

<b>Topic</b>	<b>6.</b>	<b>Noise</b>	<b>Pollution</b>
?	Physical	properties	sound.
?	Measurement	of	noise.
?	Sources	of	noise.
?Noise Maps.			
<b>Topic</b>	<b>7.</b>	<b>Light</b>	<b>pollution</b>
?	Properties	of	sources.
?	Measurement	of	pollution.
?	Sources	of	contamination.
? Control methods.			

**Topic 8 Soil Pollution**

**Topic 9 Environmental Management Systems.**

#### 4.4. Course planning and calendar

The topics planning is shown below:

- **Week 1:** Topic 1.
- **Week 2 and 3:** Topic 2.
- **Week 4, 5 and 6:** Topic 3 and 4
- **Week 7 and 8:** Topic 5.
- **Week 9 and 10:** Topic 6.
- **Week 11:** Topic 7.
- **Week 12:** Topic 8.
- **Week 13, 14 and 15:** Topic 9.
- **Week 15:** Topic 8.

The hours of the subject, as well as the dates of evaluation in each call will be published on the website of the EUPLA.

#### 4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28760>