

**COURSE DATA****Data Subject**

Code	34930
Name	Environment and sustainability
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
1404 - Degree in Industrial Electronic Engineering	School of Engineering	2	First term

Subject-matter

Degree	Subject-matter	Character
1404 - Degree in Industrial Electronic Engineering	13 - Principles of environmental technologies and sustainability	Obligatory

Coordination

Name	Department
SANCHEZ TOVAR, RITA	245 - Chemical Engineering

SUMMARY

The main objective of the subject Environment and Sustainability is to gain a global view of the environmental pollution on the basis of its origins and problems, attending also to the sustainability principles, the environmental technologies and its application. It is a compulsory subject that is taught quarterly in the first semester of the second year of the Degree in Chemical Engineering. The subject consists of a total of 6 ECTS.

This subject aims for students to become aware of environmental problems, mainly those derived from industrial activities, and that they acquire the strategies and approaches to solve these problems from the perspective of sustainable development principles, prevention of pollution, or, ultimately, from the application of remediation technologies.



The general objectives of the subject are:

- Introduce to students the origins of pollution, its problems and basic principles for its control.
- Ensure that the student understands the concept of sustainability and its integration in the industrial activity.
- To acquaint students with the tools of environmental management, and especially its application in industry.
- Introduce to students the different measures and technologies for the prevention and control of pollution.
- Stimulate and encourage the student those values and attitudes of respect for the environment that should be inherent to an engineer.

The subject contents are: **Sources of environmental pollution. Assessment of water quality. Types of waste and its characterization. Air pollutants. Measurement and control of air quality. Soil contamination. Legislative framework. Waste management strategies, wasted effluents and emissions. Concept of sustainability. Tools for sustainable development in the industry. Wastewater, waste and atmospheric emissions treatment schemes.**

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

It is recommended that the student has basic knowledge of physics and chemistry.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1404 - Degree in Industrial Electronic Engineering

- CG3 - Knowledge of basic and technological subjects that allows students to learn new methods and theories and provides them with versatility to adapt to new situations.



- CG4 - Ability to solve problems with initiative, decision-making skills, creativity and critical reasoning and to communicate and transmit knowledge, abilities and skills in the field of industrial engineering (with specific industrial electronics technology).
- CG5 - Knowledge to carry out measurements, calculations, assessments, appraisals, surveys, studies, reports, work plans and analogous work.
- CG6 - Ability to deal with specifications, regulations and mandatory standards.
- CG7 - Ability to analyse and assess the social and environmental impact of technical solutions.
- CG8 - Ability to apply the principles and methods of quality control.
- CG11 - Knowledge, understanding and ability to apply the necessary legislation for practising professionally as a qualified industrial engineer.
- CG27 - Basic and applied knowledge of environmental technologies and sustainability.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

Learning outcomes:

- Knowing the sources of pollution (Competences CG3, CG5 and CG27).
- Establish criteria for assessing water quality (Competences CG3, CG4, CG5, CG6, CG7, CG8, CG11 and CG27).
- Have knowledge of different types of leaks, waste and emissions into the atmosphere, and its problems (Competences CG3, CG4, CG5, CG6, CG7, CG11 and CG27).
- Knowing the problems of soil contamination (Competences CG3, CG6 and CG7).
- Establish the framework legislation on environmental (Competences CG5, CG6 and CG11).
- Gain knowledge of the waste and emissions management strategies (Competences CG6, CG7, CG8, CG11 and CG27).
- Understand the concept of sustainability and its application to industry (Competences CG3, CG7 and CG27).
- Acquire a basic knowledge of wastewater, waste and atmospheric emissions treatment schemes (Competences CG3, CG8 and CG27).

Skills to be acquired:

The student should be able to:

- Recognize the origins and sources of water, atmosphere and soil pollutants
- Understand the application of the principles of sustainability in production processes
- Describe the objectives and characteristics of the Environmental Management Systems
- Identify engineer's functions in environmental aspects
- Recognize the parameters for the assessment of water, air and soil quality
- Identify the different types of leaks, waste and atmospheric emissions problems
- Gather and understand the environmental regulations
- Define the principles of environment oriented-design and tools for its application



- Consider options for waste and emissions management
- List the principles of integrated pollution prevention
- Gather information on Best Available Techniques
- Recognize the main wastewater, waste and atmospheric emissions treatment processes

In addition to the specific objectives mentioned above, the subject will encourage the development of several generic skills, among which include

- Capacity for critical analysis and synthesis
- Appropriate use of scientific and technical terms
- Ability to communicate orally and in writing
- Skills in interpersonal relationships
- Ability to learn independently
- Creativity. Ability to explore new situations

DESCRIPTION OF CONTENTS

1. ORIGINS AND PROBLEMS OF ENVIRONMENTAL POLLUTION

Economy, Society and Environment. Interaction between industry and environment. Concept of sustainability and its integration into production processes. Tools for sustainable development in the industry. Environmental Management Systems. Functions of the engineer.

2. WATER POLLUTION

Assessment of water quality. Evaluation of water quality. Characterization of natural and wastewaters. Legislation. Wastewater treatments. Sludge treatment. Schemes of wastewater treatment.

3. ATMOSPHERIC POLLUTION

Atmospheric emissions. Atmospheric pollutants. Measurement and control of air quality. Pollutants dispersion. Control of the atmospheric pollution. Legislation.

4. WASTE

Waste management strategies. Waste classification. Types of waste and characterization. Urban waste. Hazardous waste. Prevention/minimisation, reuse, recycling, valorisation, final treatment. Contamination and treatment of contaminated soils. Another type of contamination. Legislation.

**5. INTEGRATED POLLUTION PREVENTION IN INDUSTRIAL PROCESSES**

Legal Framework. Types of actions. Best available technologies. Lines of action. Environmental impact assessment.

6. DESIGN FOR ENVIRONMENT

Integrated Product Policy. Life cycle analysis. Eco-design. Design for X.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	45,00	100
Classroom practices	15,00	100
Development of group work	15,00	0
Development of individual work	15,00	0
Preparation of evaluation activities	20,00	0
Preparing lectures	20,00	0
Preparation of practical classes and problem	20,00	0
TOTAL	150,00	

TEACHING METHODOLOGY

The methodology used in the course will consider the following aspects:

Classroom Sessions: a global view of each part will be offered to the students, and they will be focused on those key concepts that will be developed as well as resources to be used for further preparation of the subject in depth. These sessions will present examples and some practical applications, will solve problems and will include presentations and work on groups to enhance the assimilation of the concepts introduced. (Competences CG3, CG5, CG6, CG7, CG8, CG11 and CG27).

Practical Activities: includes practical classes and seminars that will include, under the supervision of the teacher, practical problems and presentations (Competences CG3, CG4, CG5, CG6, CG7, CG8, CG11 and CG27).

EVALUATION

The subject will be evaluated, both in the first and second call, by continuous assessment and by taking an individual test (EXAM) on the date of the official call.



- Continuous assessment: It consists of carrying out and delivering non-recoverable activities, in which the theoretical / practical concepts studied in the classroom are worked on. Part of these activities are carried out in the classroom during the established sessions, while others must be carried out by students out of the class.

- Exam: it consists of carrying out an exam composed of a theory part and a problem part and covers the contents of the entire subject. To pass the exam, the student must obtain at least 5 points out of 10.

The final grade for the course will be obtained as the maximum grade of:

- Average of the mark of the activities delivered (20%) and the mark of the exam (80%), as long as the exam gives a mark equal to or greater than 5 points out of 10.

- Grade obtained in the exam (100%).

The minimum mark to pass the course is 5 points out of 10. The final mark, if the subject has not been passed due to having obtained a mark lower than 5 points out of 10 in the exam, will be the mark of the exam.

In any case, the evaluation system will be governed by the provisions of the Regulation of Avaluació i Qualificació of the University of Valencia per a títols de Grau i Màster (<http://links.uv.es/7S40pjF>).

REFERENCES

Basic

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Additional

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