# COURSE DATA

## DATA SUBJECT

**Code:** 34759
**Name:** Environment and sustainability
**Cycle:** Undergraduate Studies
**ECTS Credits:** 6
**Academic year:** 2026-27

## STUDY (S)

| Degree | Center | Acad. year | Period |
|---|---|---|---|
| 1401 - Degree in Chemical Engineering | Escola Tècnica Superior d'Enginyeria | 2 | First quarter |
| 1934 - Double Degree Program in Chemistry-Chemical Engineering | Facultat de Química | 2 | First quarter |

## SUBJECT-MATTER

| Degree | Subject-matter | Character |
|---|---|---|
| 1401 - Degree in Chemical Engineering | Principles of environmental technologies and sustainability | COMPULSORY |
| 1934 - Double Degree Program in Chemistry-Chemical Engineering | Segundo curso | COMPULSORY |

## COORDINATION

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# 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.**

**Observations**: The classes will be taught in the language as stated in the course sheet available on the website of the degree.

## 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, chemistry and mass- and energy-balances.

## COMPETENCES / LEARNING OUTCOMES

### 1401 - Degree in Chemical Engineering

Ability to apply quality principles and methods.

Ability to handle specifications, regulations and standards of compliance.

Acquire knowledge of basic and technological subjects to facilitate the learning of new methods and theories, and develop the versatility to adapt to new situations.

Act autonomously in learning, make informed decisions in different contexts, issue judgements based on experimentation and analysis and transfer knowledge to new situations.

Analyse and evaluate the social and environmental impact of technical solutions.

Basic knowledge and application of environmental technologies and sustainability.

Be able to understand and apply the legislation required for the practice of the profession of technical industrial engineer.

Collaborate effectively in work teams, assume responsibilities and leadership roles, and contribute to collective improvement and development.

Contribute to the design, development and implementation of solutions that respond to social demands, guided by the Sustainable Development Goals.

Demonstrate critical and self-critical thinking, considering professional ethics, moral values and social implications of the different activities carried out throughout the degree.

Knowledge for carrying out measurements, calculations, valuations, appraisals, expert opinions, studies, reports, work plans and other similar work.

Propose creative and innovative solutions to complex situations or problems, typical of the area of ¿¿¿¿connection, to donate responses to the various professional and social needs

Saber comunicarse de manera efectiva, tanto de forma oral como escrita, adaptándose a las características de la situación y de la audiencia

Solve problems with initiative, make decisions, think creatively and critically, and communicate and convey knowledge, skills and competences in the field of industrial engineering.

## 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. WASTE AND EMISSIONS MANAGEMENT STRATEGIES

Waste and air emissions. Legal Framework. Prevention/minimization, reuse, recycling, valorization, final treatment.

## 3. DESIGN FOR ENVIRONMENT

Integrated Product Policy. Life cycle analysis. Ecodesign. Design for X.

## 4. INTEGRATED POLLUTION PREVENTION IN INDUSTRIAL PROCESSES

Legal Framework. Types of actions. Best available technologies. Lines of action.

## 5. POLLUTION CHARACTERIZATION

Assessment of water quality. Types of waste and characterization. Air pollutants. Measurement and control of air quality. Soil contamination. Other types of pollution.

## 6. TECHNOLOGIES FOR THE MANAGEMENT AND TREATMENT OF WASTE AND EMISSIONS

Wastewater, waste and atmospheric emissions treatment schemes.

# WORKLOAD

### PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Theory | 45,00 |
| Classroom practices | 15,00 |
| **Total hours** | **60,00** |

### NON PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Attendance at other activities | 0,00 |
| Individual or group project | 30,00 |
| Independent study and work | 0,00 |
| Preparation of lessons | 40,00 |
| Preparation for assessment activities | 20,00 |
| Resolution of case studies | 0,00 |
| **Total hours** | **90,00** |

# 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.

**Practical Activities:** includes practical classes and seminars that will include, under the supervision of the teacher, practical problems and presentations.

## EVALUATION

Subject evaluation System

The subject will be evaluated, both in the first and second call, by continuous evaluation and by conducting a final objective test on the date of official call.

- Continuous evaluation: It consists of the realization and delivery of activities, not recoverable, in which the theoretical concepts studied in the classroom are worked on. Some of these activities must be carried out in the classroom sessions, while others consist on deliverable homework.
- Objective test: consists of an exam composed of a part of theory and a part of problems. To pass this test the student must obtain at least 3.5 points out of 10 in each of the parts of the test (theory and problems). In addition, the minimum mark to pass the test as a whole is 5.0 out of 10.

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

- Average of the grade of the activities delivered (50%) and the grade of the objective test (50%).
- Grade obtained in the objective test (100%).

The minimum grade to pass the subject is 5 points out of 10. The final grade of students who have not passed the course for having obtained in the objetive test a mark less than 5 points out of 10, will be the grade obteined in the objetive test.

Copying or plagiarism of any activity that is part of the evaluation will result in the impossibility of passing the course, and the student will then be subject to the appropriate disciplinary procedures indicated in the ACTION PROTOCOL FOR FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA (ACGUV 123/2020).

Anyhow, the evaluation system will be based on the guides stated in the "Reglament d'Avaluació i Qualificació de la Universitat de València per a Graus i Màsters" (ACGUV 108/2017).

## REFERENCES


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