COURSE DATA

DATA SUBJECT

Code: 34785
Name: General services and auxiliary systems
Cycle: Undergraduate Studies
ECTS Credits: 4.5
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1401 - Degree in Chemical Engineering	Escola Tècnica Superior d'Enginyeria	4	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1401 - Degree in Chemical Engineering	Optional subjects	ELECTIVES

COORDINATION

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SUMMARY

The course ***General Services and Auxiliary Systems*** generally aims to provide students with practical knowledge and operational energy services necessary for the operation of industrial facilities. The course addresses in a comprehensive and integrated way various support systems necessary in almost any chemical plant (mains water, electric and thermal energy, transport of materials, fire protection).
This is an elective course that is taught quarterly basis in the fourth year of an undergraduate degree in Chemical Engineering. In the curriculum currently in place consists of a total of 4.5 ECTS. The contents of the course are divided into four sections:

- Fire protection.
- Energy services.
- Operational services.
- Electrical installations.

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 acquired the skills of the core subjects of Chemical Engineering Applied Thermodynamics and Heat Transfer, Fluid Mechanics, Electrical and Electronic Principles and Graphic Expression.

COMPETENCES / LEARNING OUTCOMES

1401 - Degree in Chemical Engineering

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

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.

Propose creative and innovative solutions to complex situations or problems, specific to the field of knowledge, to respond to diverse professional and social needs.

Recognise and apply the basic principles of the various subjects within this applied and professional field to deepen the learning outcomes already covered in the core subjects.

DESCRIPTION OF CONTENTS

Auxiliary services in the chemical industry.
Types of services and location in the chemical plant.
Energy needs and services in the plant.

Steam generation. Steam distribution network.
Cogeneration systems.
Refrigeration systems.

Firestop Systems.
Active Protection Systems.

1. Introduction

Auxiliary services in the chemical industry.
Types of services and location in the chemical plant.

2. Energy services

Steam generation. Steam distribution network.
Cogeneration systems.

3. Antifire systems

Firestop Systems.
Regulation
Calculating the Equipped Fire Hydrant Networks.

4. Operational services

Tap water and sanitary water. Industrial water.
Compressed air. Other industrial gases.

5. Electrical facilities

Introduction.
Switchgear.
Calculation and design of three-phase and single phase systems.
Transformers.
Protection systems: overcurrent and overvoltage devices. Earthing devices.
Lighting installations.
Distribution boards.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	25,00
Classroom practices	20,00
Total hours	**45,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	27,00
Independent study and work	20,00
Preparation of lessons	20,50
Preparation for assessment activities	0,00
Resolution of case studies	0,00

Total hours	**67,50**

TEACHING METHODOLOGY

Lecture sessions: We will use the lecture model, where the teacher will give an overview of the issue impacting on the key to understanding it. Also he/she will recommend adequate resources for the further deepening of the subject by the student.

Practical sessions: Practical classes will complement the theoretical activities in order to apply the basic concepts and extend them with the knowledge and the experience that the students acquire during the course. This will be done in the classroom or in small groups. They include the following types of classroom activities:

- Classes of problems in the classroom. The professor will explain a number of sample problems that allow students to acquire the necessary skills to analyse, formulate and solve the problems of each unit. It will enhance students' skills for decision-making.
- Discussion sessions and problem solving. In these sessions, to be held in small groups, we will analyse and discuss a series of exercises or works previously raised by the teacher and the worked by the students in small groups.

Tutorials: The tutorials will arise as voluntary sessions to resolve any doubts arising in the resolution of problems that students must perform on their own.

EVALUATION

Method of evaluation A:

The evaluation of the student learning will take place through continuous assessment and final evaluation.

- **Continuous assessment**: It is based on:

  - Student participation in the teaching-learning process, given the resolution of questions raised in class, individually and / or in small groups (15% of the final grade).
  - The resolution of a number of problems or activities that students must solve, individually or in small groups, and deliver on the date indicated (35% of the final grade).

- **Final Assessment**: The student must make a single objective test consisting of an examination at the end of the semester that will be valued at 50% of the final grade. The exam will consist of both theoretical and practical issues as problems in order to verify that they have assimilated the basic concepts of the subject.

To qualify for this type of evaluation, the student must deliver 75% of the issues, problems or proposed activities.

Method of evaluation B:

Alternatively, to the evaluation method described above, the evaluation may be performed by a final exam counting 75% of the final mark, keeping the assessment of the activities developed during the course, but with a proportionally reduced weight.

In both evaluation methods, to pass is necessary to obtain an average rating of 5 out of 10, provided on the final exam to obtain a grade equal to or greater than 5 points (out of 10).

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 Màster* (ACGUV 108/2017)

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).

REFERENCES

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