COURSE DATA

DATA SUBJECT

Code: 34773
Name: Process and product engineering II
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	4	First quarter
1934 - Double Degree Program in Chemistry-Chemical Engineering	Facultat de Química	5	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1401 - Degree in Chemical Engineering	Process and product engineering	COMPULSORY
1934 - Double Degree Program in Chemistry-Chemical Engineering	Quinto curso	COMPULSORY

COORDINATION

SANCHEZ TOVAR RITA

SOLSONA ESPRIU BENJAMIN EDUARDO

SUMMARY

Process and Product Engineering II is a four-monthly compulsory module to be taught in the fourth year of the Degree in Chemical Engineering, with a charge of 6 ECTS. This module is part of a subject (Process and Product Engineering - IPP) having an overall charge of 10.5 ECTS, 4.5 of them for the first part to be conducted in the third year of the degree (PPI-I).

It is a core subject in the curriculum of Chemical Engineering due to the great importance that the knowledge of industrial chemical processes has. It will be focused on the description and analysis of these processes with special emphasis on aspects related to the choice and use of raw materials, energy saving and environment. Fundamental aspects of Product engineering will also be studied.

Students who pass this course must learn, in a basic way, the characteristics of the major industrial chemical processes and evaluate, in the context of technological development, the importance of the concept "product". Students should also be able to interpret drawings and flowcharts, to propose different

alternatives and select the most appropriate for a particular product.

The theory classes will be taught in Spanish and practical and laboratory classes according to the technical file available on the web 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

The student who enrols in this course should have knowledge of physics, chemistry and chemical engineering (unit operations and chemical reactors). They must also have an intermediate level of English reading.

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.

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

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

Capacity for the management of the activities that are the subject of the engineering projects described in the previous section.

Draft, sign and develop projects within the field of industrial engineering, aimed at constructing, renovating, repairing, maintaining, demolishing, manufacturing, installing, assembling or operating structures, mechanical equipment, energy systems, electrical and electronic installations, industrial facilities and plants, and manufacturing and automation processes, in accordance with the knowledge acquired through the specific technology of industrial chemistry.

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.

Understand material and energy balances, biotechnology, mass transfer, separation operations, chemical reaction engineering, reactor design, and the valorisation and transformation of raw materials and energy resources.

Work in a multilingual and multidisciplinary environment.

DESCRIPTION OF CONTENTS

1. Introduction to the study of industrial chemical processes.

Basic knowledges about the chemical industry. Raw materials. Energy in the industry.

2. Inorganic Chemical Industry

Industrial gases.
Chemicals derived from sodium chloride.
Limestone as a feedstock. The cement industry
Silica as a raw material. Glassmaking process.
Silicates as a feedstock. Ceramic Industry.
Sulphur as a raw material. Sulphuric acid production.
Phosphate rock as a feedstock. Process to obtain phosphoric acid. Fertilizers.

3. Petroleum and Petrochemical

The petroleum refining industry.
Current status and prospects of oil. Composition and properties of oil. Atmospheric and vacuum distillation. Thermal and catalytic cracking. Catalytic reforming. Alkylation. Isomerization. Hydrotreating and hydro-cracking. The petrochemical industry.
Petrochemical Industry. Production and functionalization of olefins and aromatics. Obtaining and uses of the synthesis gas.

4. Chemical Industry of performance products

Polymers.
Industrial use of cellulose.
Varnishes and paints.
Soaps and detergents.

5. Product Engineering

Product engineering. Design and manufacture of the product.
Design cycle of a product. Manufacturing process of a product.
Product engineering. Product validation and industrialization
Validation tests and product approval. Industrialization of a product.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	35,00
Classroom practices	25,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	20,00
Independent study and work	25,00
Preparation of lessons	0,00
Preparation for assessment activities	45,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

The development of the subject is articulated around three axes: theory classes, practical classes and tutorials.

Theoretical classes: The method of theory classes will be based mainly on the master class model. The teacher will show through presentations the contents of each topic focusing on the key aspects.

Practical classes: At the beginning of the course a work will be proposed to the students. Specifically, each working group (consisting of 2-3 students) must carry out a detailed report on an industrial process. Then, this work will have to be exposed (oral presentation) to the teacher and classmates.

Tutorials: Regarding the tutorials, the teacher will discuss with the students and clarify both general

aspects of the subject and particular issues.

EVALUATION

First call

The evaluation of student learning will be carried out according to the following model:

The marks obtained in 2 individual tests will be considered. The evaluation will be carried out considering two independent blocks: Block I and Block II.

The test of block I will be carried out at the end of the subject of this block.

The block II test will be in the official date of the first call.

To pass the subject, students must have an average grade between the 2 individual tests equal to or greater than 5 points out of 10 ([First Test Mark + Second Test Mark]/2 greater than or equal to 5 points out of 10) and a mark for each of the individual tests equal or greater than 4.5.

The Final Mark will be calculated following the criteria:

37.5% Grade First Test (Block I)

37.5% Grade Second Test (Block II)

25% Grade of planned activities

In addition, to pass the subject in the first call, a Final Mark equal to or greater than 5/10 must be obtained.

Second call

In case of not passing the subject in the first call, the students will have a second call, in which there will be a single exam of the entire program of the subject (Block I and Block II).

To pass the course, students must have an exam grade equal to or greater than 5 points out of 10

The Final Mark will be calculated following the criteria:

75% Grade Final Test (second call)

25% Grade of planned activities

In addition, to pass the subject in the second call, a Final Mark equal to or greater than 5/10 must be obtained.

The Planned Activities are not recoverable, so to be graded they must be delivered on the dates stipulated by the faculties.

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).

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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