COURSE DATA

DATA SUBJECT

Code: 36899
Name: Materials science in the Chemical Industry-Dual Mention
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1110 - Degree in Chemistry	Facultat de Química	4	Annual

SUBJECT-MATTER

Degree	Subject-matter	Character
1110 - Degree in Chemistry	Materiales y Procesos en la Industria Química	ELECTIVES

COORDINATION

MONLEON VENTURA ALICIA

SUMMARY

The course "Materials Science in the Chemical Industry" is a mandatory course within the Dual Mention program, comprising 6 ECTS credits, and is scheduled in the fourth year of study.

This course establishes the foundations that enable students to understand the relationship between the real structure of materials and their properties, applying this knowledge in an industrial environment.

The properties of materials are analyzed from a practical perspective, focusing on their relevance and applicability, allowing for a comprehensive and practical understanding of materials science in a professional context.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

Relationship with other subjects of the same degree program.
No enrollment restrictions have been specified with other courses in the curriculum.
Other types of requirements
This is an interdisciplinary course, and it is related to all previously studied courses. All concepts studied in earlier courses are used to interpret the relationship between structure and properties of different types of materials.
In order to take the subject, the student must have been selected to enroll in the Degree in Chemistry Dual Mention option.

COMPETENCES / LEARNING OUTCOMES

1110 - Degree in Chemistry

Act autonomously in learning, making well-founded decisions in various contexts, forming judgements based on experimentation and analysis, and applying knowledge to new situations.

Address new problems and propose strategies to solve them.

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

Communicate effectively both orally and in writing, adapting to the context and audience.

Demonstrate both inductive and deductive reasoning skills.

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

Demonstrate the ability to analyse, synthesise and reason critically.

Describe the characteristics and behaviour of the different states of matter and the theories used to explain them.

Distinguish between the qualitative and quantitative aspects of chemical problems.

Distinguish the principles, procedures and techniques used in the determination, separation, identification and characterisation of chemical compounds.

Evaluate the risks involved in the use of chemical substances and laboratory procedures.

Express ideas correctly, both orally and in writing, in any of the official languages of the Valencian Community.

Identify chemical elements and their compounds, including their extraction, structure, reactivity, properties and applications.

Identify chemical processes in everyday life.

Identify the structure and reactivity of the main classes of biomolecules and the chemistry of key biological processes.

Implement sustainable and environmentally friendly methodologies.

Propose creative and innovative solutions to complex situations or problems in the field, addressing diverse professional and social needs.

Relate chemistry to other disciplines.

Relate theory to experimentation.

Solve problems effectively.

State the principles of thermodynamics and kinetics and their application in chemistry.

Understand and analyse, from the perspective of the degree programme, social inequalities based on sex and gender; integrate gender-sensitive approaches into problem-solving and solution design.

Use chemical terminology, nomenclature, conventions and units correctly.

DESCRIPTION OF CONTENTS

The course "Materials Science in the Chemical Industry" focuses on each student undertaking an autonomous and individual work, supervised by both a company tutor and an academic tutor, according to the educational plan agreed upon between them and the student.

Specific aspects to be addressed include: Classification and design of materials, considering their economic and environmental impact. Principles of bonding and structure in solids; kinetics of phase transformations and phase equilibrium aspects. Properties related to transport, mechanical, electrical, magnetic, and optical properties, highlighting their significance in various industrial applications.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Internship	60,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

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

TEACHING METHODOLOGY

Each student will be assigned a company tutor and an academic tutor. The company tutor will be assigned by the collaborating entity and the academic tutor will be assigned by the Faculty of Chemistry at the proposal of the Dual Mention Committee. Both tutors will coordinate the development of the activities established in the training project and will be in contact to solve any doubt or problematic situation.

Within the program of the subject the types of teaching activities that can be developed will be mainly:

- Lecture class.
- Practical class.
- Participative class.
- Field trip/guided visit.
- Exercise resolution.
- Reading/commentary of texts.
- Seminar.
- Debate.
- Search for information.
- Attendance at external events.
- Problem-based learning.
- Case study/analysis.
- Oral presentations.

Certain activities such as tutorials with the academic tutor, independent work by the student, seminars and activities related to the acquisition of transversal competences could be carried out both in the company and in the Faculty of Chemistry.

EVALUATION

The evaluation will be carried out by means of a continuous evaluation system in which both the company tutor and the academic tutor will be involved. The system is based on the evaluation of competencies, skills and knowledge acquired by the students.

- The activity developed will be evaluated by means of:
- Surveys and follow-up reports that allow to know the acquisition of knowledge, skills and competences of the students.
- A rubric agreed between the company tutor and the academic tutor to be specified in the training plan.
- Follow-up meetings and interviews carried out between the tutors and the student in which the degree of compliance with the training plan and the competencies acquired will be verified.
- By means of a written or oral exam if required by the activities carried out in the company.

In order to pass the subject the competences acquired will be evaluated using as indicators the reports of the company and/or University tutors, with a weight of 30% of the final grade.

In addition, the evaluation meetings, tests and reports of the work done during the dual training will be evaluated, with a weight of 70% of the final grade.

REFERENCES

- Callister, W. D. J.; Rethwisch, D. G. Materials Science and Engineering: An Introduction (SI Version) 10th, Glob ed.; John Wiley & Sons, 2020.
- Callister, W. D.; Rethwisch, D. G. Ciencia e Ingeniería de Materiales; Reverte, 2016.
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- Smith, William & Hashemi, J. Fundamentos de La Ciencia e Ingenieria de Materiales; 2006. https: //links.uv.es/materiales/Smith
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