

## SUBJECT TEACHING GUIDE

### G770 - Materials Science and Technology

#### Degree in Chemical Engineering First Degree in Chemical Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Chemical Engineering First Degree in Chemical Engineering			Type and Year	Compulsory. Year 2 Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Materials and Chemistry Module: Compulsory Training in Common with the Industrial Branch				
Course unit title and code	G770 - Materials Science and Technology				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. CIENCIA E INGENIERIA DEL TERRENO Y DE LOS MATERIALES				
Name of lecturer	CARLOS THOMAS GARCIA				
E-mail	carlos.thomas@unican.es				
Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 0. DESPACHO (0005)				
Other lecturers	LUCIANO SANCHEZ ARAMBURU				

### 3.1 LEARNING OUTCOMES

- Basic knowledge of the different families of materials most used in engineering, its properties and applications
- Ability to assess the suitability of a material for a given application. Basic notions of materials selection
- Knowledge of the basic production techniques, conformation and transformation of industrial materials

#### 4. OBJECTIVES

- Relate processing techniques, structure and properties with the behavior of materials.
- Acquire a basic knowledge of the different families of materials commonly used in industrial applications
- Define, analyze, evaluate and compare the physical and mechanical properties of industrial and construction materials.
- know the basic techniques of production, conformation and transformation of industrial materials.

#### 6. SUBJECT PROGRAM

CONTENTS	
1	Part 1 □ BASICS OF MATERIALS SCIENCE Lesson 1.- Introduction to materials. Lesson 2.- Hooke's law. Lesson 3.- Crystalline and amorphous structure. Lesson 4.- Tensile strength and hardness. Lesson 5.- Other mechanical tests. Lesson 6.- Sudden fracture and toughness. Lesson 7.- Fatigue failure. Lesson 8.- Creep and relaxation. Lesson 9.- Oxidation and corrosión.
2	Part 2 □ BASICS OF MATERIALS TECHNOLOGY Lesson 10.- Phase diagrams Lesson 11.- Ferrous alloys Lesson 12.- Other metal alloys. Lesson 13.- Treatments. Lesson 14.- Production and metal shaping. Lesson 15.- Ceramic and glass. Lesson 16.- Polymers. Lesson 17.- Composites.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
7.1 ASSESSMENT METHODS AND CRITERIA Description Type Final Evaluation Reassessment % Evaluation of Part1 Written exam No Yes 40,0	Written exam	Yes	Yes	40,00
7.1 ASSESSMENT METHODS AND CRITERIA Description Type Final Evaluation Reassessment % Final Evaluation Written exam Yes Yes 40,0	Written exam	Yes	Yes	40,00
7.1 ASSESSMENT METHODS AND CRITERIA Description Type Final Evaluation Reassessment % Continuous Evaluation Others No No 20,0	Others	No	No	20,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
If necessary, the remote evaluation will be conducted by proposing an exam for each Block, which will consist of a theoretical part with multiple-choice questions and another part for solving practical problems related to the contents of the corresponding lessons included in the course syllabus.				
<b>Observations for part-time students</b>				
The attention and evaluation of part-time enrolled students will be conducted in accordance with the provisions set forth in the UC regulations. Attendance at laboratory practices, as well as scheduled company visits, will be mandatory. In any case, the particular circumstances of each student in this situation will be individually assessed, verifying the possibilities of meeting the aforementioned requirements, in order to guarantee these students' right to pass the course through a single evaluation process.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
<b>BASIC</b>
ASHBY y JONES: "Materiales para la Ingeniería" (Vol. 1 y 2). Ed. Reverte ASKELAND: "La ciencia e ingeniería de los materiales". Grupo Editorial Iberoamérica FLINN y TROJAN: "Materiales de ingeniería y sus aplicaciones". McGraw-Hill SMITH: "Fundamentos de la ciencia e ingeniería de los materiales. McGraw-Hill CALLISTER: "Ciencia e ingeniería de los materiales". Ed. Reverte