SUBJECT TEACHING GUIDE

G742 - Materials

Degree in Mechanical Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Mechanical Engineering			Type and Year	Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Materials Module in Common with the Industrial Branch				
Course unit title and code	G742 - Materials				
Number of ECTS credits allocated	6	Term		Semester based (1)	
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	JOSE ANTONIO CASADO DEL PRADO
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Other lecturers	LUCIANO SANCHEZ ARAMBURU ANA ISABEL CIMENTADA HERNANDEZ SORAYA DIEGO CAVIA

3.1 LEARNING OUTCOMES

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

4. OBJECTIVES

- Correlate the processing techniques, the structure, and the properties with the behavior of the materials.
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6. COURSE ORGANIZATION

	CONTENTS
1	Block I.- FUNDAMENTALS OF MATERIALS SCIENCE Lesson 1.- Introduction to Materials. Description, composition, properties and applications Lesson 2.- Hooke´s Law. Analysis of physical properties Lesson 3.- Crystalline and Amorphous Structure. Structure and behavior Lesson 4.- Tensile Strength and Hardness Lesson 5.- Fast Fracture and Toughness Lesson 6.- Fatigue Failure Lesson 7.- Creep Lesson 8.- Oxidation and Corrosion
2	Block II.- FUNDAMENTALS OF MATERIALS TECHNOLOGY Lesson 9.- Phase diagrams Lesson 10.- Iron Alloys Lesson 11.- Other Metal Alloys Lesson 12.- Treatments Lesson 13.- Production and Conformation of metals. Processes for the production of pieces. Lesson 14.- Ceramics and Glasses Lesson 15.- Polymers Lesson 16.- Composite Materials Lesson 17.- Mortars and Concrete Lesson 18.- Materials Selection

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
minimum grade: 5,00 Lengh of the exam: 3 hours Date: During the last two weeks of November Reassesment: September Exam Evaluation of theoretical contents and Exercises. The minimum grade to compensate theory or exercises will be 2,50 in either of the two	Written exam	No	Yes	40,00
minimum grade: 5,00 Lengh of the exam: 3 hours Date: The one that indicates the exam calendar Reassesment: September Exam Evaluation of theoretical contents and Exercises. The minimum grade to compensate theory or exercises will be 2,50 in either of the	Written exam	Yes	Yes	40,00
Date: For the first quarter Laboratory practices, periodic tests, delivery of solved problems, delivery and oral presentation (not read) of works and complementary activities.	Others	No	No	20,00
TOTAL				100,00

Observations

The final grade of the subject will be obtained by means of the following formula:
0,4·(grade Block I) + 0,4·(grade Block II) + Continuous Evaluation grade (maximum 2 points).

The grade of the Continuous Evaluation will be saved for the September Call for all those students who do not pass the Subject in the February Call.

Neither of the two blocks will be saved for later courses

Observations for part-time students

In general, the evaluation of part-time students will be based on what is established for this purpose in the Evaluation Regulations of the University of Cantabria. In any case, the unique circumstances of each student who is in this situation will be assessed individually and the right of these students to overcome the subject in an unique evaluation process will be guaranteed.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

ASHBY and JONES: "Materiales para la ingeniería" (Vol. 1 y 2). Ed. Reverté, 2008.
MONTES, CUEVAS y CINTAS: "Ciencia e ingeniería de los materiales". Ed. Paraninfo.
ASKELAND: "La Ciencia e Ingeniería de los Materiales". Grupo editorial Iberoamérica
FLINN and 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". Editorial Reverté.
ASHBY M, F. “Materials Selection in Mechanical Desing”, Ed Pergamon Press, Oxford.