

SUBJECT TEACHING GUIDE

G1178 - Characterisation of Materials

Degree in Civil Engineering

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Degree in Civil Engineering			Type and Year	Optional. Year 4
Faculty	School of civil Engineering				
Discipline	Optional Subjects: Open to all Itineraries				
Course unit title and code	G1178 - Characterisation of 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	ISIDRO ALFONSO CARRASCAL VAQUERO				
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Other lecturers	DIEGO FERREÑO BLANCO				

3.1 LEARNING OUTCOMES

- Knowledge of the operation of a materials testing laboratory.
- Knowledge of the preliminary operations to characterise materials
- Knowledge of the equipment available in a testing laboratory.
- Knowledge of the experimental techniques necessary to obtain the properties of materials.
- Distinguish the characterisation technique to be applied in each particular situation.
- Knowledge of the relationship between the properties of materials and their behaviour.

4. OBJECTIVES

- Relate the internal structure of materials to their properties and, in turn, to their behaviour.
- To know the mechanical properties of materials, as well as the experimental methodology to determine them.
- To know the different microstructural characterisation techniques.
- Knowledge of the different thermal and thermomechanical analysis techniques.
- Knowledge of the different non-destructive characterisation techniques.

6. COURSE ORGANIZATION

CONTENTS	
1	<p>MECHANICAL CHARACTERISATION:</p> <ul style="list-style-type: none"> - SUBJECT 1: TENSILE TEST - SUBJECT 2: COMPRESSION, BENDING, SHEAR AND TORSION - SUBJECT 3: HARDNESS - SUBJECT 4: STRESSES AT HIGH STRETCH RATE - SUBJECT 5: STRESS AT LOW STRAIN RATE - SUBJECT 6: FRACTURE - SUBJECT 7: FATIGUE
2	<p>PHYSICAL CHARACTERISATION:</p> <ul style="list-style-type: none"> - SUBJECT 8: MICROSTRUCTURE AND COMPOSITION - SUBJECT 9: THERMO-MECHANICAL ANALYSIS - SUBJECT 10: MACROSCOPICAL PHYSICAL CHARACTERISATION - SUBJECT 11: NONDESTRUCTIVE CHARACTERISATION

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Description EXAMINATION BLOCK I (40%)	Written exam	No	Yes	40,00
Description EXAMINATION BLOCK II (40%)	Written exam	No	Yes	40,00
Description CONTINUOUS EVALUATION (20 %)	Others	No	No	20,00
TOTAL				100,00

Observations

In relation to the agreements adopted at the ordinary session of the School Board held on 10 June 2010, it is established that, with regard to the assessment activities that are recoverable,

- As a general criterion and unless otherwise specified in this guide, a student may only sit for the recovery of those activities that he/she has not passed, that is to say, those in which he/she has not obtained a minimum mark of five out of ten.

- As a general criterion, and unless otherwise specified in this guide, in the recovery period the assessment procedure for an activity will be the same as that of the activity that gave rise to it.

Note: According to Royal Decree RD 1125/2003 on the European credit system and the grading system for official university degrees valid throughout the national territory, the results obtained by the student in each of the subjects of the syllabus will be graded according to the following numerical scale from 0 to 10, to one decimal place, to which the corresponding qualitative grade may be added:

0.0-4.9: Fail (SS).

5.0-6.9: Pass (AP).

7.0-8.9: Good (NT).

9.0-10: Outstanding (SB).

The uncertainty associated with the possible non-compliance with the social distancing decreed by the health authorities may condition the evaluation system. If necessary, the assessment may be adapted, on an ad hoc basis, to the use of the most appropriate telematic means available, in order to measure the degree of student achievement of the theoretical and practical concepts taught, whether in the classroom or in the laboratory.

Observations for part-time students

In general, the assessment of part-time students will be in accordance with what is established for this purpose in the Assessment Regulations of the University of Cantabria. In any case, the individual circumstances of each student in this situation will be assessed individually and the right of these students to pass the subject in a single assessment process will be guaranteed.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

1. American Society for Metals, ASM. Material Characterization. Metals Handbook. Vol 10
2. Coca Rebolledo, P. y Rosique Jiménez, J. Ciencia de los Materiales. Teoría, ensayos, tratamientos. Ediciones Pirámide. Madrid. 1991
3. Anderson, J. C. Ciencia de los Materiales. Limusa. Noriega Editores. 2ª edición, Balderas, Mexico, 1998.
4. Laseras, J.M. y Carrasquilla, J.F. Ciencia de los Materiales. Editorial Donostiarra. San Sebastián. 1992
5. Beer, F.P., Johnston, R., Mecánica de Materiales. McGraw Hill Interamericana, 2ª edición. Santa Fé de Bogota, Colombia. 1993
6. Nash, W. A. Resistencia de Materiales. McGraw Hill Interamericana, 2ª edición. Mexico. 1995
7. Urbón Montero, F. Resistencia de materiales. Ediciones Akal. Fuenlabrada. 1997.
8. Gutierrez-Solana, F., González, J.J., Setién, J. y Varona, J.M. Guía de estudio de Ciencia de los Materiales. Fundamentos y problemas. Parte II Comportamiento Mecánico de los Materiales. Universidad de Cantabria. Santander. 1996
9. Askeland, D.R.: Ciencia e Ingeniería de los Materiales. Thomson Editores. Paraninfo. Madrid. 2001
10. Jastrzebski, Z.D., Naturaleza y Propiedades de los Materiales para Ingeniería. Nueva editorial Interamericana, 2ª edición. Mexico. 1979.
11. Shackelford, J.F., Ciencia de Materiales para Ingenieros. Prentice Hall Hispanoamericana, 3ª edición. Mexico. 1992.
12. Callister, W.D. Ciencia e Ingeniería de los Materiales. Editorial Reverte. Barcelona. 1995.
13. Balart, R. y otros. Técnicas Experimentales de análisis Térmico de Polímeros. U. Politécnica de Valencia. 2003