

SUBJECT TEACHING GUIDE

621 - Failure Modes in Materials

Master's Degree in civil Engineering, Canal and Port Engineering

Academic year 2025-2026

1. IDENTIFYING DATA					
Degree	Master's Degree in civil Engineering, Canal and Port Engineering			Type and Year	Optional. Year 2
Faculty	School of civil Engineering				
Discipline	SPECIALITY IN STRUCTURES, MATERIALS AND GEOTECHNICS				
Course unit title and code	621 - Failure Modes in Materials				
Number of ECTS credits allocated	3	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	SERGIO CICERO GONZALEZ				
E-mail	sergio.cicero@unican.es				
Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 1. DESPACHO (1065)				
Other lecturers					

3.1 LEARNING OUTCOMES
- To apply models, theories and criteria in the assessment the performace and safety of structures containing cracks
- To apply failure models to fatigue, creep and stress corrosion cracking problems.

4. OBJECTIVES
To understand the causes of failures in materials, structural components and structures
To know the different tools used in failure analysis.
To be able to manage a failure analysis process, coordinating the different types of assessments being performed.
To understand the importance of failure analysis in people safety , in the economy, in the enviroment and in the proper development of engineering

6. SUBJECT PROGRAM

CONTENTS

1	Introduction to materials failure analysis
2	Failure mechanisms in engineering materials: fracture, fatigue, creep and corrosion
3	Failure analysis tools: chemical, microstructural and stress analyses, microscopy, structural integrity.
4	Case studies in failure analysis.
5	Course work: solving a real case

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Final exam	Written exam	Yes	Yes	40,00
Course work	Work	No	Yes	40,00
Continuous assessment	Others	No	No	20,00
TOTAL				100,00
Observations				
Laboratory practice is mandatory				
Observations for part-time students				
Part-time students will be evaluated from the final exam and the course work results, without continuous assessment. In any case, laboratory sessions are mandatory.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Transparencias de la asignatura (S.Cicero), proporcionadas en moodle.