

SUBJECT TEACHING GUIDE

620 - Numerical Methods in Geotechnics

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

Academic year 2024-2025

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	620 - Numerical Methods in Geotechnics				
Number of ECTS credits allocated	3	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. CIENCIA E INGENIERIA DEL TERRENO Y DE LOS MATERIALES				
Name of lecturer	JORGE CASTRO GONZALEZ				
E-mail	jorge.castro@unican.es				
Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 3. DESPACHO 3-FUNDACION TORRES QUEVEDO (3031B)				
Other lecturers	MARINA MIRANDA MANZANARES				

3.1 LEARNING OUTCOMES
- To solve geotechnical problems using numerical methods.
- To use different constitutive models for soils and rocks.

4. OBJECTIVES
To know the main constitutive models for soils and rocks.
To know the main characteristics of the use of numerical methods in geotechnical engineering.
To be able to use numerical methods to design and calculate geotechnical problems (seepage, slopes, embankments, foundations, retaining walls and tunnels).

6. SUBJECT PROGRAM	
CONTENTS	
1	Introduction to numerical methods in geotechnics
2	Distinctive features in geotechnical problems
3	Constitutive models for soils and rocks
4	Practical exercises (seepage, slopes, foundations, retaining walls and tunnels) (hands-on training)

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Written exam about numerical methods in geotechnics (Units 1-3)	Written exam	No	Yes	50,00
Project on numerical tools applied to seepage and slope problems (Unit 4a)	Work	No	Yes	25,00
Project on numerical tools applied to geotechnical structures (Unit 4b)	Work	Yes	Yes	25,00
TOTAL				100,00
Observations				
In the event that the minimum grade required for the written exam is not obtained, the final grade will be the weighted average of all the evaluation activities with a maximum value of 4.9, in accordance with article 35 of the Evaluation Regulations of the University of Cantabria. The grades of the different parts will be valid for the whole academic year . The written exam can be taken again in the last ordinary evaluation period.				
Observations for part-time students				
Part-time students will be assessed on the basis of the same activities, but they may request to submit the projects and take the written examination during the official period for final examinations . In the latter case, the project statement and the written exam will be new for part-time students.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Apuntes y diapositivas de la asignatura.
Geotechnical Finite Element Analysis: A practical guide. A. Lees. London: ICE Publishing. 2016.
Finite element analysis in geotechnical engineering. D.M. Potts y L. Zdravkovic. London: Thomas Telford, 2001.
Guía para el proyecto de cimentaciones en obras de carretera con Eurocódigo 7. Ministerio de Fomento, 2019.