

SUBJECT TEACHING GUIDE

M1476 - Tunnels and Deep Excavations

Master's Degree in Civil Engineering

Academic year 2019-2020

1. IDENTIFYING DATA					
Degree	Master's Degree in Civil Engineering			Type and Year	Compulsory. Year 2
Faculty	School of civil Engineering				
Discipline	Geotechnical Engineering				
Course unit title and code	M1476 - Tunnels and Deep Excavations				
Number of ECTS credits allocated	4,5	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				
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Other lecturers	JORGE CAÑIZAL BERINI ALMUDENA DA COSTA GARCIA				

3.1 LEARNING OUTCOMES

- Know construction methods for tunnels and understand their pros and cons.
Use design methods for tunnels.
Know instrumentation and control methods for tunnels.
- Analyze the stability of rock slopes.
Describe the main remediation measures for instabilities in rock slopes.
- Describe and apply design methods for flexible earth retaining structures.
Use design methods for ground anchors.

4. OBJECTIVES

Know construction methods of tunnels.
Know and apply design methods for tunnels.
Know instrumentation and control methods for tunnels.

The students must understand the main typologies, construction and design methods for tunnels and deep excavations, including ground anchors and rock slopes.

The students must be able to analyse instabilities in rock slopes and propose remediation measures.

6. COURSE ORGANIZATION

CONTENTS

1	Rock slopes
2	Tunnels. Design and analysis
3	Flexible earth retaining structures

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Written exam 1 (Unit 1)	Written exam	No	Yes	20,00
Written exam 2 (Unit 2)	Written exam	No	Yes	50,00
Written exam 3 (Unit 3)	Written exam	Yes	Yes	30,00
TOTAL				100,00

Observations

Regarding those evaluation activities that the students can resit, the following general criteria were adopted at the regular meeting of the Civil Engineering School Board held on June 10, 2010: - A student can only resit an evaluation activity that has not passed (i.e. a grading lower than 5 out of 10). - The evaluation activity in the resitting period will follow the same procedure and will have the same guidelines as in the ordinary period.

Note:

According to Spanish regulations (RD 1125/2003) about the European credit system and the grading system for University degrees, each course will be graded using a linear scale between 0 and 10 with a precision of a decimal. According to that grading, a qualitative rating may be added:

0.0-4.9: Suspenso (SS). Fail

5.0-6.9: Aprobado (AP). Satisfactory

7.0-8.9: Notable (NT). Good

9.0-10: Sobresaliente (SB). Excellent

9.0-10: Matrícula de Honor (MH). Outstanding (with honours)

Observations for part-time students

Part time students may ask for a different evaluation procedure that consists in doing both exams that cover the full course (100% of the grade) in the same day during the official period for final exams.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Manual de Túneles y Obras Subterráneas. C. Lopez Jimeno. Ed. E. Gráfico. 2011

Rock Slope Engineering. E. Hoek y J. Bray. Spon Press, 1981.

Finite Elements in Geotechnical Engineering. D. Potts y L. Zdrakovicz. T. Telford, 2000.

