Course guide
220239 - 220239 - Geotechnical Engineering

Last modified: 18/05/2026

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2025). (Optional subject).

Academic year: 2026 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: David Vives

Others:

TEACHING METHODOLOGY

The course is divided into parts:
Theory classes
Practical classes
Self-study for doing exercises and activities.
In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.
In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.
Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.
The teachers provide the syllabus and monitoring of activities (by ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

To achieve a general overview of soil mechanics, earth retaining walls and foundations, allowing the student to face the main basic issues to be developed in a foundation project.

STUDY LOAD

Type	Hours	Percentage
Self study	48,0	64.00
Hours large group	27,0	36.00

Total learning time: 75 h

CONTENTS

Module 1: SOIL MECHANICS

Description:
- Introduction to soil behavior. Main parameters.
- Load distribution throughout a soil.
- Soil's resistance to shear stress.
- Earth pressure against structures.

Full-or-part-time: 23h
Theory classes: 9h
Self study : 14h

Module 2: EARTH RETAINING STRUCTURES

Description:
- General aspects of earth retaining walls
- Gravity retaining walls
- Cantilever earth retaining walls
- Diaphragm earth retaining walls: BLUM method

Full-or-part-time: 33h
Theory classes: 11h
Self study : 22h

Module 3: FOUNDATIONS

Description:
- Introduction to foundations. Requirements and types.
- Surface foundations.
- Pile foundations.

Full-or-part-time: 19h
Theory classes: 7h
Self study : 12h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

40 % Theoretical part exam (1 final exam)
50 % Practical part exam (1 final exam)
10% Activities and problems to be proposed in class (during the course)

BIBLIOGRAPHY

Basic:
- "CTE DB SE-C Cimientos". Código técnico de la edificación. Madrid: Ministerio deVivienda, Boletín Oficial del Estado, 2008.
- "CTE DB SE-AE Acciones en la Edificación". Código técnico de la edificación. Madrid: Ministerio de Vivienda, Boletín Oficial del Estado, 2008.

Complementary:
- Das, Braja M. Principles of geotechnical engineering. 8th ed. Stamford: Cengage Learning, cop. 2014. ISBN 9781133108672.
- Jimenez Montoya, P. ... [et al.]. Hormigón armado. 15ª ed. basada en la EHE-2008. Barcelona: Gustavo Gili, 2009. ISBN 9788425223075.
- Calavera Ruiz, J. Muros de contención y muros de sótano. 3ª ed. [Madrid]: Instituto Técnico de Materiales y Construcciones, DL 2001. ISBN 8488764103.
- Schneebeli, G. Muros pantalla : técnicas de realización : métodos de cálculo. 2ª ed. Barcelona: Editores Técnicos Asociados, 1981. ISBN 8471461455.