

### COURSE NAME

Name: **UNDERGROUND AND SURFACE WORKS**

Code: 101209

Curriculum: **DEGREE IN ENERGY ENGINEERING AND MINERAL RESOURCES AND UNIVERSITY MASTER'S DEGREE  
IN MINING ENGINEERING** Year: 4

Name of the module to which it belongs: SPECIFIC TO MINING

Subject: UNDERGROUND AND SURFACE WORKS

Nature: OBRIGATORY Duration: SECOND SEMESTER

ECTS Credits: 6

Classroom hours: 60

Face-to-face classroom percentage: 40%

Non-contact hours: 90

### FACULTY DETAILS

Name: HERNANDO FERNÁNDEZ, JOSÉ LUIS (Coordinador)

Department: MECHANICS

Area: MINING OPERATIONS

Location of the office: Principal building, 1st floor

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### SKILLS

- CB1 Have and understand specific knowledge of the field of study of mining engineering.
- CB3 Be able to apply the knowledge acquired in professional contexts and to elaborate and defend arguments in the field of knowledge of mining engineering.
- CB4 Solve problems within the study area of Mining Engineering.
- CB5 Gather and interpret relevant data within the study area of mining engineering in order to make judgments that include reflection on social, scientific or ethical issues.
- CEEM8 Design and execution of surface and underground works.
- CEEM9 Drilling and support techniques applied to underground and surface works.

### OBJECTIVES

The aim is for students to acquire the knowledge and skills that will enable them to design and implement both surface and underground mining works and constructions, as well as their support in both the construction and operation phases. Special emphasis will be placed on how this subject relates to the concepts of Circular Mining and Sustainable Mining.

### CONTENTS:

#### 1. Theoretical contents

Topic 1: Mining benches and slopes. Circular Mining, examples. Geomechanical classifications.

Topic 2: Anchors. Slope monitoring.

Topic 3: Failures in competent rock masses.

Topic 4: Failures in granular rock masses. Spoil tips.

Topic 5: Mining tracks.

Topic 6: Shallow foundations and deep foundations.

Topic 7: Inclined and small-section underground excavations.

Topic 8: Horizontal and large-section underground excavations.

### 2. Practical contents.

Geotechnically characterising rock masses. Designing and calculating self-supporting slopes. Calculating anchors (bars and cables). Supporting slopes at risk of landslides. Shallow and deep drainage. Earth retaining walls. Designing tracks and accesses. Calculating foundations. Calculating and dimensioning underground support structures.