

## 26436 - Engineering Geology

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 26436 - Engineering Geology

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 296 - Degree in Geology  
588 - Degree in Geology

**ECTS:** 5.0

**Year:** 4

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

This subject seeks to familiarize our students with the techniques of work in engineering geology, highlighting the importance of geology, in general terms, in civil engineering. The different variables that influence the soil behaviour are studied and their importance for the evaluation of the soil and its impact on the public works is discussed. The parameters used in the study and classification of rock masses and their application for the excavation of slopes, foundations, design of dams, tunnels, etc., are analysed.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030: Goal 6; Goal 9.

### 2. Learning results

In order to pass this subject, the students shall demonstrate they has acquired the following results:

- Knows the basic methodologies of surface and groundwater hydrology applied in Geological Engineering.
- Applies the geomechanical parameters and the usual rock mass classifications to the estimation of supports by empirical methods.
- Knows the excavatability criteria.
- Knows the main methods of slope monitoring.
- Knows the main slope correction measures and the situations in which their application can be effective and cost-effective.
- Knows the types of dams and auxiliary structures, and the necessary geological and geotechnical surveys.
- Knows the types of linear works and the requirements of geological and geotechnical studies.
- Knows the most frequently used investigation methods and corrective measures applied to engineering problems related to karst and certain special soils (expansive and dispersive clays, collapsible soils, soils with organic matter, etc.)

This subject seeks not only to introduce students to the concepts and methods of this discipline, but also to inculcate a procedural style of problem solving in such a way as to increase their ability to provide solutions to geological problems in applied geology and engineering, knowing the usual nature of these problems and identifying the most appropriate procedures to solve them.

### 3. Syllabus

#### I. THEORY

- Rock mechanics
- Characterization of rock masses
- Surface hydrology in civil works
- Hydrogeology under construction
- Slope stability

- Tunnels
- Dams
- Linear works
- Special land

## II. FIELD

- Characterization of rock massifs (1 day).
- Visits to construction sites and special cases (2 days).

## III. OFFICE

- Breakage criteria.
- Rock slopes and tunnels.
- Empirical support
- Two-dimensional hydraulic modelling
- Special lands.

### Three blocks:

1. Rock massifs (topics 1, 2; practice 1; field 1)
2. Works (topics 5, 6, 7, 8; practices 1, 2, 3, 4, field 2)
3. Water, special soils (topics 3, 4, 9; practices 5, 6, field 3)

## 4. Academic activities

The program offers the students help to achieve the expected results and comprises the following activities:

Activity 1: Learning of conceptual and descriptive aspects and calculation bases. Participative master classes (15 hours ) and work on script-questionnaire (5 hours)

Activity 2: Procedure learning Field practices (15 teaching hours, 3 field days).

Activity 3: Learning skills. Practical work: numerical problem solving (12 teaching hours) and seminars (3 teaching hours), in some cases based on a presentation in English.

## 5. Assessment system

### Continuous Assessment

- Individual theoretical questionnaires.
- Continuous evaluation of problem solving and case studies.
- Evaluation of field practices and delivery of reports
- Written test .

### Continuous evaluation criteria

#### Thematic blocks 1 and 2:

Midterm exam 1: Theory questionnaires (10%), additional exercises (25%), massif characterization report (35%), 2nd day field report (30%).

#### Thematic block 3:

Midterm 2: The sections described above will be evaluated, calculating the final grade with the following expression: grade= (exam x 0.7)+(average of questionnaires, practices, reports x 0.3).

**Final grade:** (Midterm 1: 1 x 0,65) +(Midterm 2 x 0,35)

### Overall test

Students who have not followed the subject continuously, and those who, even if they have done so, wish it, will have the right to a global evaluation test.

In the first and second call the global test will include the evaluation of all the activities, including the instrumental practice activities (estimated duration of 4-5 hours) and will consist of:

- 1) a written test
- 2) an additional test, in which the student must demonstrate proficiency in rock mass characterization protocols

**Overall evaluation criteria**

The final grade for the subject will be obtained with the following expression:

grade= (written test x 0.7) + (additional test x 0.3)