

## 28704 - Geological engineering

### Syllabus Information

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**Academic Year:** 2019/20

**Subject:** 28704 - Geological engineering

**Faculty / School:** 175 -

**Degree:** 423 - Bachelor's Degree in Civil Engineering

**ECTS:** 6.0

**Year:** 1

**Semester:** First semester

**Subject Type:** Basic Education

**Module:**

## 1.General information

### 1.1.Aims of the course

The course and its expected results respond to the following aims:

The main objective of the subject is to get students to acquire the basic knowledge of geology and morphology of the terrain and its application in problems related to Engineering, as it is included in the compulsory competency of Basic Training B.05 of the Report of Degree in Civil Engineering. To achieve this main objective, we will pursue the achievement of a series of specific objectives, which are explained below:

- Knowledge of the different types of geological materials, mainly rocks, of which the student must know how to classify, describe and know their mineralogical and chemical characteristics.
- Basic knowledge and main properties of natural materials, according to their technical characteristics: soils and rocks.
- Acquisition of basic knowledge about hydrology, hydrogeology and climatology, very important in Civil Engineering and that will be developed in detail in subjects of the following courses of the degree with an intensity that will depend on the educational path chosen by the student.
- Familiarization with the main natural risks related to geology, as well as its affection to civil engineering works.

### 1.2.Context and importance of this course in the degree

This course is carried out in the first year of the degree since it involves the delivery of basic geology contents, necessary to be able to tackle other applied subjects that are found in the following courses, mainly the so-called "Geotechnics".

Other aspects that are presented and worked on in this subject constitute the starting point for the development of other courses. Among these aspects are the issues related to hydrology, both superficial and underground, and to the techniques of cartographic representation.

### 1.3.Recommendations to take this course

In this course the most important geological aspects of application to various fields of civil engineering are presented, from an eminently basic level, so there are no specific recommendations to take this course.

## 2.Learning goals

### 2.1.Competences

### 2.2.Learning goals

### 2.3.Importance of learning goals

### 3.Assessment (1st and 2nd call)

#### 3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

### 4.Methodology, learning tasks, syllabus and resources

#### 4.1.Methodological overview

Strong interaction between the teacher/student. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

The current subject (Engineering Geology) is conceived as a stand-alone combination of contents, yet organized into two fundamental and complementary forms, which are: the theoretical concepts of each teaching unit, and the solving of problems/resolution of questions.

#### 4.2.Learning tasks

Involves the active participation of the student, in a way that the results achieved in the learning process are developed, not taking away from those already set out, the activities are the following:

##### ? Face-to-face generic activities:

1. **Theory Classes:** The theoretical concepts of the subject are explained and illustrative examples are developed as support to the theory when necessary.
2. **Practical Classes:** Problems and practical cases are carried out, complementary to the theoretical concepts studied.
3. **Individual Tutorials:** Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

##### ? Generic non-class activities:

1. ? Study and understanding of the theory taught in the lectures.
2. ? Understanding and assimilation of the problems and practical cases solved in the practical classes.
3. ? Preparation of seminars, solutions to proposed problems, etc.
4. ? Preparation of the written tests for continuous assessment and final exams.

#### 4.3.Syllabus

The theoretical contents are articulated on the basis of fifteen teaching units, which are organized into two main blocks, as detailed below:

##### **BLOCK A: BASIC GEOLOGY**

1. Introduction to Geology. Introducción a la Geología. Importance of Geology in Civil Engineering.
2. Matter and Minerals.
3. Igneous Rocks.
4. Sedimentary Rocks.
5. Metamorphic Rocks.
6. Joints
7. Introduction to Geological Cartography

##### **BLOCK B: APPLIED GEOLOGY**

8. Introduction to Rock Mechanics. Use of rocks in Civil Engineering.
9. Surface and Ground Hydrology. Climatology
10. Introduction to Soil Mechanics
11. Introduction to Natural Risks in Civil Engineering

12. Seismic Risk.
13. Fluvial processes and Flooding Risk.
14. Slope Movements Risk.
15. Karstic Subsidence Risk.

#### **4.4.Course planning and calendar**

The subject has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class.

A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the subject file in the Accreditation Report of the degree, taking into account the level of experimentation considered for the said subject is moderate.

<b>Activity</b>	<b>Weekly school hours</b>
Lectures	4
Other Activities	6

Nevertheless the previous table can be shown into greater detail, taking into account the following overall distribution:

? 52 hours of lectures, with 50% theoretical demonstration and 50% solving type problems.

? 4 hours of written assessment tests, two hours per test.

? 90 hours of personal study, divided up over the 15 weeks of the 2<sup>nd</sup> semester.

#### **4.5.Bibliography and recommended resources**

<http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=9276>