

## 26440 - Industrial Rocks and Minerals

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 26440 - Industrial Rocks and Minerals

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

**Degree:** 296 - Degree in Geology

588 - Degree in Geology

**ECTS:** 5.0

**Year:** 4

**Semester:** First semester

**Subject type:** Optional

**Module:**

### 1. General information

The main objective of the subject is to provide a solid formation on industrial rocks and minerals that allows to solve scientific and applied problems in the different industrial sectors where these raw materials are used.

The subject will focus on expanding the previous knowledge on properties and composition of rocks and minerals, especially in the aspects related to the characterization of the properties that condition their suitability for different industrial applications.

Taking this subject will enable students to contribute to the achievement of SDG 9 "Build resilient infrastructure, promote sustainable industrialization and foster innovation" and SDG 12 "Ensure sustainable consumption and production patterns"

The subject is suitable for students who want to deepen their knowledge of the industrial applications of rocks and minerals.

Basic knowledge of mineralogy and petrology is required.

### 2. Learning results

- Identify and characterize the main types of industrial rocks and minerals.
- Use basic methods of analysis and characterization of industrial rocks and minerals.
- Understand the behaviour and usefulness of minerals and rocks involved in various industrial processes.
- Know the operation of the main industrial processes that are carried out using rocks and/or minerals as raw materials.
- Know and know how to assess the quality requirements of natural materials (rocks and minerals), as well as products made from them.
- Apply the knowledge acquired to address various types of studies related to minerals and industrial rocks

The learning results obtained in the subject have an applied value that acquires greater importance by being useful in the professional activity. It should not be forgotten that both rocks and minerals are raw materials fundamental for the functioning and development of society. Knowledge of their physical and compositional properties is essential to understand the different industrial processes where these raw materials are processed, as well as to control their quality, from the prospecting of the deposits to their final processing.

### 3. Syllabus

**Mineral block. Theory (11.5 hours):** T1 Refractories and Insulators; T2 Abrasives; T3 Chemical Industry; T4 Fertilizers; T5 Absorption, Filtration and Catalysis; T6 Electronics and Optics.

**Practices (8.5 hours):** Identification of industrial minerals by visu and XRD and preparation of a report detailing, among other aspects, the methodology used, the results obtained and the possible applications of the samples studied.

**Rocks block Theory (11.5 hours):** T1 Introduction and regulations. T2 Physical properties of rocks. Porous system.

Mechanical, thermal and aesthetic properties. T3 Durability and quality of construction and ornamental rocks. T4 Aggregates.

T5 Cements, limes and plasters. T6 Ceramic industry.

**Practices (8.5 hours):** Characterization, behaviour and quality tests of rocks and mortars. Alterability and Impairment.

Technological criteria for stone selection according to its use.

**Field practices:** Two field trips, one corresponding to each block

#### 4. Academic activities

The **theoretical contents** will be taught through classroom lectures. In the Rocks Block, a series of exercises related to complementary and/or applied aspects of each topic will be delivered. Each student will prepare a printed dossier with the resolution of all the exercises for their continuous evaluation, which must be delivered at least 15 days before the date of the global exam.

The **practical sessions** of the **Mineral Block** will be devoted to the study of problem specimens of minerals in order to proceed to their identification by visu and X-ray diffraction.

The **practical sessions** of the **Rock Block** will be devoted to the study of practical cases of characterization of rock properties with special emphasis on the relationship between physical properties and petrographic characteristics

#### 5. Assessment system

Continuous assessment

**Minerals Block (50% of the final grade).** The theoretical contents will be evaluated by means of a written exam (50% of the block grade). The practical contents will be evaluated through the completion of a report of the practices of laboratory (45% of the block grade) and a report of the field trip (5% of the block grade). In each case, the subject will be passed with a minimum grade of 5 out of 10.

**Rocks Block (50% of the final grade):** theoretical contents (50% of the block grade) will be evaluated through the completion of a report with the resolution of theoretical-practical or bibliographic exercises corresponding to each theoretical topic of the block. The practical contents will be graded on the basis of the report of the practices carried out in the laboratory (45% of the block grade) and the field report (5% of the block grade). In each case the subject will be passed with minimum grade of 5 out of 10.

To pass the subject in continuous evaluation it will be necessary to pass the two blocks separately, both with a minimum grade of 5 out of 10.

##### Global evaluation:

All enrolled students, including those who have eliminated material from one of the two blocks in continuous evaluation and want to improve their grade, may sit for this type of exam. A minimum grade of 5 out of 10 must be obtained to pass the evaluated part of the subject. The parts passed in the first call will be saved for the second call.

#### 6. Sustainable Development Goals

9 - Industry, Innovation and Infrastructure

12 - Responsible Production and Consumption