

Información del Plan Docente

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| Academic Year | 2018/19 |
| Subject | 26440 - Industrial Rocks and Minerals |
| Faculty / School | 100 - Facultad de Ciencias |
| Degree | 296 - Degree in Geology |
| ECTS | 5.0 |
| Year | 4 |
| Semester | First semester |
| Subject Type | Optional |
| Module | --- |

1.General information**1.1.Aims of the course****1.2.Context and importance of this course in the degree****1.3.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**

The course is part of the module " Applied Geology " and is especially recommended for those Students interested in pursuing industrial applications of rocks and minerals.

To take this course basic knowledge of mineralogy and petrology / petrography are needed.

The main objective of the course is that students acquire a strong background related to the rocks and industrial minerals that allow them to solve problems both scientific and applied to different industrial sectors where these raw materials are used.

In this course, concepts related to the rocks and industrial minerals related to identification, characterization and applications will be discussed. The contents are divided into two modules. Module 1 is dedicated to the study of industrial minerals used as raw materials in several industrial processes. Module 2 is dedicated to the study of industrial rocks used in construction related activities.

4.2.Learning tasks

1. Lectures (25 hours): focused on understanding and assimilation of the main foundations about industrial minerals and rocks.
2. Laboratory practices (19 hours): identification and characterization of industrial minerals and rocks.
3. Field trip (6 hours)
4. Exams (1 hour)

4.3.Syllabus

The THEORETICAL PROGRAM is divided into two modules:

I. INDUSTRIAL MINERALS (12.5 hours)

- I.1. Refractories and Insulation: Bauxite, Al-Nesosilicates, Magnesite and Asbestos
- I.2. Abrasives: Diamond, Corundum, Silica and Garnet.
- I.3. Chemical industries: Sulphates, Carbonates, Halite, Borates, Silica sands, Feldspars and Fluorspar
- I.4. Fertilizers: Nitrates, Phosphates, Potassium Salts
- I.5. Filters: Zeolites and Diatomite
- I.6. Non ceramic Clays: Bentonite, Sepiolite, Palygorskite, Talc and Kaolinite
- I.7. Electronic and Optical materials: Muscovite, Quartz, Beryl and Gold.

II: INDUSTRIAL ROCKS (12.5 hours)

- II.1. Introduction and European regulations of the sector.
- II.2. Physical properties of rocks. porous system. mechanical, thermal and aesthetic properties.

II.3. Durability and quality of building rocks.

II.4. Aggregates. Types and properties.

II.5. Cement, lime and gypsum.

II.6. Rocks for the ceramic industry.

The PRACTICAL PROGRAM is divided into two modules

I. INDUSTRIAL MINERALS (9.5 hours)

I.1: Laboratory practices: Identification of industrial minerals by "visu" and XRD and completion of a report which will detail the methodology used, the results obtained and possible applications of the samples studied.

II. INDUSTRIAL ROCKS (9.5 hours)

Hidric Laboratory test in constructive rocks

Intrinsic characterization of the rock. Correlation between the texture of the rock and its technological properties. Characterization tests, behavior and quality of the rocks. Correlation between technical petrographic and laboratory tests. It is assessed by means of a placement report on the methodology used and results obtained are detailed.

FIELD TRIPS (6 hours): Two field trips will be done. The first one, we will visiting an industrial minerals deposits and the processing plant. The second one we will visiting a quarry of ornamental rocks and the processing plant

4.4.Course planning and calendar

This course is a **first** semester course. Classes will start the first academic week.

Students can refer to the Faculty of Sciences and Earth Sciences Department websites (<https://ciencias.unizar.es>; <https://cienciatierra.unizar.es/>) for timetable, classroom or assessment dates.

Further information regarding this course (examination, individual or group assignments...), will be provided on the first day of class.

Dates for each field trip will be published at the Earth Sciences Department website.

Tutorials: Office hours will be also provided the first day of class.

4.5.Bibliography and recommended resources

