

60378 - Applied Mineralogy

Syllabus Information

Academic year: 2024/25

Subject: 60378 - Applied Mineralogy

Faculty / School: 100 - Facultad de Ciencias

Degree: 624 - Master's in Geology: Techniques and Applications

ECTS: 3.0

Year: 1

Semester: Second semester

Subject type: Optional

Module:

1. General information

1. General Information

The main objective of this subject is to provide the basic knowledge and tools that allow students to assess the industrial or technological interest of mineral resources. Special emphasis is placed on the formation environments of critical, strategic and high-tech raw materials, on biominerals and on the basic processes of crystalline synthesis and industrial applications of synthetic minerals.

This goal is aligned with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda specifically, the learning activities planned in this subject will contribute to the achievement of Goal 7 and targets 8.2 and 8.4; 9.2 and 9.4; 11.4 and 11c; 12.2 and 12.5; 13b and 14c.

This subject is suitable for students interested in expanding their knowledge of the uses, identification and characterization of critical, strategic and High_Green-Tech rocks, minerals and resources directly related to the energy transition and used in various industrial processes.

A basic knowledge of mineralogy and petrology is required to take this subject.

2. Learning results

Upon completion of the subject, the student will be able to:

- Characterize various mineral resources and assess their industrial and technological interest.
- Know examples of biominerals and their interest
- Know the basic processes of crystalline synthesis and the industrial interest of synthesis.
- Manage bibliography, in Spanish and English, related to the topics of the subject.
- Express their knowledge, assessments and proposals in written and/or oral reports.

The learning results obtained in the subject have an applied value that acquires greater importance as they are useful in the professional activity. It should not be forgotten that both rocks and minerals are fundamental raw materials for the green transition that will enable a clean, green, safe and more resilient economy. Knowledge of their physical and chemical properties is essential to understand the different industrial processes these raw materials undergo, as well as to control their quality, from the prospecting of the deposits to their final processing.

3. Syllabus

Theoretical program:

T1 Crystal and crystal growth.

T2 Industrial minerals.

T3 Minerals and crystals for optics and electronics.

T4 Crystal synthesis methods.

T5 Biominerals.

T6 Critical, strategic and High-Green-Tech resources. Introduction and basic concepts.

T7 High_Green-Tech resources: uses and applications; formation environments. Prospecting and exploration.

T8 Strategic resources: uses and applications; formation environments. Prospecting and exploration.

Practical activities program:

Problem solving and case studies: P1 and P2 (X-ray diffraction) and P5 and P6 (interpretation of maps for mineral exploration of critical, strategic and High_Green-Tech resources and assessment of possible prospecting strategies).

Laboratory practices: P3 and P4 (synthesis of crystals).

4. Academic activities

- **Master classes:** 18 hours
- **Problem solving and case studies:** 8 hours.
- **Laboratory practices:** 4 hours.

5. Assessment system

Theory assessment (60% of the final grade): written exam of the contents corresponding to topics T1 to T5 (55.5% of the final theory grade) and topics T6 to T8 (44.5% of the final theory grade). Both parts will average from a grade equal to or higher than 4.0. The theory assessment will be passed with a minimum grade of 5 out of 10

Practical classes assessment (40% of the final grade): completion of a brief report presenting the methodology and results of the practical classes P1 to P4 (66.66% of the practical classes' grade). The practical assessment will be passed with a minimum grade of 5 out of 10. The assessment of the cabinet practices P5 to P6 (33.33%) will be based on the presentation of the results at the end of each practice.

The parts passed in one call will be considered as passed for the following call of the same academic year, maintaining the grade obtained.

Global assessment.

Students who have not passed the subject by continuous assessment or who have not opted for this type of evaluation will have to take a single theoretical-practical test of all the contents of the subject, whose assessment will represent 100% of the grade. In order to pass it, it will be necessary to obtain a minimum grade of 5 out of 10 points.

6. Sustainable Development Goals

7 - Affordable and Clean Energy