Universidad Zaragoza

Academic Year/course: 2023/24

26402 - Crystallography

Syllabus Information

Academic year: 2023/24
Subject: 26402 - Crystallography
Faculty / School: 100 - Facultad de Ciencias
Degree: 296 - Degree in Geology
588 - Degree in Geology
ECTS: 6.5
Year: 1
Semester: Second semester
Subject type: Basic Education
Module:

1. General information

The main objective is that the student acquires the appropriate knowledge to know and understand the crystalline structures of minerals and their properties, as well as the vocabulary used in this field. Knowing the basics of the crystalline matter is basic for the geologist, since it constitutes the majority of geological materials.

This subject supports those that study geological materials, mainly Mineralogy and Petrology. In turn, it needs the help of other basic subjects, especially Mathematics, Physics and Chemistry.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement. Goal 4: Quality education.

2. Learning results

- To know and be able to describe the structural characteristics and properties of crystalline materials of geological interest.
- To understand published scientific information (bibliographic references), in Spanish and English, on basic crystallographic issues . - To convey crystallographic information adequately, in Spanish.
- To know the basic techniques for mineral identification.
- To relate the knowledge acquired about crystallography with the rest of the disciplines of the degree.
- To recognize and describe the characters of the geometric models of crystalline matter.
- To properly handle the transmitted light polarization microscope for the observation of the optical properties of crystals. - To interpret the corresponding optical phenomena and describe them with the appropriate vocabulary

3. Syllabus

Geometric crystallography

Concept of crystal and properties of crystalline matter. Crystal lattices and their elements. Symmetry and crystalline systems.

Stereographic projection.

Structural crystallography and crystallochemistry

Spatial symmetry, spatial groups and unit cell. Crystalline structures: basic principles and types; study techniques.

Compositional variability: isomorphism.

Physical properties of crystals

Physical properties of crystals. Crystalline optics. The polarization microscope: fundamentals and application to the study of crystals.

Crystalline dynamics

Crystalline defects and crystalline dynamics. Formation and growth of crystals. Aggregates and twins. Polymorphism

4. Academic activities

Participative master class: 33 hours

The teacher will explain the contents of the subject. As a working tool, questionnaires will be proposed to be solved individually and corrected by the teacher.

Problem solving and case studies: 18 hours

Special practices (microscopy): 14 hours

For these activities, supplementary material will be provided in Moodle

Examination: 5 hours

5. Assessment system

Continuous assessment: problem-solving practice exam and case studies. Students who pass with a grade of 6 or higher will not have to take the corresponding exam in the global exam (B1)

Global evaluation test

A) Theory exam: 60% of the overall grade

B) Practice exams: 40% of the overall grade

B1. Geometric Crystallography and Diffraction (20%)

B2. Optical microscopy (20%)

It is necessary to pass all three tests (A, B1 and B2) separately (with a 5). The parts passed will be considered eliminated for the purposes of the exams of the academic year to which the student is entitled.

Demonstration of the assimilation of knowledge and the development of the corresponding competencies will be assessed. Special attention will be paid to the clarity and rigor in the exposition of topics and the use of specific vocabulary, as well as the ability to relate concepts to each other. On the contrary, lack of precision, grammatical incorrectness, and other defects in the exposition that hinder the understanding of the argumentation will be negatively assessed in the written tests.