

60375 - Methods and techniques in Geology

Syllabus Information

Academic year: 2023/24

Subject: 60375 - Methods and techniques in Geology

Faculty / School: 100 - Facultad de Ciencias

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

ECTS: 9.0

Year: 1

Semester: First semester

Subject type: Compulsory

Module:

1. General information

The subject provides a fundamental basis for students who want to pursue studies in any field of geology since it offers a spectrum of the most common techniques used in the different branches of earth sciences and their applications.

The student will acquire a broad and integrated vision of the techniques and methods currently available, in order to be able to adapt them to their future needs and design a work plan according to the requirements and limitations of each specific case.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs): 4, 6, 9, 12, 13, 14 and 15 of the United Nations 2030 Agenda.

2. Learning results

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

- A. Identify the main properties of interest (physical, mechanical and chemical) in the characterization of geological materials and know the appropriate study methods for each case.
- B. Select the most appropriate laboratory and field techniques and methods to obtain results in accordance with the objectives of a specific geological study.
- C. Assess the operational requirements, including economic ones, and especially sampling, of the different techniques and methods applicable in geology, for prospecting as well as fundamental and applied research.
- D. Know and assess the different dating methods in geology, as well as to select the most appropriate for the problem under study.

3. Syllabus

Theory program

MODULE 1: instrumental techniques: requirements and applications

1.1. Determination of physical and mechanical properties

1.2. Introduction to mineral and chemical characterization techniques

MODULE 2: Dating of geological materials

2.1. Radioisotope techniques

2.2. Thermochronology

2.3. Geochronological applications of paleomagnetism

2.4. Cyclostratigraphy and astrochronology.

Biochronology

2.6. Chronostratigraphy and geochronology

Internship program

MODULE 1

- Determination of petrophysical properties: density, porosity, permeability, etc.
- Practical session on rock magnetism techniques

MODULE 2

- Dating of series with sedimentary cyclicity
- Practical session of magnetostratigraphy
- Quantitative and statistical biostratigraphy exercises

4. Academic activities

The learning process in this subject is distributed in:

1.- Lectures (4.9 ECTS): detailed exposition of the topics with the help of ICTs and active participation of the students.

2.- Practical classes (2.5 ECTS): they include the solving of problems and cases, laboratory practices and teaching assignments or seminars, based on real or possible cases, with the use of equipment and general or specific computer programs for each application.

3.- Special practices (3 field practices; 1,6 ECTS): identification of the geological characters of the study areas and application of the study and sampling strategies appropriate to the objectives.

5. Assessment system

1. **Continuous assessment:** the following activities will be carried out:

- Written tests: throughout the semester there will be several theoretical-practical questionnaires related to the contents of the theoretical-practical sessions, which students will have to answer, during class time, at the end of each topic or block of topics.

- Completion of assignments and reports: throughout the semester, assignments related to the contents of the theoretical and practical sessions will be proposed, and students must submit a report on specific deadlines that will be announced at the beginning of each of the modules.

The weight (%) in the final grade of each of the questionnaires, papers and reports will be proportional to the hours of teaching of the topic or block of topics covered.

2. **Global assessment:** a theoretical and practical written exam will be held for those students who do not pass the subject through continuous evaluation or who do not choose this assessment method. This exam will assess the achievement of the expected learning results and will be worth 100% of the final grade.