

## 60383 - Underground geological repositories

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 60383 - Underground geological repositories

**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

The objectives of this subject are for the student to:

1. Understand the concept of geological storage and its different types.
2. Gain the knowledge to assess, characterize and monitor different types of geological repositories.
3. Be trained in resource management and the assessment, management and treatment of anthropogenic waste.
4. Gain detailed knowledge about radioactive waste, CO<sub>2</sub> and gas storage.
5. Learn about the tools and methodologies for the study of these systems.

### 2. Learning results

The importance of this subject lies in the environmental, societal and economic interest of the use of geological repositories. It will help the student understand the fundamentals and consequences of these repositories as an alternative for the management of both hazardous waste and essential energy resources.

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

- Know the different geological environments capable of acting as geological repositories and their different types.
- Know the different properties that condition the suitability of a geological repository and be able to assess whether a given rock formation (together with its context) is suitable as a repository.
- Know the different techniques for prospecting suitable sites, their characterization, and the assessment of the future behaviour of geological repositories.

### 3. Syllabus

#### Theory:

Topic 1. General introduction to geological repositories.

Topic 2. Types of geological repositories and properties that characterize them.

Topic 3. Radioactive waste storage. Options, features and associated problems. Examples from around the world.

Topic 4. CO<sub>2</sub> storage. Options, features and associated problems. Case study on the feasibility of CO<sub>2</sub> storage.

Topic 5. Gas storage. Options, features and associated problems.

#### Practices and seminars:

Practices and seminars related to topic 3: videos, student's personal work on natural analogues and underground laboratories.

Practices and seminars related to topic 4: CO<sub>2</sub> storage.

### 4. Academic activities

**Activity 1: master classes** (15h). Development of the theoretical bases of the subject, according to section 3.

**Activity 2: problems and cases** (10h). Problem solving based on real or possible cases, with the application of general or specific computer programs.

**Activity 3: teaching assignments or seminars** (5h). Presentation and sharing of papers or case studies prepared by the students and discussion of the results obtained.

**Activity 4: student's personal work** (45h non face-to-face). Time needed to consolidate knowledge and prepare reports.

## 5. Assessment system

### Continuous assessment

**Activity 1** (master classes). Assessment by means of an individual theoretical-practical questionnaire at the end of each thematic block (**50%** of the grade for the subject).

**Activity 2** (problem and case study practices). Assessment of the reports of each practical session, written and delivered within the established deadline (**25%** of the subject's grade).

**Activity 3** (seminars). Assessment based on the work (individual or group) presented in written and oral form (**25%** of the subject's grade).

Final grade of the subject: weighted average of the grades of each activity, provided that the grade of each one is equal to or higher than 5.

### Overall 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.

## 6. Sustainable Development Goals

7 - Affordable and Clean Energy  
11 - Sustainable Cities and Communities  
13 - Climate Action