

26410 - Hydrogeology

Syllabus Information

Academic year: 2023/24

Subject: 26410 - Hydrogeology

Faculty / School: 100 - Facultad de Ciencias

Degree: 296 - Degree in Geology

588 - Degree in Geology

ECTS: 7.0

Year: 2

Semester: Second semester

Subject type: Compulsory

Module:

1. General information

The general objective of the subject is to understand and assimilate the concepts, theories and models of water flow through geological materials, its importance as a geological agent, and its socio-economic interest in today's world. The specific objectives of the subject are the acquisition of the following skills

- 1.-The main hydrogeological concepts.
- 2.-Use of hydrogeological information.
- 3.-Knowledge of groundwater exploration, collection and exploitation.
- 4.-Basic knowledge of groundwater physico-chemistry and contamination.
- 5.-Basic knowledge of resource estimation and groundwater management, including hydrological modelling
- 6.-Knowledge of the role of groundwater in geological processes.

This is a subject within the context of APPLIED GEOLOGY. It is useful for achieving the SDGs, specifically SDG 6.

2. Learning results

The student should be able to:

- Identify geological formations according to their hydrogeological parameters (porosity and permeability) and the effects of their geometric arrangement.
- Explain and relate qualitatively and quantitatively the connection between all the components of the natural and artificial hydrological cycle.
- Acquire, analyse and synthesize hydrological information using current techniques (GIS, databases, excel sheets...)
- Use hydrogeological research-prospecting techniques for both exploitation and management of groundwater resources
- Carry out the design, execution and exploitation of groundwater catchments.
- Acquire, analyse and synthesize water physicochemical data and relate them to urban, agricultural and industrial pollution processes

3. Syllabus

THEORY PROGRAM: Basic principles of hydrogeology. Water balance and resource estimation. Fundamentals of general hydraulics. The general equation of groundwater movement. Introduction to subsurface flow modelling. Groundwater exploration. Groundwater and geological materials. Drilling and boreholes. Catchment hydraulics. Relationship between surface and groundwater, springs and wetlands.

Basic hydrochemistry and groundwater contamination. Thermal, mineral and mineral-medicinal waters.

PRACTICAL PROGRAM Basic hydrology. Water balances. Darcy's Law. Application of Darcy's law. Application of tracers. Flow networks and hydrogeological maps. SW flow modelling. Hydrogeology WebGIS and hydrological data. Catchment hydraulics 1. Catchment hydraulics 2.

4. Academic activities

The theoretical part of the subject (32 hours) will be taught through lectures of a participative nature. The contents will be available at the University's ADD Anillo Digital Docente).

The practical part of the subject (30 hours) is face-to-face and is carried out by solving practical examples in the office, together with specific tasks that are the basis of the continuous evaluation. These assignments are sent to the University's ADD.

The Fieldwork part (8 hours) corresponds to the attendance and use of 2 field trips with report - homework to be submitted to the ADD.

The student has 105 hours of non-attendance work.

5. Assessment system

In the normal development of the subject, i.e., in the classroom, the evaluation activities will consist of the following

1. Written test on basic knowledge: consisting of questions that require short answers or that require an extensive development of the subject. Two problems similar to those solved in the practices of cabinet are included. The written test will be based on the scheduled learning activities program. The written test will account for 70% of the evaluation of the subject and its grade must always be higher than 4 (out of 10) to be considered as averageable.

2. Individual assignments with continuous evaluation: The work done in practices and others that are proposed, should be delivered in the ADD as weekly assignments, individually and partially done by hand, constituting the main part of the continuous evaluation. A Seminar will be given as part of the assignments to be submitted. Attendance to the practices will be mandatory.

Students who have not attended the subject in person, and those who, even if they have done so, wish it, will have the right to a global evaluation test that will include: a theoretical concepts exam, similar to the one taken by the on-site students; and a written test on practical cabinet exercises (problems).