

## 28904 - Geology, soil science and climatology

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 28904 - Geology, soil science and climatology

**Faculty / School:** 201 - Escuela Politécnica Superior

**Degree:** 583 - Degree in Rural and Agri-Food Engineering

**ECTS:** 6.0

**Year:** 1

**Semester:** First semester

**Subject type:** Basic Education

**Module:**

### 1. General information

The geological, edaphic and climatic systems are closely related and are the basis of all environmental dynamics. The knowledge provided is essential for soil management through agricultural practices and livestock.

These approaches are aligned with the following SDGs:

- SDG 2: Zero hunger in its target 2.4 (Sustainability of food production systems).
- SDG 4: Inclusive and egalitarian education.
- SDG 6: Sustainable water management. This objective is related to the good teaching practice "DIVERSITY OF

ENVIRONMENTAL EFFECTS OF AGRICULTURAL PRACTICES" in which students follow an itinerary through the countryside to discover the state of water alteration by agricultural activities.

- SDG 12: Responsible production and consumption in targets 12.2 (efficient use of natural resources) and 12.4

(sound management of chemicals).

- SDG 13: Climate action in its target 13.3 (mitigation and adaptation to climate change).
- SDG 15: Life of terrestrial ecosystems in its target 15.3 (Combat desertification).

### 2. Learning results

To know the basics of geology essential to understand the current conditions of a given environment, and the need to foresee the consequences of an intervention or an activity developed on it.

To be able to identify the forming factors and relate them to soil properties. And understand the importance of the main physical, chemical and biological properties of soil.

To be able to understand soil-environment relationships, to situate a soil within a given environment and to relate it to its geological context.

To understand the importance of soil as an essential resource in agricultural production, its delicate balance, risks and possibilities of soil fertility management.

Ability to incorporate and coordinate the different sources of information that can be useful in the study of soil, geological substratum and climate (field studies, laboratory, cartography, aerial photography, datasets, satellite information, etc.)

Knowledge of the main sampling and laboratory sample analysis techniques, their application to soil and the value of the information they provide.

To be able to describe a soil pedon, differentiate the genetic horizons and recognize its main physical, chemical or biological properties, both in the field and with laboratory support (texture, structure, drainage, oxidation state, biological activity, root disposition, etc.)

To know the basics of climatology, and the components of climate. Understanding that climate is a primary component of the physical environment that affects most activities in the rural environment.

To understand the basic aspects of atmospheric behavior on which meteorology is based. So that you can collect and take advantage of the information on the atmospheric situation and short-term forecasts.

In relation to FAO's Sustainable Development Goals (SDGs):

understand the importance of the soil as an essential resource in agricultural production, its delicate balance, the risks of desertification associated with erosion, contamination and possible treatment, salinization and possible improvements, and fertility management possibilities.

- understand the role of soil and soil management in climate change mitigation and pollution problems.
- to know the recycling capacity of by-products in the soil.
- in short, to understand the imperative need to preserve the soil resource in its full capacity of use, both for food and for the maintenance of the environment.

### 3. Syllabus

THEORY: Divided into three thematic blocks:

- Geology: Geological time, minerals and rocks, principles of stratigraphy, hydrogeology.
- Edaphology: Formation, soil profile, mineral and organic components, physical and chemical properties of soils.
- Climatology: Basic principles and climatic elements.

LABORATORY PRACTICES (visual recognition of rocks and determination of soil properties) GABINET PRACTICES (Interpretation of maps and geological cross-sections)

FIELD TRIPS (geological description of saline soils and contaminated aquifers. Study of a representative soil pedon).

VIRTUAL COURSE ON INFORMATION (development of the structure and citation in academic papers).

### 4. Academic activities

The activities are divided into face-to-face (40% of the total of the subject) and non-face-to-face (60%).

#### FACE-TO-FACE ACTIVITIES.

- Theoretical sessions - Participative lectures.
- Laboratory practices in groups of 2-3 people for the identification of rocks and soil properties.
- Cabinet practice in the classroom for the resolution of practical problems.
- Field trips to analyze the geological and edaphic processes explained during the theoretical sessions.
- Virtual Information Course - Two 50-minute sessions to explain the contents of the subject and an appointment workshop.

#### NON-FACE-TO-FACE ACTIVITIES

- Study of the material taught in class (1-1.5 h of study per theoretical session)
- Elaboration of the practice booklet.
- Online realization of the VIRTUAL COURSE OF INFORMATION.
- Geology-edaphology work linked to the Virtual Course.

Theoretical and practical sessions will be related to SDGs 6, 13 and 15.

### 5. Assessment system

The final grade of the subject will be obtained from the sum of the partial grades of each of the assessment activities by applying the formula:

60% theory + 20% internship script + 20% work

The Theory will consist of two exams (one on Geology and the other on Soil Science), both of which must be passed in order to pass the subject. Practices and work are mandatory and must be passed in order to pass the subject. Plagiarism will be sanctioned with the failure of the work. The subject will be passed if the result of this sum, with the aforementioned conditions, is equal or higher than 5 points out of 10.

Those who take the Virtual Information Course will be rewarded 0.5% of the final grade of the geology part.

All the students who do not pass the course in the first call, will be able to take those parts not passed, keeping the grade obtained in the remaining parts.

Any of the parts with a grade of 5 or higher may be reserved for the next session. The student may choose between keeping the grade obtained or resubmitting the corresponding part in the following calls, in which case the grade that will prevail will be the one obtained in the most recent call.

The average success rate of the subject in the last three years is: 2019/20: 60%; 2020/21: 72,73%; 2021/22: 50%