

25245 - Soil and land evaluation

Syllabus Information

Academic year: 2023/24

Subject: 25245 - Soil and land evaluation

Faculty / School: 201 - Escuela Politécnica Superior

Degree: 571 - Degree in Environmental Sciences

ECTS: 6.0

Year:

Semester: Second Four-month period

Subject type: Optional

Module:

1. General information

This subject provides knowledge of the soil as:

(1) a natural resource capable of providing ecosystem services (production of food and raw materials), intervening in the water cycle, carbon sequestration, habitat for organisms, etc.,

(2) a complex environment whose management must be sustainable in order not to lose its quality (by salinization, eutrophication, erosion, pollution...)

(3) a component of every terrestrial ecosystem, the knowledge of which is essential in restoration processes (quarries, burned areas, riverbanks, etc.), in the design of experiments and the transfer of their results.

(4) the result of the interaction of the forming factors whose spatial variation generates different types of soils, with their own designation (classification) and suitability (evaluation) for different uses

All of these aspects are aligned with SDG2, SDG3, SDG4, SDG 6, SDG13 and especially SDG 15 (Life in terrestrial ecosystems)

2. Learning results

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

- Interpret how the soil has been formed (genesis), what are its components and properties (constituents) - Diagnose the quality of the soil or "topsoil" for use in rehabilitation projects: open-pit mining operations, remediation, phytoremediation, riverbank reclamation, evaluation of areas affected by forest fires, etc

- Recognize the different types of soils, their names and properties (classification), as well as interpret the distribution of soils in the landscape (mapping)

- Evaluate the suitability that different types of soils and territories can have for different uses in a sustainable way

- Acquire skills in predicting soil behaviour under certain cultural practices and in environmental impact studies

3. Syllabus

Topic 1. Ecosystem services of soils

Topic 2. Soil characterization: methods and interpretation of results

Topic 3. Edaphogenesis: review of soil formation factors and processes

Topic 4. What are the soils called? The Worldwide Reference System (WRB) of soil classification (IUSS, 2022).

Soil evaluation systems for land use planning

Topic 6. Soil-landscape relationships and their representation: Soil mapping

Topic 7. Soil quality diagnosis and remediation measures

Topic 8. Bioengineering techniques for soil conservation

Topic 9. Soils affected by forest fires; effects and post-fire actions

4. Academic activities

1 - Explanatory and participative classroom lectures.

2 - Laboratory and greenhouse practices: activities of demonstrative-active-interrogative type. Examples:

2.1. Rain simulation

2.2. Physical properties

2.3. Chemical properties

2.4. Biological properties

3 - Field practices: participatory-active-interrogative activities (subject to budget availability)

4 - Tutorials: sessions that, at the students' request, should help to solve doubts about the previous activities.

5 - Non-face-to-face activities: resolution of exercises by the student: use of soil maps, diagnosis of soil quality, own web sites such as www.cienciadelsuelo.es; , www.suelosdearagon.com

6 - Exams: preparation and performance of exams, including oral presentation of papers.

5. Assessment system

In addition to the global test, the possibility of continuous evaluation will be offered, which will consist of various activities such as

Activity 1. Practice with Rain Simulator: soil and water quality under different types of cover (mulch, crop, bare soil). Collective presentation (in small groups) of a report on the results obtained in the greenhouse session: 20%

Activity 2. TSI Project: Take the Soil and Investigate. From samples of an unknown soil profile, the student will describe its morphological properties, apply tests to check what components it has and what origin. Individual presentation of a report and oral presentation of the same: 20%

Activity 3. MAPA Project. Interpretation of an on-line soil map. Use of soil maps (E. 1:25.000) to evaluate their suitability as waste acceptors. Individual presentation of a report on the results obtained in the cabinet session: 20%

Activity 4. Special practices. Field trips to identify various soil typologies in the field and to interpret their use limitations and potential for improvement. Multiple choice test, to be answered via Moodle: 20%

Activity 5. IARASOL Project. On-line soil classification. <http://www.suelosdearagon.com/>. Self-assessing program 20%.

The success rate in recent academic years has been 100%.

The detailed assessment system will be explained in the presentation of the subject.