

Degree programme	Type	Course
Environmental Biology	OB	2

Contact lecturer

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Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

Although there are no official prerequisites, it is convenient that the student has:

- 1) The basic knowledge about Earth Sciences and the Environment that acquired in this subject during the secondary education.
- 2) The basic knowledge of the subjects of Chemistry, Physical Environment, Ecology and Prospecting of the Natural Environment.

Objectives

The objective of the subject is training the student in his/her ability i) to describe the most relevant components and properties of the soil and its organization, ii) to take representative samples and analyze them using standardized methods, and iii) to interpret the results in order to deduce the soil formation processes.

Learning outcomes

- CM31 (Propose viable projects and actions in the field of soil science that enhance social, economic and environmental benefits.) Propose viable projects and actions in the field of soil science that enhance social, economic and environmental benefits.
- CM32 (Propose actions to change methods and processes in the field of soil science to respond to environmental demands through the use of organic amendments and/or mineral fertilizers.) Propose actions to change methods and processes in the field of soil science to respond to environmental demands through the use of organic amendments and/or mineral fertilizers.
- KM38 (Define the basic properties of soil, as well as the structure and characterization of its

components.) Define the basic properties of soil, as well as the structure and characterization of its components.

- KM39 (Identify different types of soil, their nomenclature and properties (classification), as well as their distribution in the landscape.) Identify different types of soil, their nomenclature and properties (classification), as well as their distribution in the landscape.
- SM40 (Analyse different types of soil, interpreting their potential use and possibilities for restoration.) Analyse different types of soil, interpreting their potential use and possibilities for restoration.
- SM41 (Conduct soil studies that include the description and classification of different types of soil, as well as their behaviour in response to certain agricultural practices, such as crop rotation, use of fertilisers, irrigation and tillage.) Conduct soil studies that include the description and classification of different types of soil, as well as their behaviour in response to certain agricultural practices, such as crop rotation, use of fertilisers, irrigation and tillage.

Contents

BLOCK I: Soil as a natural system

1. Concept of soil.
2. Morphological description of the soil profile and the horizons.
3. Study of soils in the field.

BLOCK II: Organization and soil components

4. Soil texture and colour.
5. Soil structure.
6. Soil porosity and density.

BLOCK III: Mineral soil constituents

7. Parental materials and weathering.
8. Silicate minerals.

9. Non-silicate minerals.

BLOCK IV: Soil organic matter, its transformations, and biological activity

10. Soil organic matter (SOM) and role in the global carbon cycle.

11. SOM composition and dynamics.

12. The edaphic system.

BLOCK V: Soil as a water reservoir

13. Retention of water in the soil.

14. Movement of water in the soil.

BLOCK VI: Soil physical properties and chemical properties

15. Nutrients and soil retention capacity.

16. Acidity, salinity and sodicity. BLOCK VII: Soil diversity

17. Soil classification.

18. The WRB-FAO system and main soil types in Europe.

19. Soil maps.

*The language of instruction will be predominantly Catalan, with the possibility of some sessions in Spanish.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Tutorial meeting	2	0.08	CM31, KM38, SM40
Field work	2	0.08	SM41
Independent study	58	2.32	CM31, CM32, KM38, KM39, SM40, SM41
Master class	34	1.36	CM31, CM32, KM38, KM39, SM40, SM41
Field practices	8	0.32	KM39, SM40, SM41
Lab practices	12	0.48	KM38, SM40
Poster work	30	1.2	CM31, KM38, KM39, SM40, SM41

Lectures. The exhibitions are the main activity that will be done in the classroom, as they allow transmitting basic concepts to many students in a short time. In addition, it will be accompanied with PowerPoint presentations and diverse educational materials that, if appropriate, will be available in the virtual campus.

Field practices. It is essential for the student to use the knowledge acquired in relation to the description and sampling of soils. They will consist of an entire day's trip in which students, in groups of 5, will describe the environment where a soil has formed, excavate a soil pit, and will describe the different horizons and will take samples for analytical purposes.

Lab practices. These sessions are designed with the aim that the students learn the most common analytical procedures in the soil characterization, to obtain sufficiently reliable and representative results of the samples that will have obtained in the field. They will be organized in three four-hour sessions in which the students, in the same groups they did in the field, will analyze the samples and interpret the results. In order to attend it is necessary that the student had passed the biosafety and safety tests that will find in the Virtual Campus and to be knowledgeable and accept the working rules of the laboratories of the Faculty of Biosciences.

Collaborative work (poster). It consists on the culmination of the group work. A summary of the field practices and laboratory practices, and will be realized by the same working groups. It will consist of the realization of a poster that will include the description of the study area and the soil studied, the analytical results that have been obtained, and its interpretation in relation to the formation of the soil and its use abilities.

Tutorials. The collaborative work will be presented in a tutorial session that will serve to identify learning errors and seek the possibilities of solution in relation to collaborative work.

Use of AI (Model 2 - Restricted). In this course, the use of Artificial Intelligence (AI) technologies is permitted exclusively for support tasks (such as bibliographic or information searches, text correction or translations, or the generation of explanatory graphics). Students must clearly identify which parts have been generated using this technology, specify the tools used, and include a critical reflection on how these have influenced the process and final outcome of the activity. Failure to disclose the use of AI in this graded activity will be considered a breach of academic integrity and may result in a partial or total penalty on the activity's grade, or more severe sanctions in serious cases..

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Poster	25%	0	0	CM31, SM41
Final test	50%	2	0.08	CM31, CM32, KM38, KM39, SM40
Midterm test	25%	2	0.08	CM31, CM32, KM38, SM41

The 2017 modification of the Title IV (Appraisal) of the UAB Regulations according to the RD 1393/2007, applicable from the 2018-2019 academic year, will rule the appraisal, which will consist of three activities:

1) Mid-term test (25% weight). It consists of questions and/or short answer exercises on the main concepts on the subject that must be reached at the time of its completion.

2) Final test (45% weight). It consists of questions and/or exercises that will be formulated in the relation the morphological description and the analytical results of a soil. This test will have an integrating character of the contents imparted throughout the course, according to the continuous appraisal system in force at the UAB.

3) Poster (25% weight). It consists in the hand-out of the poster in PDF format for each field and lab practices group. This activity cannot be retaken.

Test review. At the time of publication of the exam notes in the virtual campus, the date, time and place of the review will be communicated for any interested student. There will be no individual reviews outside of these hours.

Retake exam and 'No Avaluable' criteria. The students can only attend to a retake exam if the weighted mean of the midterm and the final test is below 5 and over 3.5. The mark of the retake test substitutes the average (weighted) mark of the other tests (hence the retake test having a 75% weight), and will include all the contents of the subject. The student will be graded as \"No Avaluable\" if the weight of all the evaluation activities conducted is below a 67% weight of the final score. The attendance to practical sessions (or field trips) is mandatory. Students missing more than 20% of programmed sessions will be graded as \"No Avaluable\".

Appraisal criteria. Once all the evaluation steps are completed, including the retaketest, a student will be considered as 'failed' when the weighted average mark is below 5, or when the weighted mark of the midterm and the final exams or that of the retake exam is below 4.5.

Students in single evaluation mode. Consult with the Faculty of Biosciences on how to opt for this evaluation mode or visit the website <https://www.uab.cat/doc/CriterisAvaluacioUnica>. The single evaluation in this subject will correspond to a single synthesis test that will assess the content of the entire theoretical program of the subject. The grade obtained in this synthesis test will account for 75% of the final grade for the subject. The single evaluation test will be held on the same date as the final scheduled continuous evaluation test, and the same recovery system as the continuous evaluation will be applied. As for the evaluation of practical activities (poster), it will follow the same process as the continuous evaluation and will account for 25% of the final grade for the subject. This final activity cannot be recovered. The retake of this single evaluation exam follows the same procedure as the continuous assessment.

Irregularities during assessment. Committing any irregularity in an assessment activity (academic fraud, plagiarism, or improper use of AI, unless such use is expressly authorized in the course guide) that could lead to a significant variation in the grade means that this activity will be graded with a 0. If the course guide stipulates that passing the subject requires obtaining a minimum grade in this assessment activity, or if several

irregularities occur in the assessment activities of the same subject, the final grade for that subject will be 0. In addition to this, disciplinary proceedings may be initiated against a student who commits any of these irregularities.

Bibliography

Books:

- Brady NC, Weil RR. 2017. The nature and properties of soils (15th ed.). Pearson, Columbus.
- Porta J, López-Acevedo M, Poch RM. 2019. Edafología: uso y protección de suelos (4a ed.). Mundi-Prensa, Madrid.
- Tan, K. H. 2009. Environmental soil Science (3rd Ed.). CRC Press. Boca Raton, FL.

Soil analysis and description:

- Stocking M. & Murnaghan N. 2003. Manual para la evaluación de campo de la degradación de la tierra. Ediciones Mundi-Prensa, Madrid, 172 p.
- Soil Survey Staff. 2024. Field Book for Describing and Sampling Soils, version 4.0. USDA-NRCS. <https://www.nrcs.usda.gov/resources/guides-and-instructions/field-book-for-describing-and-sampling-soils>
- USDA - Natural Resources Conservation Service. Technical References for Soils <https://www.nrcs.usda.gov/resources/guides-and-instructions/technical-references-for-soils>
- Van Reeuwijk, L. P. 2002. Procedures for soil analysis. ISRIC - FAO.

Soil classification handbooks:

- IUSS Working Group WRB. 2022. World Reference Base for Soil Resources. International soil classification system for naming soils and creating legends for soil maps (4th ed.). International Union of Soil Sciences (IUSS), Vienna. https://wrb.isric.org/files/WRB_fourth_edition_2022-12-18.pdf
- Soil Survey Staff. 2022. Keys to Soil Taxonomy (13th ed.). USDA-Natural Resources Conservation Service. <https://www.nrcs.usda.gov/resources/guides-and-instructions/keys-to-soil-taxonomy>

Soil maps:

- Mapes de sòls de Catalunya en format WMS <https://www.icgc.cat/ca/Geoinformacio-i-mapes/Geoinformacio-en-linia-Geoserveis/WMS-Geoindex/WMS>
- Dades de perfils a Catalunya: Geoíndex - Sòls. <https://www.icgc.cat/ca/Eines-i-visors/Visors/Visualitzadors-Geoindex/Geoindex-Sols>
- European Soil Data Centre (ESDAC) (<https://esdac.jrc.ec.europa.eu/resource-type/maps>)
- FAO/UNESCO Soil Map of the World 1:5M. <https://www.fao.org/soils-portal/data-hub/soil-maps-and-databases/faounesco-soil-map-of-the-world/en/>
- FAO Global Soil Organic Carbon Map (GSOCmap) <https://www.fao.org/soils-portal/data-hub/soil-maps-and-databases/global-soil-organic-carbon-map-gsocm>
- ISRIC - SoilGrids <https://www.soilgrids.org>

Education webs:

- USDA - Natural Resources Conservation Service. Soil Education <https://www.nrcs.usda.gov/resources/education-and-teaching-materials/soil-education>
- FAO Soils Portal. <https://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/en/>
- Universidad de Granada. Departamento de Edafología y Química Agrícola. Libros y monografías sobre suelos. <http://edafologia.ugr.es/index.htm>
- Soil-net. <http://www.soil-net.com/>
- International Union of Soil Sciences. <https://www.iuss.org/>

Additional resources:

- FAO, ITPS, GSBI, CBD & SCBD. 2020. State of knowledge of soil biodiversity - Status, challenges and potentialities. FAO, Roma. <https://openknowledge.fao.org/items/24035f6b-eed4-40a8-a838-b45b866c35c2>

- Orgiazzi A, Bardgett RD, Barrios E, et al. 2016. Global Soil Biodiversity Atlas. European Commission, Publications Office of the European Union, Luxembourg.
- FAO & ITPS. 2021. Recarbonizing global soils: a technical manual. FAO, Roma.
<https://openknowledge.fao.org/items/89ef22bb-5ea9-4db6-8412-1d2c9d8b08ca>
- Unió Europea. 2025. Directiva sobre Monitorització de Sòls (EU Soil Monitoring Law).
https://environment.ec.europa.eu/topics/soil-health/soil-monitoring-law_en

Software

None.

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	22	Catalan	first semester	afternoon
(PLAB) Practical laboratories	221	Catalan	first semester	morning-mixed
(PCAM) Field practices	221	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	222	Catalan	first semester	morning-mixed
(PCAM) Field practices	222	Catalan	first semester	morning-mixed
(PCAMs) Suport a les pràctiques de camp dirigides	222	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	223	Catalan	first semester	morning-mixed
(PCAM) Field practices	223	Catalan	first semester	morning-mixed