Physical Environment

Code: 100838
ECTS Credits: 6

2025/2026

Degree	Type	Year
Environmental Biology	FB	1

Contact

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Although there are no official prerequisites, it is advisable for the student to review:

1) Rocks and minerals classification and identification systems.

2) Highschool Earth Sciences fundamentals.

Objectives and Contextualisation

In the Degree in Environmental Biology, the Physical Environment (abiotic natural environment) is considered as a fundamental part of the Biosphere dynamics. This systemic approach to the natural environment requires the development of certain aspects of the Geological Sciences. Those aspects that allow us to understand how geologic (geomorphological and hydrogeological) and climatic processes closely interact with biological systems.

This course has been designed to provide to the future biologists fundamental knowledge about the physical environment as the scenario in which the biological processes occur. Intentionally, this course is not focused on those methods and specific contents that are only useful for geology professionals. Instead, it focuses on those aspects that can be applied and useful for future professionals of Environmental Biology.

The matter is closely related to the compulsory courses: Natural Environment Prospection (First Year) and Environmental Cartography Analysis (Second Year).

Specific objectives:

- To identify the different rock types. To recognize the origin and properties of each lithology type.

- To incorporate the geological perspective of time and space to the study of the natural processes

- To understand the importance of diverse tectonic settings as a determinant of the physic environment

- To know about the main atmospheric processes that determine meteorological and climatic patterns.

- To understand the causes and features of the climatic changes occurred during the Quaternary period

- To delve into the methods and features of all components of hydrological cycle.

- To learn the main principles of groundwater hydrology and hydrochemistry

- To learn the main external geological processes that define the present-day landscape

- To be able to identify in the field the active geological processes based on the geomorphology of region

- To recognize the active geological processes as basic determinants habitats distribution and ecosystem dynamics

- To acquire expertise to analyze information from different sources and to be able to integrate it in a coherent way.

Learning Outcomes

1. CM06 (Competence) Interpret thematic maps of the natural environment and its natural biological resources.
2. CM07 (Competence) Integrate relevant information about the physical environment to make judgments applied to the field of environmental biology, including multidisciplinary reflection.
3. KM10 (Knowledge) Define the physical, hydrological and geological concepts that characterize the natural physical environment.
4. KM11 (Knowledge) Describe environmentally-related physical and hydrological processes, and their response to climate and environmental changes.
5. SM08 (Skill) Apply the methods and techniques for describing the characteristics of the physical environment.
6. SM09 (Skill) Apply physical, hydrological and geological theories in the formulation and resolution of environmental problems.
7. SM10 (Skill) Describe thematic cartographies of the natural environment.

Content

Geology fundamentals

The physical environment as a support for biological processes. Fundamentals. Space and time scale in Geology. Petrogenetic cycle. Types of rocks. Deformation. The geological map.

Basic topics of Climatology and Meteorology.

Climate system and meteorology. Structure of the atmosphere. Radiation balance and spectral distribution. Energy flows. Temperature as a climate parameter.

Atmospheric humidity Evapotranspiration and respiration. Atmospheric pressure. Dynamics of the air masses, anticyclones and storms. Atmospheric general circulation, main and local winds. Stability and instability of air masses and atmospheric disturbances. Precipitation, rainfall regimens.

Climatology. Catalan climatic diversity. Paleoclimatology. Climate change due to astronomical and geological causes. Quaternary climate changes. Climate evolution from the Last Glacial Maximum. Anthropogenic climate change, evidence, potential for global warming of GHGs. Emission scenarios and IPCC projections.

Hydrology

The water cycle. Hydric balance. The hydrographic basin. Surface-water hydrology. Fluvial hydraulic parameters. Data management and representation.

Aquifers. The groundwater hydrology. Principles of fluid mechanics. Water energy in aquifers. The hydraulic gradient. The water flow in the saturated zone: Darcy's law. Hydraulic parameters. Representation of the underground flow: the piezometers. Measures. Graphic representation. River-aquifer relation.

Hydrochemistry. Physical-chemical analysis of water and plots used in Hydrogeology. Hydrochemistry fundamentals. Geochemical evolution of waters.

Geomorphological systems

External Geodynamics. Agents, processes and forms. Geomorphology: analysis and fundamentals. The time and space scales in Geomorphology.

Fluvial: Erosive and depositional processes. Floodplains. Alluvial fans. River terraces. Flooding.

Karst: Dissolution of carbonates. Surface characteristics (Karr). Sinkholes. Poljes Karst valleys and springs. Endokarst. Type of karst and climate influence. Evaporite karst.

Coastline: Sea level oscillations. Waves, currents and tides. Type of coasts. Beaches, barriers and arrows. Coastal dunes. Mud plains, salt marshes (wetlands) and mangrove swamps. Estuaries and deltas.

Glacier and periglacial: The glaciers. Glacier Erosion. Erosion processes and resulting landforms. Glacier transport and sedimentation. The periglacial domain. Typical processes. Periglacial forms.

Arid and semi-arid zones: Processes and wind forms. Mechanisms of meteorization. Surface forms. Slopes forms. Arid lakes and associated forms.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
In-field practices	22	0.88	
Master classes	32	1.28	
Type: Autonomous			
Preparation of dossiers and portfolio	20	0.8	
Problem study and solving	70	2.8	

In accordance with the previously defined objectives, the theoretical and practical aspects of the course are distributed as follows:

Master class:

Theoretical lessons will take place at the lecture room.

Team work:

The students have to hand in a team work about an study area located in the Catalan region. The goal of this work is to learn about the regional geological diversity and to be able to integrate climate and geology as basic determinants of habitats distribution and ecosystem dynamics.

Field and campus practices

Practical sessions will take place as two lessons at the university campus and two days of fieldwork.

Campus practical sessions:

Day 1: Rock identification practical session at the Geology Department.

Day 2: The study of existing outcrops at the UAB campus. Relation with local hydrogeology

Field work practical sessions:

During field trips, the student must acquire a transversal and systemic knowledge of various geo-environmental problems existing in Catalonia. Each of the practices-group will attend the following field trips:

1) River Llobregat basin 1. Súria-Cardona sector

2) Llobregat River Basin 2. Baix Llobregat-Barcelona Sector

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

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Collective works	20	0	0	CM06, SM08, SM09, SM10
Test 1	40	3	0.12	CM07, KM10, KM11, SM08, SM09
Test 2	40	3	0.12	CM07, KM10, KM11, SM08

Evaluation:

The evaluation will be carried out throughout all the course, partly individually and partially collectively.

1. Exam evaluation (80% of final grade):

Scientific-technical knowledge acquired during the course is evaluated individually, as well as synthesis, and critical reasoning skills.

The theoretical and part of the practical contents are evaluated with 2 written tests. The qualification of this part is the sum of both (40% each one). The qualification obtained in this individual evaluation will represent 80% of the matter final grade.

2. Collective evaluation (20% of the final grade):

This part evaluates the group work. Activities distributed throughout the course will be proposed. The obtained grade in this collective evaluation is 20% of the final course grade.

3. Attendance at practical sessions (or field trips):

It is mandatory. Students will obtain the "Not Evaluable" grade when the absence is greater than 20% of the scheduled sessions.

4. Remedial examinations:

To participate in the remedial evaluation, students must have been previously evaluated in a set of activities, the weight of which equals a minimum of two thirds of the total grade of the matter or module.

5. Single Evaluation:

Attendance at Field Trips (PCAM) will be mandatory for all students, regardless of whether they take the single assessment.

The single assessment consists of a single synthesis test (with multiple choice questions and problems), on the contents of the entire theory and practice program. The mark obtained in the theoretical synthesis test is 50% of the final mark of the subject, the one obtained in the applied part (focused on the aspects worked on in the field trips) will be the other 50%.

The single assessment test will be done coinciding with the same date set in the calendar for the last continuous assessment test and the same recovery system will be applied as for the continuous assessment.

It is necessary to grade a minimum of 5 points out of 10 in each of the parts (synthesis test, applied part).

Bibliography

Bibliography
Basic bibliography
1) Geology fundamentals and field work:
• Tarbuck, E J. y Lutgens, F. K. (2005). Ciencias de la Tierra. Una introducción a la geología física (8ªedición). / Prentice Hall - Pearson educación ISBN: 9788420544007.
2) Climatology and Meteorology:
• Cuadrado, J. M. y Pita, M.F. 2006. Climatología (4ª edición). Ed. Cátedra, Madrid, 496 p. ISBN 84-376-1531-3
• Martín Vide J., Olcina J., 2001. Climas y tiempos de España. Alianza editorial, Madrid, 258p.
• Al Gore (2007) Una verdad incómoda. Ediciones 62 y Editorial Gedisa S.A. Barcelona, 328p. ISBN 978-84-9784-222-8
• Grupo Intergubernamental de Expertos sobre el Cambio Climático, www.ipcc.ch/
3) Hydrology:
• URL: http://web.usal.es/~javisan/hidro/hidro.htm
4) Geomorphological systems:
• Gutiérrez Elorza, M (2008): Geomorfología. Ed. Pearson -Prentice Hall. 898 p.
5) Practical issues:
• Pozo, M .; González Yélamos, J .: Giner, J. (2003). Geología Práctica. Introducción al Reconocimiento de Materiales y Análisis de Mapas. Prentice Hall - Pearson educación. ISBN: 84-205-3908-2.

Complementary bibliography will be provided throughout the course.

Links:
Aula Virtual de la Autónoma Interactiva https://cv2008.uab.cat

Software

No specific software is required.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PCAM) Field practices	211	Catalan	second semester	morning-mixed
(PCAM) Field practices	212	Catalan	second semester	morning-mixed
(PCAM) Field practices	213	Catalan	second semester	morning-mixed
(TE) Theory	21	Catalan	second semester	afternoon