Universitat Autònoma de Barcelona

2022/2023

External Geological Processes

Code: 102841
ECTS Credits: 6

Degree	Type	Year	Semester
2501915 Environmental Sciences	OT	4	2

Contact

Name: Mario Zarroca Hernandez
Email: mario.zarroca.hernandez@uab.cat

Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: No

Prerequisites

No prerequisites are required to take this course. However, it is convenient that the students review the knowledges on earth science adquired during previous courses of the Degree.

Objectives and Contextualisation

This course offers to the student the opportunity to increase knowledge on geomorphology through the study of several practical cases in the lecture room and in the field. Active geological processes characterization is an indispensable part of the land management and geomorphology provides a key basis to understand recent landscape evolution and dynamics. This course gives practical knowledge to facilitate the integration of geo-environmental information in a future professional career. The course has many hours of fieldwork and therefore it has been prepared as a very practical approach to the topic.

Main objectives are:

- To learn about the main external geological processes that shape present day landscape (see contents for more details).

- To learn basic principles on geomorphology and cartography of active geological processes

- To be able to identify in the field the main morphodynamics occurring on our territory.

- To be able to identify main geological risks based on the dominant geological processes occurring on a territory.

- To acquire experience on how to search and analyze information from different available sources (maps, public databases, scientific papers, reports) to integrate it in studies or management plans.

Competences

- Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
- Analyze and use information critically.
- Demonstrate adequate knowledge and use the most relevant environmental tools and concepts of biology, geology, chemistry, physics and chemical engineering.

- Demonstrate concern for quality and praxis.
- Demonstrate initiative and adapt to new situations and problems.
- Learn and apply in practice the knowledge acquired and to solve problems.
- Quickly apply the knowledge and skills in the various fields involved in environmental issues, providing innovative proposals.
- Teaming developing personal values regarding social skills and teamwork.
- Work autonomously

Learning Outcomes

1. Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
2. Analyze and use information critically.
3. Assess changes in geological media by natural or anthropogenic action and their level of degradation, and proposals for prevention and mitigation.
4. Demonstrate concern for quality and praxis.
5. Demonstrate initiative and adapt to new situations and problems.
6. Identify the geological processes in the environmental surroundings and to value properly and originally.
7. Interpret maps and geological sections developed by other authors.
8. Interpret over from different spatial scales in terms of geological risk and planning.
9. Knowing the interactions between the various layers or areas of the planet.
10. Learn and apply in practice the knowledge acquired and to solve problems.
11. Prepare and interpret maps and geological sections.
12. Recognize and interpret the forms of relief, and assess the evolution of the landscape.
13. Teaming developing personal values regarding social skills and teamwork.
14. Work autonomously

Content

The students will acquire an integral vision of active geological processes that occur on our territory and how these interact with human activity and environment. The theoretical concepts will be taught in a natural classroom during the field trip sessions. In these field trips, through the study of specific cases in different places of our territory, the analysis of geological and geoanthropic processes and their implications for various geoenvironmental problems will be addressed.

Geology as a fundamental part of the ecological processes and an essential element for landscape interpretation and territorial/land management. Basic principles. Geological cartography and the new geothematic maps of Catalonia (resources guide). Concept of geological risk. Hazard, vulnerability, return period.

Geomorphological system:

- External geodynamics: Introduction. Processes and landforms.

- Fluvial: Hydrosystem. Erosive and depositional systems. Floodplains. Alluvial fans. Fluvial terraces. Flood risk: case study.

- Karst: Limestone dissolution. Superficial features. Sinkholes. Karstic valleys and springs. Evaporite karst. Risk associated to sinkholes and collapses: case study.

- Landslides: Landslides types. Landslide risk: case study.

- Coastal: Sea level oscillations. Waves, coastal currents and tides. Types of coasts. Beach, lagoon, littoral dunes. Estuary and delta formation. Case study on coastal dynamics of the Catalan shore.

- Glacial and periglacial: Glaciers. Glacial erosion. Erosive processes and resulting landforms. Glacial transport and sedimentation. The periglacial domain. Periglacial shapes. Glacial landscape interpretation: case study.

- Arid and semiarid: Eolic processes and landforms. Weathering mechanisms. Lakes of arid areas and associated landforms.

Methodology

- The students have to hand in a report on a study case related with external geological processes and geohazards. The oral presentations of these works will take place during the seminar days (see next point).

- Six entire day sessions are planned that consist in 4-5 fieldtrips (whole day) and 1-2 days seminar days (whole day). The seminar day/s will be destined to the oral presentations of the case studies and to work on data and information gathered from the field. The location and contents of these fieldtrips will be detailed on "Campus Virtual" at the beginning of the semester. For some field sessions transportation with bus from UAB will be provided, for other fieldtrips the students will have to go by public transport or by their own transportation. The students will have to bring their own food/water and adequate field clothes and shoes. Attendance to all field and seminar sessions is required to pass the course. The fieldtrip dates can be checked on the semester schedule.

The proposed methodology can be modified if required to adapt it to the mobility restrictions imposed by Health authorities.

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Fieldwork	30	1.2	2, 10, 3, 9, 5, 4, 11, 6, 8, 7, 12, 1, 14, 13
Theoretical sessions (taught in a natural classroom during the field trip sessions)	15	0.6	2, 10, 3, 9, 5, 4, 11, 6, 8, 7, 12, 1, 14, 13
Type: Autonomous			
Autonomous work load	93	3.72	2, 10, 3, 9, 5, 4, 11, 6, 8, 7, 12, 1, 14, 13

Assessment

Evaluation will be based on:

1. Individual. Theoretical and practical exam to evaluate the Practical exam to evaluate the the synthesis capacity of students on a geo-environmental topic (25%)

2. Group/individual. Practical exercises and work during de fieldtrips (25%).

3. Group/individual. Work on a study case: The treatment of a specific case study on geological risk will be evaluated (25%). The students will give oral presentations on their case and their capacity on discussing the questions made by the professors and other students will be evaluated.

Second-chance exam:

The practical exam an the practical exercises and fieldwork cannot be retaken.

The students who have not attended at least 2/3 of the previous evaluation activities may not be re-evaluated.

The proposed evaluation can be modified if required to adapt it to the mobility restrictions imposed by Health authorities.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exercices and fieldwork	25 %	2	0.08	2, 10, 3, 9, 5, 4, 11, 6, 8, 7, 12, 1, 14, 13
Practical exam	25 %	2	0.08	2, 10, 3, 11, 6, 8, 7, 12, 1
Work on a case study (including oral presentation)	50 %	8	0.32	2, 10, 3, 5, 4, 11, 6, 8, 7, 12, 1, 13

Bibliography

Geomorphology:

- Ahnert, F. (1996). Introduction to Geomorphology. Arnold, 352 p. London.

- Chorley, R.J., Schumm, S.A. y Sudgen, D.E. (1984). Geomorphology. Methuen, 607 p. London.

- Gutiérrez, M. (2008). Geomorfología. Pearson-Prentice Hall, 920 p. Madrid.

- Selby, M.J. (1985). Earth's Changing Surface. Claredon Press, 607 p. Oxford.

- Strahler, A.N. (1965). Introduction to Physical Geography. Wiley, 643 p. New York.

- Summerfield, M.R. (1991). Global Geomorphology. Longman, 537 p. London.

Geology:

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.

Software

No specific software is required.