26910 - Geology

Información del Plan Docente

Academic Year	2017/18
Faculty / School	100 - Facultad de Ciencias
Degree	447 - Degree in Physics
ECTS	6.0
Year	1
Semester	Second semester
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It favors the understanding of the different processes, both physical and chemical, that operate in the Earth now and in the past. A wide range of teaching and learning tasks are implemented, such as theory sessions, laboratory sessions, seminars, assignments, and tutorials.
The course is taught in four one-hour theory lectures (Mo to Th, 15-16 h) and one two-hour practical session (Fr, 10-12 h) per week. Students are expected to participate actively in the class throughout the semester.

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Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.
Further information regarding the course will be provided on the first day of class.

5.2.Learning tasks

Learning task 1: Theory sessions (3.5 ECTS). Three one-hour lectures per week aimed at introducing and explaining the core concepts of Geology.
Learning task 2: Seminars (0.5 ECTS). There are 5 one-hour seminars during the semester on topics related to the course program but dealing with hot issues like recent earthquakes or breaking news that have some bearing on the relationship between Geology and society.
Learning task 3: laboratory and problem solving sessions (1.5 ECTS). One two-hour session per week for demonstrating in the lab the behavior of geological materials, learning how to interpret geologic maps and cross sections, and solving different quantitative problems.
Learning task 4: Field trip (0.5 ECTS). At the end of the semester a field trip to a particularly interesting area in the Iberian Range will be organized. During this one-day field trip the student will put in practice the methods and techniques that a field geologist use to interpret the landscape in terms of materials, tectonic processes and geological events.
Learning task 5: Tutorials. Tutorials give the student the opportunity to have a more personal learning experience and serve three main purposes: (1) solve doubts related to in-class activities; (2) solve doubts related to personal work (practice reports that should be handed in before the deadline); and (3) give advice on learning methods and procedures.
Learning task 6: Assignments. Four assignments are programmed during the semester, one for each of the four main units in which the syllabus is divided. At the end of the semester there will be a global examination for those students that did not pass the course by continuous assessment.

5.3.Syllabus

Theory sessions

UNIT 1: Panoramic view

1. The geologic cycle
2. Geologic time: relative and absolute dating and the geologic time scale
3. The Earth in the context of the Solar System

UNIT 2: Processes of internal origin

4. Internal structure of the Earth
5. Plate Tectonics
6. Processes and materials in divergent plate margins
7. Processes and materials in convergent plate margins
8. Rock deformation, 1: concepts and parameters
9. Rock deformation, 2: structural levels
10. Endogenic geological hazards: earthquakes and volcanoes

UNIT 3: Processes of external origin

11. Weathering, transport, sedimentation and diagenesis: formation of sedimentary rocks
12. Landscape formation and evolution
13. Exogenic geological hazards: landslides

UNIT 4: History of planet Earth

14. Hadic and Archaic Earth
15. The Proterozoic
16. The Phanerozoic
17. Toward our future Earth

Laboratory and problem solving sessions

1. How to read and interpret geological maps
2. Calculation of the internal temperature of the Earth: lithospheric and mantle geotherms
3. Classification of igneous rocks
4. Stress analysis and fracture mechanics
5. Deformed rocks: petrofabric
6. Classification of sedimentary rocks
7. Geologic study of an area: Alhama de Aragón

Seminars

1. How is time measured in Geology?
2. How to read and interpret geological maps and cross sections: Aliaga
3. Plate tectonics
4. Stress-strain relationships and rheological behavior of rocks
5. Climatic change: what can we learn from the past?

5.4.Course planning and calendar

Course planning

Hour of theory: 35
Hours of lab and problem solving practicals: 15
Hours of seminars: 5
Days of field trips:1 (equivalent to 5 h of in-class teaching)
Hours of personal work: 90
Total number of hours: 150

Timetable

1. Theory sessions: Mo, Tu, We from 15 to 16h.
2. Practicals: Fr, 10 to 12h.
3. Seminars: Th, 15 to 16h.

Deadline for assignments

1. Lab assignments: maximum one week after the session.
2. Field trip report: before the end beginning of the June exam period.

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Written assignments during the semester
The four written assignments will be held in the same lecture room as the theory and problem solving sessions, either on Thursday (from 15 to 16 h) or on Friday (from 10 to 12 h), approximately one week after finishing the corresponding theory unit.

5.5.Bibliography and recommended resources

BB	An introduction to our dynamic planet / edited by Nick Rogers ; authors, Stephen Blake...[et al.] . Co-published ed. 1st publ. Cambridge, UK : Cambridge University Press ; Milton Keynes, UK : The Open University, 2008
BB	Keller, Edward A.. Riesgos naturales : procesos de la Tierrra como riesgos, desastres y catástrofes / Edward A. Keller , Robert H. Blodgett . - [1ª ed.] Madrid : Pearson , D. L. 2007
BB	Lunine, Jonathan Irving. Earth : evolution of a habitable world / Jonathan I. Lunine ; original illustrations by Cynthia J. Lunine . 1st ed., repr. Cambridge : Cambridge University Press, 2000
BB	Mattauer, Maurice. Las deformaciones de los materiales de la corteza terrestre / Maurice Mattauer ; [traducido por Mateo Gutiérrez Elorza y Jesús Aguado Sánchez] . [2a ed.] Barcelona : Omega, D.L. 1989
BB	Tarbuck, Edward J. : Ciencias de la tierra : una introducción a la geología física / Edward J. Tarbuck, Frederick K. Lutgens ; ilustrado por, Dennis Tasa ; revisión técnica, Dolores García del Amo. . - 10 ed. Madrid : Pearson, D.L. 2013.
BB	Turcotte, Donald L.. Geodynamics / Donald L. Turcotte, Gerald Schubert . 2nd ed. Cambridge [etc.] : Cambridge University Press, cop. 2002
BC	Anderson, Robert S.. Geomorphology : the mechanics and chemistry of landscapes / Robert S. Anderson and Suzanne P. Anderson . Cambridge : Cambridge University Press, 2010
BC	Jambon, A. y Thomas, A.. Geochimie: Geodynamique et cycles. Dunod. 2009
BC	Melosh, H. J.. Planetary Surface Processes. Cambridge University Press. 2011