

39110 - Geology

Syllabus Information

Academic Year: 2021/22

Subject: 39110 - Geología

Faculty / School: 100 - Facultad de Ciencias

Degree: 577 - Joint Program in Physics and Mathematics

ECTS: 6.0

Year: 1

Semester: Second semester

Subject Type: Optional

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. 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, field trip, assignments, and tutorials.

Students are expected to participate actively in the class throughout the semester.

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.

4.2. Learning tasks

The course includes the following learning tasks:

- **Learning task 1:** Theory sessions (3.5 ECTS: 35 hours). Three one-hour lectures per week aimed at introducing and explaining the core concepts of Geology.
- **Learning task 2:** Seminars (0.5 ECTS: 5 hours). There are 5 one-hour seminars during the semester on topics related to the course syllabus but also 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 to show 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: 15 hours). 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 uses 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 autonomous work (practice reports that should be handed in before the deadline); and (3) give advice on learning methods and procedures.

- **Learning task 6:** Assignments (90 hours of autonomous work). Four assignments are programmed during the semester, one for each of the four main topics in which the syllabus is divided. At the end of the semester there will be a global assessment for those students who did not pass the course by continuous assessment.

4.3. Syllabus

The course will address the following topics:

Theory sessions

- Topic 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
 4. Internal structure of the Earth
 5. Plate Tectonics
- Topic 2: Processes of internal origin
 6. Processes and materials in divergent plate margins
 7. Processes and materials in convergent plate margins and during continental collision
 8. Processes and materials in the interior of plates
 9. Rock deformation, 1: concepts and parameters
 10. Rock deformation, 2: structural levels
- Topic 3: Processes of external origin
 11. Weathering, transport, sedimentation and diagenesis: formation of sedimentary rocks
 12. Landscape formation and evolution
- Topic 4: History of planet Earth
 13. The origin of the Earth and the Precambrian
 14. The Phanerozoic

Laboratory and problem solving sessions

1. Exercises with geological maps
2. Calculation of the internal temperature of the Earth: lithospheric and mantle geotherms
3. Classification of igneous rocks
4. Stress-strain relationships and rheological behavior of rocks
5. Stress analysis and fracture mechanics: Mohr's circle
6. Classification of sedimentary rocks
7. Geologic study of the transect Mediana de Aragón (Ebro Basin)-Utrillas (Iberian Range)

Seminars

1. How is time measured in Geology?
2. How to read and interpret geological maps and cross sections
3. Plate tectonics
4. Deformed rocks: petrofabric
5. Climatic change: what can we learn from the past?

4.4. Course planning and calendar

Timetable

1. Theory sessions: Mo, Tu, We from 15 to 16h.
2. Practice sessions: Fr, 10 to 12h and 12-14h.
3. Seminars: Th, 15 to 16h.

Deadline for assignments

1. Lab assignments: maximum one week after the session.
2. Field trip report: at the end of the field trip.

Written assignments during the semester
The three 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 topic.

Further information concerning the timetable, classroom, assessment dates and other details regarding this course, will be

provided on the first day of class or please refer to the Faculty of Sciences Website.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=39110>