

## 26404 - Fundamentals of Geology and Geological Mapping

### Información del Plan Docente

Academic Year	2018/19
Subject	26404 - Fundamentals of Geology and Geological Mapping
Faculty / School	100 - Facultad de Ciencias
Degree	296 - Degree in Geology
ECTS	9.5
Year	1
Semester	First semester
Subject Type	Basic Education

### Module

#### 1.General information

##### 1.1.Aims of the course

##### 1.2.Context and importance of this course in the degree

##### 1.3.Recommendations to take this course

#### 2.Learning goals

##### 2.1.Competences

##### 2.2.Learning goals

##### 2.3.Importance of learning goals

#### 3.Assessment (1st and 2nd call)

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

#### 4.Methodology, learning tasks, syllabus and resources

##### 4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, laboratory sessions, problem-solving sessions and fieldwork.

This is the first course in which new students get in touch with Geology. So, it is designed to make the student understand planet Earth as a dynamic system and Geology as an applied, multidisciplinary and also dynamic science. The student has to learn the basics of Geology (principles, terminology and basic concepts) and develop the skills to read both topographic and geological maps, to understand the information they contain and to extract sections from them. The course also includes three one-day field trips in which the student is instructed in the methodology of observation, description and data collection in the field and also in the translation of that information to a topographic map, making a

## 26404 - Fundamentals of Geology and Geological Mapping

geological map.

### 4.2. Learning tasks

This course is organized as follows:

- **Lectures.** Four 50-minutes weekly sessions. Theory basis of Geology and Cartography.
- **Laboratory sessions.** Five two-hour sessions. Description and identification of minerals, rocks and fossils.
- **Problem-solving sessions.** Reading, understanding and making of simple geological maps and sections. Seven two-hour sessions.
- **Fieldwork.** Three one-day field trips to different areas of the Iberian Chain are scheduled into this activity. Introduction to field geology and geological mapping.
- **Tutorials**
- **Course on bibliography resources** (optional).

### 4.3. Syllabus

This course will address the following topics:

#### Lectures

- **Topic 1.** Introduction to Geology.
- **Topic 2.** Planet Earth: location in the Solar system, shape, structure and composition. Introduction to global dynamics.
- **Topic 3.** Minerals and crystals. Features of crystalline matter. Properties of the minerals: identification and classification of minerals.
- **Topic 4.** Igneous rocks. Features, classification and processes that create them.
- **Topic 5.** Sedimentary rocks. Features, classification and sedimentary processes.
- **Topic 6.** Metamorphic rocks. Concept, factors and main types of metamorphism.
- **Topic 7.** The topographic map.
- **Topic 8.** Cartographic projection systems. Coordinates and orientation.
- **Topic 9.** Geological maps and geological cross-sections.
- **Topic 10.** Geological mapping of horizontal and dipping geological successions.
- **Topic 11.** Geological mapping of folds.
- **Topic 12.** Geological mapping of faults.
- **Topic 13.** Plate tectonics. Development of basins and mountain ranges. Introduction to structural geology.
- **Topic 14.** External processes: erosion, transport and sedimentation. Sedimentary environments and structures
- **Topic 15.** Surface and subsurface waters. Geomorphological processes and landforms.
- **Topic 16.** Time in geology. Absolute and relative dating methods. Biostratigraphy.
- **Topic 17.** Introduction to Historical and Regional Geology

#### Practice sessions

##### Section I. Identification and description of minerals, rocks and fossils

- **Session 1.** Identification and description of minerals (I): non silicates.
- **Session 2.** Identification and description of minerals (II) and rocks (I): silicates, igneous and metamorphic rocks.
- **Session 3.** Identification and description of rocks (II): sedimentary rocks.
- **Session 4.** Identification and description of fossils (I).
- **Session 5.** Identification and description of fossils (II).

Section II. Reading, understanding and making geological maps (some of the topics should be combined in the same practice session).

## 26404 - Fundamentals of Geology and Geological Mapping

- **Session 6.** The topographic map.
- **Session 7.** Topographic profiles.
- **Session 8.** Geological mapping of horizontal stratigraphic sequences.
- **Session 9.** Geological mapping of dipping stratigraphic sequences.
- **Session 10.** Geological mapping of stratigraphic sequences with discontinuities.
- **Session 11.** Geological sections of horizontal and dipping stratigraphic sequences and simple geological structures.
- **Session 12.** Geological maps repositories. The MAGNA series and the GEODE digital cartography.

### Fieldwork

Three one-day field trips are scheduled in this course to study:

- The Paleozoic and Triassic sequences around Montalbán (Teruel). Introduction to structure and field observation and measurements.
- The Triassic to Cretaceous sequences around Ariño (Teruel). Cartographic-scale structure.
- The Jurassic sequences around Aguilón (Zaragoza). Geological mapping of the Aguilón anticline.

Attendance to these field trips is compulsory as the results and reports are used in the practice sessions and are evaluated.

### 4.4.Course planning and calendar

The dates for the field trips are fixed and published in the web of the Earth Science Department (<https://cienciatierra.unizar.es/docencia/informacion-general-del-grado>) prior to the beginning of the course.

Further information concerning the timetable, classroom, office hours, assessment dates (<https://ciencias.unizar.es/consultar-examenes>) and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website and Moodle.

### 4.5.Bibliography and recommended resources