

Academic Year/course: 2022/23

## 26412 - Continental Palaeontology

### Syllabus Information

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**Academic Year:** 2022/23

**Subject:** 26412 - Continental Palaeontology

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 296 - Degree in Geology  
588 - Degree in Geology

**ECTS:** 6.0

**Year:** 2

**Semester:** Second semester

**Subject Type:** Compulsory

**Module:**

## 1. General information

### 1.1. Aims of the course

The objectives are aligned with the following United Nations Sustainable Development Goals (SDGs) (<https://www.un.org/sustainabledevelopment/>), in such a way that the acquisition of the results of Learning the subject provides training and competence to contribute to some extent to its achievement:

-Goal13: Climate Action

-Goal15: Life On Land

## 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 the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, laboratory sessions and fieldwork.

Continental Paleontology deals with the evolution of life and ecosystems on the continents. This course is intended for students to gain a thorough grounding in the fundamentals of paleontology, and then widen their studies to focus on fossils from continental environments (terrestrial and aquatic). Through lectures, labs, and field observations, we will address topics ranging from fossil preservation to long-term evolution of Life. The course program is designed to enable students to acquire training in the use of fossils in the dating and the environmental reconstruction of continental basins.

### 4.2. Learning tasks

This course is organized as follows:

1. Lectures (25 hours - 2.5 ECTS). Two fifty-minute sessions per week. To develop the concepts and theoretical foundations of the course. The course covers a general view on taphonomy, vertebrate morphology and phylogeny, plant taxonomy and evolution, palaeoecological, palaeobiogeographical and palaeoclimatological analyses, as well as an overview of the development of life on continents. The course program is designed to enable students to deal with the use of fossils in the dating and the environmental reconstruction of continental basins.

2. Laboratory sessions (25 hours - 3 ECTS). One two-hour session per week. To apply various laboratory work techniques for the preparation and study of plant, invertebrate and vertebrate fossils and for the palaeoecological inference and paleoenvironmental reconstruction of continental basins. Applying the fundamental palaeontology to the

continental rocks, students will learn to read the long-term evolution of Life in the continental realms. This encompasses many different geological phenomena, but understanding them requires students to constantly consider four dimensions, on time and length scales. Students will gain hands-on experience with rocks, fossils and field observations, as well as knowledge and skills to assess and apply solutions in their chosen scientific field of study.

3. Fieldwork (5 hours - 0.5 ECTS). One day long field trip in order to know three outcrops of continental formations (Palaeozoic, Mesozoic and Cainozoic) of the Iberian Range and to address field observations ranging from fossil preservation and classification, vertebrate ichnology, paleoenvironmental reconstruction, strata dating, and long-term evolution of Life. All students are expected to collect field paleontological data and to fill a questionnaire or report on each outcrop that should be given at the end of the trip.

4. Autonomous work and study (84 hours).

5. Assessment tasks (6 hours).

Teaching and assessment activities will be carried out on site for as long and as much as possible. This scenario could change if safety regulations related to the covid19 crisis recommended online activities.

### 4.3. Syllabus

This course will address the following topics:

#### Lectures

- **Topic 1.** Life on continental environments (terrestrial and aquatic) and its fossil record.
- **Topic 2.** Depositional environments and modes of fossil preservation on continents. Biostratigraphic and fossilization processes affecting vertebrate and plant remains.
- **Topic 3.** Invertebrates of interest in continental sediments. Vertebrate morphology (structure and development of bones and teeth) and phylogeny. Dietary adaptations. Locomotion and postcranial adaptations. Vertebrate palaeoichnology.
- **Topic 4.** Plants of interest in continental sediments. Plant taxonomy and evolution. Palaeoecological characterization of extinct plants.
- **Topic 5.** Community and biome reconstructions. Responses of vegetation and mammal communities to climate and palaeogeographical changes.
- **Topic 6.** Uses of paleontological data in dating continental rocks. Regional mammal biostratigraphic zonation and biochronological schemes.
- **Topic 7.** Evolution of life and ecosystems on continents. Main bioevents, factors driving diversity changes and extinction. Coevolution of plants and animals.

#### Laboratory sessions

They are related to the topics covered in the lecture classes. The contents are structured into four sections:

##### Section 1. Invertebrate and vertebrates fossils from continental environments:

- Overview of the fossils from continental environments and main techniques for their preparation and conservation (visit to the laboratory).
- Depositional environments (terrestrial and aquatic) and modes of fossil preservation on continents. Taphonomic processes.
- Introduction to the vertebrate skeleton. Endoskeleton and dermoskeleton. Cranial and postcranial skeleton. Structure and bones of the mammalian postcranial skeleton. Mammalian locomotion and postcranial adaptations.
- Skull and teeth. Structure and openings of the skull. Cranial appendages. Structure, attachment types, and eruption of teeth. Mammalian molar morphology and dietary adaptations.

##### Section 2. Plant taxonomy and palaeoecological characterization: ?

- Propteridophytes, bryophytes and other groups of "plants"
- Pteridophytes?
- Gymnosperms
- Angiosperms ?

##### Section 3. Community and biome reconstructions. Detecting the response of the mammalian paleocommunities to environmental changes. ?

##### Section 4. Palaeogeographical and climate reconstructions. Responses of vegetation and mammal communities to global changes. Calculating diversity curves using palaeontological databases.

### 4.4. Course planning and calendar

Timetable:

- Lectures will be held on Wednesdays and Thursdays from 10:00 to 11:00 through the learning weeks of the 2nd semester (except the days for field trip in the 2nd course timetable).
- The 2-hour laboratory sessions will be held every Thursday from 15:00 to 17:00 through the learning weeks of the 2nd semester (except the days for field trips in the 2nd course timetable). There will be two groups: Group I from 15:00 to 17:00, Group II from 17:00 to 19:00.
- The times of the start of the exam will be announced one week before the exam day. Each exam will include a practical test for those students who did not pass these parts during the term.

Further information concerning the timetable, classroom, office hours, 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 and Earth Sciences Department websites (<https://ciencias.unizar.es>; <https://cienciatierra.unizar.es>) and Moodle.

#### **4.5. Bibliography and recommended resources**

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=26412>