

## 60377 - Paleontology and dynamics of the biosphere

### Syllabus Information

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**Academic year:** 2023/24

**Subject:** 60377 - Paleontology and dynamics of the biosphere

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

**Degree:** 624 - Master's in Geology: Techniques and Applications

**ECTS:** 6.0

**Year:** 1

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

The main objective of the subject is that the student understands the phenomenon of life on earth, its origin, evolution and diversification using paleontological data.

The second objective is for the student to be able to propose predictive models related to various evolutionary, ecological and biogeographical aspects, and to interpret the dynamics of the biosphere at local, regional and global scales.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/en/>), so that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement:

- Goal 13: Climate Action
- Goal 14: Underwater Life
- Goal 15: Terrestrial Ecosystem Life

### 2. Learning results

Upon completion of the subject, the student will be able to:

- Understand the phenomenon of life on earth, its origin and diversification and know how to use paleontological data as a tool.
- Recognize the different types of biological evidence in the geological record.
- Know and apply the main study techniques and propose predictive models related to different evolutionary, ecological and biogeographical aspects.
- Interpret the dynamics of the biosphere at local, regional and global scales.
- Interpret the morphological variation of fossil species and their adaptation to the environment.
- Know and apply the main methods of kinship inference between organisms that lived in the past and present-day organisms, as well as understand the relationships between systematics, phylogeny and paleobiogeography.
- Know the contributions of paleontology to ecology, biogeography, evolution and astrobiology.

By understanding the phenomenon of life on earth, its origin and diversification, and recognizing the different types of biological evidence in the geological record, it will be possible to propose predictive models related to various evolutionary, ecological, conservation and biogeographical aspects.

### 3. Syllabus

The subject develops the following thematic blocks:

- Unit 1: Contributions of paleontology to the knowledge of the biosphere and its dynamics. The origin of life. Conservation of fossils. Dynamics of museums.
- Unit 2: The evolution of the form of organisms. Diversification and morphological and ecological disparity. Phylogenetic inference and its application in paleobiogeography.
- Unit 3: The study of paleodiversity. Contribution of taphonomic analysis to the reconstruction of prehistoric ecosystems and paleobiodiversity. Response of the biosphere to regional and global, periodic and non-periodic environmental perturbations. Contributions in the fields of evolutionary ecology, macroecology and historical biogeography.

### 4. Academic activities

1. Master class (22 hours - 2.2 ECTS).
2. Laboratory practices (30 hours - 3 ECTS).

- 3- Problem solving and case studies (2 hours - 0,2 ECTS).
- 4- Special practical work (field practices): 6 hours = 1 field day = 0.6 ECTS.
- 5- Assessment tests (6 hours)

## 5. Assessment system

The student must demonstrate achievement of the intended learning results through the following assessment activities:

**-Continuous** evaluation: It will consist of the delivery of a set of reports, exercises or theoretical-practical questionnaires on each of the three units of the subject (which together will account for 90% of the grade), and a questionnaire related to the field practice (which will account for the remaining 10%). The final grade will be the weighted average of the grades obtained in both tests, only if a minimum of 5 points out of 10 has been achieved in both. The weighting will be made according to the teaching hours covered by each unit or thematic block of the subject.

**-Global** assessment: Students who do not opt for continuous assessment or have not passed it, will take a single written theoretical-practical exam (100%), which must be passed with a minimum grade of 5 points out of 10. This test will take place on the dates established in the academic calendar of the Faculty of Sciences for the two calls of the academic year.

- In the assessment tests, the adequacy between the exercises proposed and the results presented, the capacity of analysis, and the clarity and order of the reasoned answers will be assessed.