UNIVERSITAT DE BARCELONA

Teaching plan for the course unit

General information

Course unit name: Pràctiques en Paleobiologia I

Course unit code: 575565

Academic year: 2023-2024

Coordinator: Carles Martin Closas

Department: Department of Earth and Ocean Dynamics

Credits: 12

Single program: S

Estimated learning time — Total number of hours 299

Face-to-face and/or online activities	112	
- Laboratory session	Face-to-face	44
- Field trip	Face-to-face	40
- Other class types	Face-to-face	28
Supervised project	87	
Independent learning	100	

Competences to be gained during study

- To plan and develop a study in palaeontology, including the resolution of a specific case-study.
- To transmit in a clear and rigorous way the development of a case-study, by integrating previous work, defining the problem to be solved, providing detail on the methodology that was followed, and finally exposing the results obtained.

- To integrate the partial results obtained on a case study in paleobiology in a team-work, by analysing in a critical way the interest of the own data as well as those from the other’s group members.

Learning objectives

Referring to knowledge

To recognize the main groups of plant fossils, invertebrates, ichnofossils and microfossils in rock samples, in the field or by observation under the microscope.

To characterize paleoenvironmental changes from the taphonomic and paleoecological study of microfossils, plant fossils, ichnofossils and invertebrates in stratigraphic successions.

To define the chronostratigraphy of sedimentary successions from the study of microfossils, plants and invertebrates.

Referring to abilities, skills

To relate different perspectives of a fossil in section to integrate them into a three-dimensional scheme, both from thin sections or from macroscopic sections.

To represent in two- and three-dimensional diagrams the reconstruction of a paleoenvironment that integrates information from the depositional environment (lithofacies) with the taphonomic and paleoecological information of various groups of fossils in real case studies.

Teaching blocks

1. Practicum in Marine Paleobiology

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1. **Practicum in taphonomy, paleoecology and ichnology:**
   1. Laboratory. Observation and analysis of taphofacies, ichnofossils and marine ichnofacies.
   2. Field work. Study of taphonomy, paleoecology and ichnology of marine invertebrates and vertebrates in a Miocene succession of the Camp de Tarragona Basin. Paleoecology taphonomy and ichnology of marine invertebrates and microfossils in a sequence of Eocene platforms of the Ebro basin (in combination with Micropaleontology and Biostratigraphy practices).
2. **Practicum in Micropaleontology**
   1. Laboratory. Observation and identification of microfossils of cyanobacteria, red algae, green algae, nannoplankton, foraminifera and marine invertebrates.
   2. Field work. Study of a succession of rhodophyte-rich carbonate platform in the Miocene of the Penedès Basin and of a middle Eocene succession rich in macroforaminifera. Taphonomy paleoecology and ichnology of marine invertebrates and microfossils in a succession of the Eocene of the Ebro basin (in combination with the practicum in Taphonomy, paleoecology and ichnology).
3. **Practicum in Marine Paleoenvironmental Modelling**
   1. Laboratory. Observation of facies and microfacies of carbonate platforms
   2. Field. Study of carbonate platforms in the Mesozoic of the Catalan Coastal Chain and the South Pyrenean Central Unit.

2. Practicum in Continental Paleobiology

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1. **Practicum in Plant Evolution**:
   1. Laboratory. Observation and identification of macro and microfossils of Paleozoic, Mesozoic and Cenozoic plants. Evolutionary implications.
   2. Field work. Study of Miocene plants and insects from the Cerdanya Basin (Pyrenees): applications in paleoenvironmental reconstruction (in combination with the practicum in Continental Invertebrates).
2. **Practicum in Continental Invertebrate Paleontology**
   1. Laboratory. Observation and identification of fossils of arthropods and continental mollusks.
   2. Field work. Study of Miocene plants and insects from the La Cerdanya basin: applications in paleoenvironmental reconstruction (in combination with the practicum in Plant Evolution).
3. **Practicum in Paleobiology and Evolution of mammals**
   1. Laboratory. To be determined by the UAB
   2. Field work. To be determined by the UAB

Teaching methods and general organization

Laboratory practicum**.** It consists of sessions of usually two hours in the microscopy classroom, during which students observe fossils, draw sketches and photograph the structures explained in theory and do exercises based on these fossils. These practicum aims enhancing observation, description, graphic illustration, and synthesis skills. This block involves hours of face-to-face work, hours of supervised work and hours of autonomous work.

Field practicum. This block consists of five field trips, three of which will be of one day duration, and one will last for two days. They will allow contextualizing in the nature the fossils studied in theory and observed in the laboratory. Field work includes studying examples of many Paleozoic, Mesozoic, and Cenozoic fossil groups. The training activities consist of searching and recognizing fossils in a stratigraphic context and extracting taphonomic, paleoenvironmental and biostratigraphic information. The result is reflected in reports or written exercises that are elaborated as supervised work. In fieldwork, group-work skills are also exercised. The block involves face-to-face hours and supervised work.

Official assessment of learning outcomes

40% Final exam

20% Exercises based on laboratory practicums

30% Reports and field work

10% Attendance and participation

Examination-based assessment

80% Final exam that will include questions from laboratory practicums and exercises.

20% Field work reports

Reading and study resources

Consulteu la disponibilitat a CERCABIB

Book

Behrensmeyer, A.K. *Taphonomy.* In: Alderton, D. & Elias, S.A. (Eds.) Encyclopedia of Geology (2nd Edition), Vol. 3 History of Life, Academic Press, Elsevier, 2021.

Buatois, L.A., Mángano, M.G. *Ichnology. Organism-substrate interactions in space and time.* , New York, 358 pp Cambridge University Press. 2011.

Mángano, M.G., Buatois, L.A. (Eds). The trace-fossil recor*d of major evolutionary events. Vol. 1: Precambrian and Paleozoic,* Topics in Geobiology 39, Springer, 2016

Mángano, M.G. & Buatois, L.A. (Eds.). The trace-fossil recor*d of major evolutionary events. Vol. 2: Mesozoic and Cenozoic.* Topics in Geobiology 40, Springer, 2016.

Martinetto, E. Tschopp, E., Gastaldo, R.A. *Nature Through Time*. Springer Nature, 2020

Mc Elwain, J. *Paleobotany and Global Change: Important Lessons for Species to Biomes from Vegetation Responses to Past Global Change*, Annual Reviews Plant Biology, 69:761-787, 2018

McGowran, B. *Biostratigraphy. Microfossils and Geological time*, Cambridge University Press, 2005.

Molina, E.. *Micropaleontología* (3ª Edición). Prensas de la Universidad de Zaragoza, 2017

Saraswati, P. *Microforaminiferal Paleontology for understanding Earth's history*, Elsevier, 2021

Sreepat J. *Fundamentals of Invertebrate Paleontology. Microfossils*, Springer, 2020

Taylor, T.; Taylor, E.; Krings, M. *Paleobotany: The Biology and Evolution of Fossil Plants*. Academic Press, 2nd Edition, 2009.

Willis, K.J.; McElwain, J.C. *The Evolution of Plants*, Oxford, 2002.