

 <p>UNIVERSITAT DE BARCELONA</p>	<p>Teaching plan for the course unit</p>

<p>General information</p>

Course unit name: Paleobiologia Marina

Course unit code: 575563

Academic year: 2023-2024

Coordinator: Zain Belaustegui Barahona

Department: Department of Earth and Ocean Dynamics

Credits: 9

Single program: S

<p>Estimated learning time</p>	<p>Total number of hours 225</p>
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Face-to-face and/or online activities 56

(Of this total of 56 hours, the UB will teach 36 hours and the UAB the remaining 20 hours.)

- Lecture	Face-to-face and online	56
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(Taught by the UB and the UAB)

Supervised project 94

Independent learning 75

<p>Competences to be gained during study</p>

To demonstrate capabilities for the autonomous acquisition of information from paleontological publications in order to develop a synthesis of the most important points.

To apply a logical and coherent analysis protocol to plan and carry out a paleontological study and solve a specific problem.

To develop a teamwork to solve problems related to the paleoenvironment, assuming their responsibility in the individual contribution and integrating it into group contributions and minimizing inequalities based on sex and gender.

To manage the information acquired in a professional business environment to address and solve specific problems in the dating of marine sediments.

To act autonomously to plan and carry out professional tasks, demonstrating originality in the way of approaching and solving specific problems in hydrocarbon exploration.

To act in the development of paleontological projects with ethical responsibility and with respect for human and fundamental rights, diversity and democratic values, as well as the principles of universal accessibility and design for all people, in accordance with the Sustainable Development Goals .

Learning objectives

Referring to knowledge

To recognize the study methods of marine microfossils, invertebrate macrofossils and marine ichnofossils both in the field and in the laboratory and cabinet.

To identify the main stages of the evolution of marine biotas (and global biotic crises that delimit them) from certain fossil associations.

Referring to abilities, skills

To apply marine fossils to solving problems related to the interpretation of the paleoenvironment, the evolution of biotas and biostratigraphy.

To integrate knowledge provided in a multidisciplinary environment in paleontology (geology, geochemistry, stratigraphy, biology) to solve evolutionary, paleoenvironmental and biostratigraphic problems based on marine microfossils, invertebrate macrofossils and ichnofossils.

To convey the acquired knowledge about marine fossils in a text/video/oral presentation, both for a specialized and non-specialized audience.

Teaching blocks

1. Micropaleontology and biostratigraphy.

- 1.1. Description of the main groups of marine microfossils in the geological record (calcareous algae, foraminifera, nanofossils, etc.): morphologies, microstructures, paleoecology and evolution.
- 1.2. Examples of biozonations and their usefulness for correlating marine sedimentary sequences.
- 1.3. Application of certain groups of microfossils as daters of sedimentary rocks from the Paleozoic to the present.

2. Marine paleoenvironmental models.

- 2.1. Clastic and carbonate marine sedimentation.
- 2.2. Main organisms and macrofossils in marine environments and their evolution during the Phanerozoic.
- 2.3. Biostratigraphic application of the main groups of marine invertebrates with representation in the fossil record.
- 2.4. Relationship between paleobiology and marine sedimentary environments.
- 2.5. Biogenic carbonate formation and concept of 'carbonate factory'.

3. Taphonomy, paleoecology and ichnology.

- 3.1. Main processes and stages of taphonomic alteration; exceptionally preserved outcrops; fossil accumulations; time averaging; taphofacies.
- 3.2. Paleoecological analysis; population and community analysis; relationships between organisms; reciprocity pairs.
- 3.3. Bases and tools for the study of organism-substrate interaction; bioturbation, bioerosion and biodeposition; importance of the ichnological record in paleoecological and paleoenvironmental interpretation; ichnofabric analysis; ichnofacies.

Teaching methods and general organization

The "Marine Paleobiology" module (9 ECTS) is made up of three blocks (two taught at the UB and one at the UAB):

- Micropaleontology and biostratigraphy (2.5 ECTS - UB)

- Marine paleoenvironmental models (3.5 ECTS - UAB)
- Taphonomy, paleoecology and ichnology (3 ECTS - UB)

Each of the blocks is organized into hybrid master classes (which may be both face-to-face and online) generally lasting 2 hours each. During the bulk of these classes, the theoretical concepts related to the three main blocks will be taught, however, more practical and/or applied exercises will also be proposed (as well as the preparation of reports) to try to consolidate the previously explained concepts.

Official assessment of learning outcomes

Continuous evaluation:

30% to 40% Theoretical tests/synthesis.

30% to 40% Exercises based on theoretical concepts.

20% Activities and Exercises.

10% Attendance and active participation in class.

Within the ranges indicated, the percentages could vary for each of the three blocks that constitute the module.

Examination-based assessment

100% Final exam which will include theoretical questions and possible exercises linked to theory.

Reading and study resources

Consulteu la disponibilitat a [CERCABIB](#)

Book

Allison, P.A. & Briggs, D.E.G. (Eds.) 1991. *Taphonomy. Releasing the data locked in the fossil record*. Topics in Geobiology 9, Plenum Press, 560 pp.

Armstrong, H.A. & Braiser, M.D. 2005. *Microfossils* (2nd Edition). Wiley-Blackwell Publishing, 296 pp.

Behrensmeyer, A.K. 2021. *Taphonomy*. In: Alderton, D. & Elias, S.A. (Eds.) *Encyclopedia of Geology* (2nd Edition), Vol. 3 / History of life, Academic Press, Elsevier, pp. 12-22.

- Brett, C.E. & Speyer, S.E. 2005. *Comparative taphonomy: Pattern and processes in fossil preservation*. Oxford University Press, 208 pp.
- Bottjer, D.J. 2016. *Paleoecology. Past, Present and Future*. John Wiley & Sons Ltd., UK, 222 pp.
- Briggs, D.E.G. & Crowther, P.R. (Eds.) 1990. *Palaeobiology. A synthesis*. Blackwell Science, 583 pp.
- Briggs, D.E.G. & Crowther, P.R. (Eds.) 2001. *Palaeobiology II*. Blackwell Publishing, 583 pp.
- Buatois, L.A. & Mángano, M.G. 2011. *Ichnology. Organism-substrate interactions in space and time*. Cambridge University Press, New York, 358 pp.
- Buatois, L.A., Mángano, M.G. & Aceñolaza, F. 2002. *Trazas fósiles. Señales de comprotamiento en el registro estratigráfico*. MEF, Museo Paleontológico Egidio Feruglio, Argentina, 382 pp.
- Knaust, D. & Bromley, R.G. (Eds.) 2012. *Trace fossils as indicators of sedimentary environments*. Elsevier, *Developments in Sedimentology* 64, 924 pp.
- Mángano, M.G. & Buatois, L.A. (Eds.) 2016. *The trace-fossil record of major evolutionary events. Vol. 1: Precambrian and Paleozoic & Vol. 2: Mesozoic and Cenozoic*. *Topics in Geobiology* 39 & 40, Springer, 358 pp & 485 pp.
- Molina, E. 2017. *Micropaleontología* (3ª Edición). Prensas de la Universidad de Zaragoza, 686 pp.
- Seilacher, A. 2007. *Trace fossil analysis*. Springer, 226 pp.
- Selden, P.A. & Nudds, J.R. 2012. *Evolution of Fossil Ecosystems* (2nd Edition). Elsevier, 288 pp.