

**COURSE DATA****Data Subject**

Code	44296
Name	Biostratigraphy
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2200 - M. U. en Paleontología Aplicada	Faculty of Biological Sciences	1	First term

Subject-matter

Degree	Subject-matter	Character
2200 - M. U. en Paleontología Aplicada	1 - Fundamentals of palaeontology	Obligatory

Coordination

Name	Department
ABELLA PEREZ, JUAN	356 - Botany and Geology

SUMMARY

The course Biostratigraphy shows the basic principles of the biostratigraphic method focused on the geochronological interpretation of the fossil record. This approach will emphasize the relevance of geological, taxonomic, sampling, taxonomic and biostratigraphic aspects. Within the latter, it is especially relevant to distinguish between biostratigraphic and biological events, to know the different biostratigraphic units, to understand the concept of biozone and the methods to define biozones. The presentation of the graphical correlation method that allows the integration of data to refine correlations is also emphasized. Finally, the construction of the International Stratigraphic Chart will be analyzed, which is the world reference system we have in Geology to relate all events and events in the history of the Earth. The fieldwork will be integrated and coordinated with other subjects of the Master, such as Micropaleontology, Paleobiodiversity and Fieldwork in Paleontology



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

There are no enrollment restrictions with other subjects of the curriculum. However, it is advisable to have a minimum knowledge of Zoology, Botany and Ecology, as well as general Geology and Paleontology.

OUTCOMES

2200 - M. U. en Paleontología Aplicada

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Be able to access to information tools in other areas of knowledge and use them properly.
- Be able to apply the research experience acquired to professional practice both in private companies and in public organisations.
- Be able to apply the research experience acquired to begin the research phase of a doctoral programme in the field of biodiversity.
- Ser capaces de trabajar en equipo con eficiencia en su labor profesional o investigadora, adquiriendo la capacidad de participar en proyectos de investigación y colaboraciones científicas o tecnológicas
- Ser capaces de acceder a la información necesaria en el ámbito específico de la materia (bases de datos, artículos científicos, etc.) y tener suficiente criterio para su interpretación y empleo.
- Aplicar el razonamiento crítico y la argumentación desde criterios racionales.
- Aplicar la Ciencia desde la óptica social y económica, potenciando la transferencia del conocimiento a la Sociedad.
- Capacidad para preparar, redactar y exponer en público informes y proyectos de forma clara y coherente, defenderlos con rigor y tolerancia y responder satisfactoriamente a las críticas que pudieren derivarse de su exposición.



- Proyectar la inquietud intelectual y fomentar la responsabilidad del propio aprendizaje.
- Conocer y entender la paleodiversidad de los seres vivos, sus relaciones ecosistémicas y la distribución paleogeográfica alcanzada por los principales grupos de seres vivos a lo largo de la historia de la Tierra.
- Conocer, entender y extraer conclusiones, aplicables al momento actual, sobre las crisis de diversidad biológica, sus causas y consecuencias en el marco del actualismo.
- Comprender en profundidad la naturaleza histórica del proceso evolutivo, tanto en sus aspectos de irrepetibilidad y contingencia, como en aquellos vinculados al cumplimiento de leyes de la naturaleza de toda índole y, por tanto, de necesidad.
- Conocer y comprender los eventos biológicos del pasado, así como las zonaciones, en el tiempo y en el espacio, de las biotas en orden a establecer la posición estratigráfica relativa de las rocas sedimentarias de zonas geográficas diversas.
- Conocer y manejar con fluidez, las divisiones de la escala de tiempo geológico, y las escalas bioestratigráficas construidas a partir de diferentes grupos de biotas del registro fósil.
- Conocer la naturaleza del registro estratigráfico, sus discontinuidades, los ciclos y eventos, los diferentes tipos de cuencas sedimentarias, los factores que controlan su relleno, las geometrías tridimensionales resultantes y las correlaciones estratigráficas.
- Conocer y entender en profundidad la Geología regional de España y de zonas periféricas, y en particular de la Comunitat Valenciana, conociendo en detalle los principales hitos paleontológicos representados en los yacimientos de la Península Ibérica y el norte de África.
- Elaborar de una forma clara y concisa, todo tipo de memorias relacionadas con la temática paleontológica a nivel oficial o profesional (informes, subvenciones, memorias de impactos patrimonial, proyectos de investigación, etc.)

LEARNING OUTCOMES

Methodical observation of the paleontological record in the outcrops.

Elaboration of a field notebook reflecting observations in the field.

Elaboration of a practice notebook reflecting the student's observations on the different biostratigraphic aspects.

Elaboration of paleontological reports based on field work and specialized bibliographic consultation.

Precise positioning of the samples in the stratigraphic series based on the observations made in the field.

Establishment of the chronological order of appearance and extinction of the main fossil groups treated in the practices.

Correct interpretation of this succession and elaboration of the different biostratigraphic units (biostratigraphic units) correctly applying the biostratigraphic method and selection of the best biostratigraphic unit with the present data.



Presentation of the data elaborated from field work and bibliographic search to classmates and teachers in public sessions.

Know (and practice) the methodology for the realization of accurate correlations between distant outcrops

DESCRIPTION OF CONTENTS

1. Introduction and basic concepts

Definition and objectives

Historical overview

Fundamentals of biostratigraphy

Utility of fossils in geology

2. Techniques and methods of biostratigraphic correlation

Interpretation of temporal relationships in the fossil record.

Types of biozones

Semiquantitative methods of correlation

3. Basics of chronostratigraphy

Biostratigraphic units and chronostratigraphic units.

The chronostratigraphic scale

Global stratotype boundaries (GSSPs).

4. Scientific and professional applications of biostratigraphy

The biostratigraphic subdivision of the Devonian.

Importance in Petroleum and Natural Gas Geology.

5. Practical development of a biostratigraphic scale

Interpretation of the temporal relationships of the fossil record in a Paleozoic and a Meso-Cenozoic locality.

Local and global correlations.



WORKLOAD

ACTIVITY	Hours	% To be attended
Laboratory practices	18,00	100
Theory classes	10,00	100
Seminars	2,00	100
TOTAL	30,00	

TEACHING METHODOLOGY

Lectures/lectures

Practical laboratory sessions

Practical field sessions

Resolution of practical cases

Preparation and presentation of works

EVALUATION

Class reports and memories.

Practical work (delivery of laboratory and field notebook).

Field questionnaire.

Evaluation of the resolution of practical cases.

To pass the course you must obtain a minimum grade of 5 (in a 0-10 scale) in each of the parts that are evaluated.

REFERENCES

Basic

- Murphy, M.A. & Salvador, A. 1999. International Stratigraphic Guide An Abridged version. Episodes 22 (4), 255-271
- North American Commission on Stratigraphic Nomenclature, 2005. North American Stratigraphic Code. AAPG Bulletin 89 (11), 1547-1591



- Shaw, A.B. 1964. Time in Stratigraphy. McGraw-Hill, New York, 365 pp.

Additional

- Johnson, J.G. 1979. Intent and reality in biostratigraphic zonation. *Journal of Paleontology* 53 (4), 931-942.
- McGowran, B. 1986. Beyond Classical Biostratigraphy. *Petroleum Exploration Society of Australia* 9, 28-41
- Miller, F.X. 1977. The Graphic Correlation Method in Biostratigraphy. In Kauffman, E.G. and Hazel, J.E. (eds.) *Concepts and Methods of Biostratigraphy*, 165-168.
- Murphy, M.A. 1977. On time-stratigraphic units. *Journal of Paleontology* 51 (2), 213-219.
- Shaw, A.B. 1969. Adam and Eve, paleontology and the non-objective arts. *Journal of Paleontology* 43 (5), 1085-1098.
- Valenzuela-Ríos, J.I. 1994. The Lower Devonian conodont *Pedavis pesavis* and the *pesavis* Zone. *Lethaia* 27 (3), 199-207.
- Valenzuela-Ríos, J.I., Slavík, L.; Liao, J-C; Calvo, H.; Hsková, A. & Chadimová, L. 2015. The middle and upper Lochkovian (Lower Devonian) conodont successions in key peri-Gondwana localities (Spanish Central Pyrenees and Prague Synform) and their relevance for global correlations. *Terra Nova* 27, 409-415.