

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

Code	44294
Name	Taphonomy and ichnology
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2200 - Master's Degree in Applied Palaeontology	Faculty of Biological Sciences	1	First term

Subject-matter

Degree	Subject-matter	Character
2200 - Master's Degree in Applied Palaeontology	1 - Fundamentals of palaeontology	Obligatory

Coordination

Name	Department
BOTELLA SEVILLA, HÉCTOR	356 - Botany and Geology

SUMMARY

Summary description of the course

The course is made up of two parts:

Taphonomy. Concepts and main tools. Recognition, description and interpretation of the main taphonomic characters will be introduced, as well as the concepts of skeletal concentration and taphofacies. The theory will be integrated with real examples of skeletal concentration and taphofacies that are significant from a paleoenvironmental standpoint.



Ichnology. Concepts and main tools. In this part of the course, problems related with the classification of trace fossils and of their use as paleoenvironmental proxies will be introduced. The first step will be the introduction of the key features used in trace fossils classification, the description of the most common trace fossils, followed by the introduction of the ichnofacies concept and of its limitation and the study of the paleoenvironmental significance of the most important ichnofacies. The last part of the course will focus on the applications of ichnology to reservoir characterization.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

It would be better for students to have basic knowledge about stratigraphy, sedimentology and general paleontology.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

2200 - Master's Degree in Applied Palaeontology

- 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.
- To be able to assess the need to complete the scientific, historical, language, informatics, literature, ethics, social and human background in general, attending conferences, courses or doing complementary activities, self-assessing the contribution of these activities towards a comprehensive development.
- Be able to communicate and disseminate scientific ideas.



- 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 realizar una toma rápida y eficaz de decisiones en situaciones complejas de su labor profesional o investigadora, mediante el desarrollo de nuevas e innovadoras metodologías de trabajo adaptadas al ámbito científico/investigador, tecnológico o profesional en el que se desarrolle su actividad.
- Conocer y comprender en profundidad la naturaleza de la biodiversidad y sus relaciones ecosistémicas tanto en la actualidad como en el pasado.
- Conocer la naturaleza del registro fósil en relación con el proceso sedimentario, las fases bioestratigráficas y fosildiagnósticas del proceso y los mecanismos de fosilización.
- 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.
- Conoce 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 los principios fundamentales del análisis de fácies en sistemas deposicionales continentales, transicionales y marinos, y el uso de los fósiles para la interpretación paleoambiental del registro estratigráfico.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

After the course, the students should be able to manage the basic literature concerning the main topics explained in class. They should also be able to use taphonomical and ichnological tools in order to characterize and interpret marine deposits. We consider of great importance that students reach the ability to integrate the knowledge acquired in other courses in order to solve the problems proposed in class or in the field.

DESCRIPTION OF CONTENTS

1. Tafonomia: Conceptes generals, concentracions esquelètics i tafofacies

Introduction to taphonomy of marine invertebrates. Taphonomy: definition and processes.

Taphonomic characters. Description and identification of the main taphonomic characters and their organization in genetic categories.

Skeletal concentrations: definition, identification and interpretation.

Taphofacies: definition and examples.

**2. Ichnology**

Ichnology: basic concepts.

Trace fossils classification: parataxonomy and basic criteria. Most common trace fossils.

The ichnofacies concept: limits and strength. Most common ichnofacies and their paleoenvironmental significance.

Ichnoassemblages and their use in the field.

WORKLOAD

ACTIVITY	Hours	% To be attended
Classroom practices	15,00	100
Theory classes	9,00	100
Laboratory practices	6,00	100
TOTAL	30,00	

TEACHING METHODOLOGY

The different methodologies used during the course will be focused to improve the active participation and learning process of the students.

Theory

- Lectures through slides
- Discussion about real cases proposed by the teacher
- Exams

Practice

- Analysis of samples and data gathering
- Group work: analysis of the taphonomic characters explained in theory
- Group work: analysis of ichnofacies
- Oral presentation of the results of the group work

Fieldwork



- Fieldtrips focused on the study of significant ichnoassemblages and taphofacies
- Analysis of sedimentary facies, ichnofacies and taphofacies in the field
- Discussion about the most significant paleoenvironmental conclusions.

EVALUATION

The assessment of the subject will be based on:

Field test 25%

Written exam theory and practice 55%

Continuous evaluation (exercises in class) 20%

IMPORTANT.

1. All the exercises, texts, exams will be evaluated over 10 points. The student will pass each exam when the mark is more than or equal to 5. The exam can be compensated when the mark is more than or equal to 4.
2. The final mark will be calculated only if the mark in each exam (theory, practice, fieldwork) is more than or equal to 4.
3. The student will pass the course if the final mark is more than or equal to 5.
4. If in one or more exams the student obtains a mark lower than 4, he can repeat the exam (or the exams) in order to achieve a higher mark.
5. If the student obtains a final mark lower than five, he must repeat at least the exam with the lowest mark.

In the second session of the exams the same rules will be applied.

REFERENCES

Basic

- BROMLEY, R.G., 1996. TRACE FOSSILS: BIOLOGY, TAPHONOMY AND APPLICATIONS. CHAPMAN AND HALL, LONDON.



- BRANDT, D., 1989, TAPHONOMIC GRADES AS A CLASSIFICATION FOR FOSSILIFEROUS ASSEMBLAGES AND IMPLICATIONS FOR PALEOECOLOGY: PALAIOS, V. 4, P. 303309.
- BRETT, C. AND BAIRD, G., 1986, COMPARATIVE TAPHONOMY: A KEY TO PALEOENVIRONMENTAL INTERPRETATION BASED ON FOSSIL PRESERVATION: PALAIOS, V. 1, P. 207227.
- FÜRSICH, F.T. AND OSCHMANN, W., 1993, SHELL BEDS AS TOOLS IN BASIN ANALYSIS: THE JURASSIC OF KACHCHH, WESTERN INDIA: JOURNAL OF THE GEOLOGICAL SOCIETY, V. 150 (1), P. 169185
- KIDWELL, S.M., 1991A, THE STRATIGRAPHY OF SHELL CONCENTRATIONS, IN: ALLISON P.A. & BRIGGS D.E.G., EDS., TAPHONOMY, RELEASING THE DATA LOCKED IN THE FOSSIL RECORD, NEW YORK: PLENUM PRESS, P. 211290.
- KIDWELL, S.M., 1991B, TAPHONOMIC FEEDBACK (LIVE/DEAD INTERACTIONS) IN THE GENESIS OF BIOCLASTIC BEDS: KEYS TO RECONSTRUCTING SEDIMENTARY DYNAMICS, IN: EINSELE, G., RICKEN, W. AND SEILACHER, A., EDS., CYCLES AND EVENTS IN STRATIGRAPHY, BERLIN: SPRINGER VERLAG, P. 268282.
- KIDWELL, S.M., FÜRSICH, F.T. AND AIGNER, T., 1986, CONCEPTUAL FRAMEWORK FOR THE ANALYSIS AND CLASSIFICATION OF FOSSIL CONCENTRATIONS: PALAIOS, V. 1, P. 228238.
- KIDWELL, S.M. AND HOLLAND, S.M., 1991, FIELD DESCRIPTION OF COARSE BIOCLASTIC FABRICS: PALAIOS, V. 6 (4), P. 426434.
- SPEYER, S.E. AND BRETT, C., 1986, TRILOBITE TAPHONOMY AND MIDDLE DEVONIAN TAPHOFACIES: PALAIOS, V. 1, P. 312327.
- FERNÁNDEZ-LÓPEZ, S. TEMAS DE TAFONOMIA.

Additional

- EL PROFESOR COORDINADOR DE LA ASIGNATURA PROPORCIONARÁ LAS REFERENCIAS COMPLEMENTARIAS NECESARIAS AL PRINCIPIO DEL CURSO.