VNIVERSITAT DE VALÈNCIA

Course Guide
46737 Taphonomy and ichnology

COURSE DATA

DATA SUBJECT

Code: 46737
Name: Taphonomy and ichnology
Cycle: Master's Degree
ECTS Credits: 3
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2266 - Master's Degree in Applied Palaeontology	Facultat de Ciències Biològiques	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2266 - Master's Degree in Applied Palaeontology	Fundamentals of palaeontology	COMPULSORY

COORDINATION

MARTINEZ PEREZ CARLOS

SUMMARY

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 / LEARNING OUTCOMES

2266 - Master's Degree in Applied Palaeontology

Access information tools from other areas of knowledge and use them appropriately.

Access the necessary information in the specific field of the subject (databases, scientific articles, etc.) and have sufficient judgement to interpret and use it.

Apply critical reasoning and argumentation based on rational criteria.

Apply science from a social and economic point of view, promoting the transfer of knowledge to society.

Apply the knowledge acquired and problem-solving abilities in new or unfamiliar situations within broader (or multidisciplinary) contexts related to the field of study.

Apply the research experience acquired to initiate the research phase of a PhD programme on biodiversity-related topics.

Apply the research experience acquired to tasks specific to the profession, both in the private sector and in public institutions.

Assume an ethical commitment and sensitivity towards environmental problems and natural and cultural heritage.

Be familiar with, develop and manage georeferenced databases of elements from the geological and palaeontological record, as well as the software used for the spatial representation and analysis of these elements.

Communicate and popularise scientific ideas.

Communicate conclusions and the knowledge and rationale supporting them to specialised and non-specialised audiences clearly and unambiguously.

Conduct studies, applying the methods and techniques needed to preserve and manage palaeontological heritage.

Continue the learning process in a manner that is largely self-directed or independent.

Demonstrate in-depth understanding of the historical nature of the evolutionary process, both in its aspects of unrepeatability and contingency and in those linked to the fulfilment of laws of nature of all kinds and, therefore, of necessity.

Demonstrate intellectual curiosity and encourage responsibility for one's own learning.

Demonstrate knowledge and understanding of the legal foundations for the protection and conservation of palaeontological heritage at the level of the EU, Spain and the Spanish Autonomous Communities.

Develop experimental skills in the handling of laboratory material and equipment in palaeontology.

Integrate knowledge and confront the complexity of making judgements based on information that, although incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of knowledge and judgements.

Know, understand and draw conclusions, applicable to the present time, about the crises of biological diversity, and their causes and consequences within the framework of actualism.

Know and confidently handle the divisions of the geological time scale and the biostratigraphic scales constructed from different groups of biota in the fossil record.

Know and understand past biological events, as well as the zonations, in time and space, of biota in order to establish the relative stratigraphic position of sedimentary rocks from different geographical areas.

Know and understand the palaeodiversity of living beings, their ecosystemic relationships and the palaeogeographical distribution achieved by the main groups of living beings throughout the Earth's history.

Learn about the techniques used in museums for the management of palaeontological heritage, identifying, during guided work visits, successful examples in the field of palaeontology (Dinópolis, the Catalan Institute of Palaeontology, the Palaeontological Museum of Elche).

Make quick and effective decisions in complex situations in their professional or research work, by developing new and innovative work methodologies adapted to the scientific/research, technological or professional field in which they carry out their activity.

Plan and manage available resources, taking into account the basic principles of quality, risk prevention, safety and sustainability.

Prepare, write and present reports and projects in public in a clear and coherent manner, defend them with rigour and tolerance and respond satisfactorily to any criticism that may arise from the presentation.

Produce all types of reports related to palaeontological matters clearly and concisely at an official or professional level (reports, grants, heritage impact reports, research projects, etc.)

Understand the nature of the stratigraphic record, its discontinuities, cycles and events, the different types of sedimentary basins, the factors controlling their infilling, the resulting three-dimensional geometries and stratigraphic correlations.

Use acquired knowledge as a basis for originality in the development or application of ideas, often in a research context.

Work efficiently in a professional or research team, acquiring the ability to participate in research projects and scientific or technological collaborations.

DESCRIPTION OF CONTENTS

1. Tafonomia: Conceptes generals, concentracions esqueletals 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

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	9,00
Laboratory	6,00
Classroom practices	15,00
Total hours	**30,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	0,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	**0,00**

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

- 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.

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