

Ichnologia

2014/2015

Code: 43135
ECTS Credits: 6

Degree	Type	Year	Semester
4314104 Paleontologia	OT	0	1

Contact

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Use of languages

Principal working language: català (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

External teachers

Jordi Martinell Callicó
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Rosa Domènech Arnal
Zain Belaústegui Barahona

Prerequisites

No prerequisites are required to attend this module.

Objectives and Contextualisation

The main objective is to provide students with the knowledge and tools to understand the processes of interaction body /substrate, their fossil record, the importance of the ichnological record in palaeoecological and palaeoenvironmental interpretations, and their contribution to decipher the evolution of the biosphere.

Skills

- Analyse data using the appropriate tools in the field of palaeontology.
- Apply the theories, paradigms and concepts of biology and ecology to analyse the biological aspects of organisms and ecosystems of the past.
- Apply the theories, paradigms and concepts of geology to achieve an appropriate holistic vision of the Earth's history
- Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
- Design and conduct research in the field of palaeontology and disseminate the results.
- Develop a capacity for criticism and self-criticism in the field of palaeontology:
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Obtain and synthesise information from the scientific literature (library, databases, online journals or reliable websites) in the field of palaeontology.
- Recognise and use appropriately the fossil record to solve specific problems in the different areas of palaeontology.

- Show mastery of the various methodologies for studying the different fossil groups, gathering and integrating field and laboratory data.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.

Learning outcomes

1. Analyse data using the appropriate tools in the field of palaeontology.
2. Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
3. Describe trace fossils using the appropriate terminology.
4. Develop a capacity for criticism and self-criticism in the field of palaeontology:
5. Identify common trace fossils in the fossil record.
6. Initiate research in the field of ichnology and disseminate the results.
7. Integrate ichnological data into sedimentary and palaeoenvironmental studies.
8. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
9. Obtain and synthesise information from the scientific literature (library, databases, online journals or reliable websites) in the field of palaeontology.
10. Show mastery of the methodologies for working in ichnology.
11. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
12. Understand the contribution of ichnological data to knowledge of the evolution of the biosphere.
13. Understand the contributions of ichnology to sedimentary geology.
14. Understand the ethological information provided by vertebrate traces.
15. Understand the interaction between biogenic activity and sedimentation.
16. Understand the palaeobiological meaning of trace fossils and the relationship between organisms, their ethology and the palaeoenvironment.
17. Understand the palaeoecological meaning of bioerosion structures.
18. Understand the processes of bioerosion, bioturbation and biodeposition.
19. Understand the role of bioturbators in benthic systems.

Content

Block 1: Introduction to ichnology.

- 1.1. Basic concepts and principles on ichnology.
- 1.2. General types of trace fossils: Bioerosion, bioturbation and biodeposition. Ichnotaxonomy.
- 1.3. Classification systems of trace fossils. Ethological and toponimic classifications.

Block 2: Main producer taxa and trace fossils.

- 2.1. Invertebrates - Bioerosion: Mechanisms of bioerosion, behaviors, boring taxa.
- 2.2. Main bioerosion traces.
- 2.3. Invertebrates - Bioturbation: Mechanisms of excavation, behaviors, excavating taxa.
- 2.4. Main bioturbation traces.
- 2.5. Vertebrates - Bioerosion and bioturbation: Traces, pathways, burrows, bites, breakages, nests, coprolites.
- 2.6. Analysis of vertebrate traces.

Block 3: Trace fossil associations in time and space.

- 3.1. Trace fossil associations, ichnofacies, ichnofabrics.
- 3.2. Trace fossils and palaeoenvironments.
- 3.3. Ichnofacies and palaeoenvironments.
- 3.4. Trace fossils and evolutionary palaeoecology.

Block 4: Field ichnology.

- 4.1. Observation and description of trace fossils and associations in the field.
- 4.2. Elaboration of a field memory.

Methodology

The teaching method is based on lectures which provide the basic information, the labs so that students gain experience in the treatment of trace fossils, and the field work that allows them to see the different types of traces in a geological context. Meanwhile, students develop skills through a personal work which will present (individually or in groups) in front of classmates during a seminar. The course is complemented by proposed readings and exercises to stimulate thinking and the acquisition of analytical techniques.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Field practices	4	0.16	3, 10, 18, 15, 13, 5, 7
Laboratory practices	10	0.4	1, 3, 10, 18, 15, 13, 5, 7
Master classes	20	0.8	1, 19, 17, 12, 14, 4, 16, 18, 13, 7
Seminars	5.5	0.22	1, 19, 17, 14, 2, 3, 4, 10, 16, 15, 13, 6, 5, 7, 11
Type: Supervised			
Solve of problems / practical cases / exercises / labs / field work	25	1	1, 19, 17, 12, 14, 4, 10, 16, 18, 15, 13, 5, 7, 8, 9, 11
Tutorials	6	0.24	1, 12, 4, 10, 16, 18, 6, 8
Type: Autonomous			
Field report	14	0.56	1, 19, 2, 3, 4, 10, 18, 15, 13, 6, 5, 7, 8, 9
Personal study	25.5	1.02	19, 17, 12, 14, 4, 16, 18, 15, 13, 8, 9
Reading of recommended papers and reports	15	0.6	19, 17, 12, 14, 4, 16, 18, 15, 13, 8, 9
Works preparation	25	1	1, 19, 17, 12, 14, 2, 4, 16, 18, 15, 13, 6, 7, 8, 9, 11

Evaluation

To assess the knowledge, much importance is given to the student's own work and the tests (60% of the total qualification). The rest of the rating will correspond to the oral work defense and the active participation in the seminars

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Active participation in seminar sessions	20%	0	0	1, 19, 17, 14, 2, 3, 4, 16, 18, 15, 13, 6, 7, 8, 9
Delivery of exercises/works/reports	30%	0	0	1, 19, 17, 12, 14, 2, 3, 4, 10, 16, 18, 15, 13, 6, 5, 7, 8, 9, 11
Delivery of the field report	10%	0	0	1, 19, 17, 14, 2, 3, 4, 10, 16, 18, 15, 13, 6, 5, 7, 8, 9, 11
Oral defence of the course work	20%	0	0	1, 2, 3, 4, 10, 16, 18, 15, 6, 5, 7, 8, 9
Theoretical and practical tests	20%	0	0	1, 19, 17, 12, 14, 2, 3, 10, 16, 18, 15, 13, 5, 7, 8

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