


	PROCESO PARA EL DESARROLLO DE LAS ENSEÑANZAS DE LA FACULTAD DE CIENCIAS DE LA UEx		
	Curso académico: 2024-25	Código: P/CL009_FC_D002	

COURSE PROGRAM

Academic Year: 2024/2025

Identification and characteristics of the course			
Code	500215	ECTS Credits	6
Course name (English)	Palaeontology		
Course name (Spanish)	Paleontología		
Degree programs	Biology		
Faculty/School	Science Faculty		
Semester	7	Type of course	Compulsory
Module	Systems Biology		
Matter	Palaeontology		
Lecturer/s			
Name	Office	E-mail	Web page
Mónica Martí Mus		martimus@unex.es	
Subject Area	Palaeontology		
Department	Plant Biology, Ecology and Earth Sciences		
Coordinating Lecturer (If more than one)	Mónica Martí Mus		
Competencies			
1. CB1: Students should be able to show that they know and understand facts and contents in a field of study which, based on a previous general secondary school level, have been extended to those included in advanced textbooks and, in some aspects, come from the front line of their field of study.			
2. CB2: Students should be able to apply their knowledge professionally in their future jobs or tasks and should have the competencies to develop and defend arguments and solve problems in their field of study.			
3. CB3: Students should be able to collect and interpret relevant data (typically within their field of study) to give an educated opinion about relevant social, scientific or ethical issues.			
4. CB4: Students should be able to communicate information, ideas, problems and solutions to both a specialized and a non-specialized audience.			
5. CB5: Students should develop the learning skills required to undertake further studies with a high degree of independence.			
6. CG1: Train biologists with general and specific competencies, capable of undertaking tasks in all fields of biology, developing their activities in public or private companies and institutions or creating their own companies.			
7. CG2: provide the students with the skills to successfully pursue the postgraduate courses that will enable them specifically to work in the fields of education, research or other professions.			

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8. CG3: Provide the graduate students with the ability to independently generate, acquire and process information related with Biology.
9. CG4: Enable them to plan, carry out and critically analyse processes of knowledge in the realm of their activity.
10. CG5: The final aim is to train graduate students capable to undertake the tasks officially stipulated for professional biologists, as defined in the directive of April 5, 2006 of the Presidential office of the Regional Government of Extremadura (DOE April 20, 2006).
11. CT3: know and understand the information in advanced text books and to have access to the knowledge coming from the front line of their field of study.
12. CT4: develop the learning, organization and planning skills, necessary both to continue with further studies with a high degree of independence and to perform professionally.
13. CT5: interpret, analyse and synthesise relevant data and information that will enable the student to develop ideas, solve problems and give critical arguments about important social, scientific or ethical issues.
14. CT7: express oneself correctly orally and in writing in the native language, as well as master a foreign language, preferably English.
15. CE3: know and understand the structure, morphology, organization and development of living beings.
16. CE7: understand the origin and evolution of life, identifying the evolutionary processes and mechanisms, including systematics, phylogeny and biogeography of the modern and extinct living beings.

Contents

Course outline

Fossils; Earliest evidence of life; Fossil record; Main fossil groups; Systematics; Evolution; Phylogeny.



Course syllabus

Name of lesson 1: PALAEOLOGY AND FOSSILS.
Contents of lesson 1: Introduction to palaeontology.

Name of lesson 2: FOSSILS AND ROCKS.
Contents of lesson 2: Fossils and the rock cycle. Geological time. Chronostratigraphic table.

Name of lesson 3: FOSSIL RECORD OF PROKARYOTES.
Contents of lesson 3: Micropalaeontology and Precambrian Palaeontology. Stromatolites. Geochemistry and evidence of life.
Description of the practical activities of lesson 3: observation and drawing of fossils in the laboratory. Practical class 1.

Name of lesson 4: UNIT 4: FOSSIL RECORD OF UNICELLULAR EUKARYOTES AND MACROSCOPIC ALGAE.

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Contents of lesson 4: Fossils record of the earliest eukaryotes. Main fossil groups of unicellular eukaryotes: foraminiferans, coccolithophores, and diatoms. Fossil record of pluricellular algae: red, brown and green algae.
Description of the practical activities of lesson 4: observation and drawing of fossils in the laboratory. Practical class 1 and 2.

Name of lesson 5: FOSSILS AND PHYLOGENIES.
Contents of lesson 5: Phylogenetic systematics. Basic concepts and terminology. Stem and Crown groups.

Name of lesson 6: FOSSIL RECORD OF TERRESTRIAL PLANTS AND FUNGI.
Contents of lesson 6: Earliest terrestrial plants. Main fossil groups. Importance of the Carboniferous period. Postpalaeozoic radiation of plants. Fungi.
Description of the practical activities of lesson 6: observation and drawing of fossils in the laboratory. Practical class 2.



Name of lesson 7: FOSSIL RECORD OF "BASAL" METAZOA.
Contents of lesson 7: Poriferans and Cnidarians. Main fossil groups: archaeocyathids, "sclerosponges", palaeozoic and scleractinian corals. Problematic groups and early metazoan evolution: fossils from the Ediacaran period.
Description of the practical activities of lesson 7: observation and drawing of fossils in the laboratory. Practical classes 3 and 4.

Name of lesson 8: FOSSIL RECORD OF LOPHOTROCHOZOANS (OR SPIRALIANS).
Contents of lesson 8: Main fossil groups: molluscs, brachiopods and bryozoans. Problematic groups and lophotrochozoan early evolution.
Description of the practical activities of lesson 8: observation and drawing of fossils in the laboratory. Practical classes 5 and 6.

Name of lesson 9: FOSSIL RECORD OF ECDISOZOANS.
Contents of lesson 9: Main fossil groups: trilobites. Problematic groups and ecdisozoan early evolution.
Description of the practical activities of lesson 9: observation and drawing of fossils in the laboratory. Practical class 7.

Name of lesson 10: FOSSIL RECORD OF "INVERTEBRATE" DEUTEROSTOMES.
Contents of lesson 10: Main fossil groups: echinoderms and graptolites fossil record of "invertebrate" chordates. Problematic fossil groups and deuterostome early evolution.
Description of the practical activities of lesson 10: observation and drawing of fossils in the laboratory. Practical class 8.

Name of lesson 11: FOSSIL RECORD OF "BASAL" VERTEBRATES.
Contents of lesson 11: Main fossil groups: ostracoderms and placoderms. Problematic fossil groups and vertebrate early evolution.
Description of the practical activities of lesson 11: observation and drawing of fossils in the laboratory. Practical class 8.



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Name of lesson 12: TERRESTRIAL VERTEBRATES.
 Contents of lesson 12: The tetrapod lineage. The mammal lineage. The bird lineage. The human lineage.
 Description of the practical activities of lesson 11: observation and drawing of fossils in the laboratory. Practical class 8.

- PRACTICAL CLASSES
- PRACTICAL CLASS 1: stromatolites / protists (foraminifera, diatoms, coccolithophorids)/ Megascopic Carbonaceous Compressions
- PRACTICAL CLASS 2: plants / acritarchs
- PRACTICAL CLASS 3: poriferans / Ediacaran fossils / first trace fossils
- PRACTICAL CLASS 4: corals / *Cloudina*
- PRACTICAL CLASS 5: cephalopods / other molluscs
- PRACTICAL CLASS 6: bivalves / brachiopods / bryozoans
- PRACTICAL CLASS 7: trilobites and their trace fossils / other arthropods
- PRACTICAL CLASS 8: deuterostomes (graptolites / echinoderms / vertebrates)

Educational activities

Student workload in hours by lesson		Lectures	Practical activities				Monitoring activity	Homework
Lesson	Total	L	HI	LAB	COM	SEM	SGT	PS
1	2	1						1
2	2	1						1
3	17	5		1				11
4	8.5	2		1.5				5
5	9	3						6
6	10	2		2				6
7	25	6		4				15
8	2.5	6		4.5				15
9	14	3		3				8
10	14	4		1				9
11	7.5	2		0.5				5
12	12.5	4		0.5				8
Assessment	3	3						
TOTAL	150	42		18				90

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L: Lectures (85 students)
 HI: Hospital internships (7 students)
 LAB: Laboratory or field practices (15 students)
 COM: Computer room or language laboratory practices (20 students)
 SEM: Problem classes or seminars or case studies (40 students)
 SGT: Scheduled group tutorials (educational monitoring, ECTS type tutorials)
 PS: Personal study, individual or group work and reading of bibliography

Teaching Methodologies

1. Explanation and discussion of contents.
2. Practical classes, such as labs, computer classes and field work.
3. Student personal work.

Learning outcomes

- Know and understand the structure, morphology, organisation and development of living beings.
- Understand the origin and evolution of life, identifying evolutionary processes and mechanisms and including the systematics, phylogeny and biogeography of modern and extinct living beings.

Assessment systems



In accordance with the grading regulations in the University of Extremadura (DOE 3 November 2020), the following assessment options are included:

(1) Continuous assessment option: assessment system consisting of various activities distributed throughout the teaching semester. This option may also include a final exam on the official examination date.

(2) Global assessment option: assessment system consisting exclusively of a final exam including all the course contents and taking place on the official examination date.

Waiver of continuous assessment option:

The choice of the global assessment option corresponds to the students. The "default" option is the continuous assessment option, so students who wish to opt for the global assessment option must apply for it through a specific space created for this purpose on the virtual campus. The deadline for choosing the global option for the courses taught in the second semester will

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be the first quarter of the teaching period or until the last day of the extended enrolment period if it ends after that period.

Continuous assessment:

Attendance to theory classes and participation in class activities will constitute up to 0.5 point of the final grade.

Attendance to practical classes and submission of a sketchbook (including original drawings made during the observation of the fossils) will constitute up to 1 point of the final grade.

Students will have the possibility of taking two mid-term exams, each evaluating half of the course contents. The date of the first mid-term exam will be decided when composing the timetable for the semester. The date of the second midterm exam will coincide with that of the final exam (date set by the University). The mid-term exams will cover both theoretical and practical contents.

At the end of the course there will be a final (official) exam where all the contents of the course (theoretical and practical) will be assessed. The exam could be exclusively multiple-choice questions, questions requiring a written answer, or mixed (including both types of questions). In the case of questions requiring a written answer, the contents, the ability to summarise, and the quality of the writing will all be considered when grading.

In the continuous assessment modality, the maximum mark for the exam will be 8.5 points (the remaining 1.5 points will be obtained, as indicated above, by class and practical attendance, participation in class activities and the completion of a sketchbook).

The marks obtained for class and practical attendance, participation in class activities, and submission of a sketchbook, will be maintained during the current academic year. The marks obtained in these activities may also be maintained during the following two academic years.

The mark of the mid-term passed exams will be maintained exclusively during the official exams of the current academic year.



Students who do not wish to have a continuous assessment (global assessment):

Students who so wish, can take a final exam as the only evaluation for the course. The maximum grade that can be obtained by taking this single exam will be 10. As mentioned above, the "default" assessment option is the continuous option, so students who wish to opt for the global assessment option must apply for it through a specific space created for this purpose on the virtual campus.

Final grade of the course

The current grading system of the University of Extremadura will be applied. The maximum grade for the course will be 10 and it will be necessary to obtain a grade equal to or higher than 5 in order to pass.

In the case of the continuous assessment option, the grade of the exam and the activities will be weighted according to the criteria expressed above.

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Bibliography (basic and complementary)

Basic bibliography

Benton, M.J. & Harper, D.A.T. 2020. Introduction to Paleobiology and the Fossil Record (2nd edition). Wiley-Blackwell, Chichester, 656 pp.

Additional bibliography

Clarkson, E.N.K. 1998. Invertebrate Palaeontology and Evolution (4th edition). Blackwell Science, Oxford, 452 pp.

Giribet, G. & Edgecombe, G.D. 2020. The Invertebrate Tree of Life. Princeton University Press, Princeton, 608 pp.

Lipps, J. 1993. Fossil Prokaryotes and Protists. Blackwell Scientific Publications, Boston, 342 pp.

Benton, M.J. 2014. Vertebrate Palaeontology (4th edition). Wiley Blackwell, Oxford, 480 pp.

Taylor, T.N., Taylor, E.L. & Krings, M. 2009. Paleobotany. The biology and evolution of fossil plants. (2nd edition). Academic Press, Amsterdam, 1252 pp.

Electronic resources

<https://stratigraphy.org/>

Official page of The International Commission on Stratigraphy from which you can access the latest versions of the chronostratigraphic table in different languages and formats.

<https://ucmp.berkeley.edu/allife/threedomains>

This page offers a journey through the phylogenetic tree exploring the systematics and fossil record of the different groups of living beings.

<https://burgess-shale.rom.on.ca/main-gallery/>

Gallery of exceptionally preserved fossils from the Cambrian Burgess Shale locality.

<https://www.sci.news/news/paleontology>

One of several similar pages with palaeontology news.

<https://www.youtube.com/c/eons>.

Collection of educational videos on paleontological topics produced by the US public television network PBS (Public Broadcasting Service).

Other resources and complementary educational materials

Additional teaching material (texts, images and Power Point presentations) will be provided through the Virtual Campus to facilitate lectures and practical classes.