

Degree programme	Type	Course
Environmental Biology	FB	2

Contact lecturer

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Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

There are no specific official prerequisites to take this subject.

Objectives

The general aim of this course is to provide students with an integrated view of the diversity of arthropods and chordates from a morphological, functional, and evolutionary perspective, promoting the understanding of the processes of adaptation and diversification of the main animal lineages.

The specific learning objectives are as follows:

- To understand the main anatomical organization patterns of arthropods and chordates.
- To understand the diagnostic and distinctive traits of the main arthropod and chordate lineages.
- To understand the morphological and functional modifications of different organ systems in relation to the ecological adaptations of the main groups.
- To understand the functional and adaptive basis of morphological diversity in arthropods and chordates.
- To acquire a general understanding of the phylogenetic relationships among the main arthropod and chordate lineages.
- To integrate the current diversity of these groups within an evolutionary and animal diversification framework.

Learning outcomes

- CM15 (Integrate the potential of animal diversity in ecosystems, relating it to environmental factors and

assessing the environmental impact of human activity.) Integrate the potential of animal diversity in ecosystems, relating it to environmental factors and assessing the environmental impact of human activity.

- CM16 (Communicate knowledge in the field of zoology objectively and clearly, both orally and in writing, to both a specialist and non-specialist audience.) Communicate knowledge in the field of zoology objectively and clearly, both orally and in writing, to both a specialist and non-specialist audience.
- KM20 (Describe the development, growth and biological cycles of animals, as well as their diversity, evolution and relationships according to the ecosystem in which they are found.) Describe the development, growth and biological cycles of animals, as well as their diversity, evolution and relationships according to the ecosystem in which they are found.
- KM21 (Identify animal species by applying current techniques for classifying living organisms.) Identify animal species by applying current techniques for classifying living organisms.
- SM19 (Apply dissection methods to the observation and analysis of the internal anatomy of representative specimens of the main groups of animals.) Apply dissection methods to the observation and analysis of the internal anatomy of representative specimens of the main groups of animals.
- SM20 (Apply sampling techniques to obtain animal specimens and materials for subsequent laboratory analysis.) Apply sampling techniques to obtain animal specimens and materials for subsequent laboratory analysis.
- SM21 (Prepare reports and conduct sample and data analysis in the field of zoology, presenting them in both written and oral form.) Prepare reports and conduct sample and data analysis in the field of zoology, presenting them in both written and oral form.
- SM22 (Analyse the origin, evolution and diversity of animals and their behaviour.) Analyse the origin, evolution and diversity of animals and their behaviour.

Contents

THEORETICAL PROGRAMME

ARTHROPODS

Topic 1.- What is an arthropod? Taxonomy and systematics of the group.

Topic 2.- Arthropodization, tagmosis patterns, metamerism, and ecdysis.

Topic 3.- General characteristics of arthropods: reproduction and development, osmoregulation and gas exchange, internal organization (nervous system).

Topic 4.- Chelicerata: diversity, systematics, ecology, and evolution.

Topic 5.- Myriapods: diversity, systematics, ecology, and evolution.

Topic 6.- "Crustaceans": diversity, systematics, ecology, and evolution.

Topic 7.- Hexapoda: diversity, systematics, ecology, and evolution.

Topic 8.- Detailed study of the diversity, ecology, and evolution of the four megadiverse insect orders: Coleoptera, Hymenoptera, Diptera, and Lepidoptera.

CHORDATES

Topic 9.- Chordates. Position of Chordates within the animal kingdom, abundance, and diversity. Fundamental characters and general organization.

Topic 10.- The concept of "protochordates". Cephalochordates. Diagnostic characters. General organization and development.

Topic 11.- Olfactores. Urochordates. Diagnostic characters. General organization of an ascidian. Diversity of Urochordates. Representative life cycles.

Topic 12.- Vertebrates. Definition. Interpretation of their structure within an evolutionary framework. General diversity. General considerations on their classification.

Topic 13.- "Agnathans": jawless vertebrates. Myxiniiformes. Petromyzontiformes. Gnathostomes: the conquest of the aquatic environment. Acquisition of jaws and paired fins. Adaptations to aquatic life. Chondrichthyans: diagnostic characters and diversity. The evolutionary success of Osteichthyans. Actinopterygians: diagnostic characters and diversity.

Topic 14.- The conquest of the terrestrial environment. Sarcopterygians: diagnostic characters and diversity. Tetrapods: origin, diagnostic characters, and adaptations to terrestrial life. Amphibians: diagnostic characters and diversity. Lissamphibians: caecilians, urodeles, and anurans.

Topic 15.- The expansion of terrestrial vertebrates. Evolutionary criteria for diagnosing the major groups of Amniotes. The first Amniotes. The concept of "Reptile". Diagnostic characters and diversity of Diapsids. Lepidosaurs: sphenodontians and squamates. Diapsids without temporal fenestrae: turtles.

Topic 16.- Archosaurs: diagnostic characters and diversity. Crocodiles. Dinosaurs. Birds: origin and fundamental characters. Feathers. Archaeopteryx and Cretaceous birds. Diversity of modern birds.

Topic 17.- Synapsids. Origin and diagnostic characters of Mammals. Monotremes: egg-laying mammals. Therians: diagnostic characters. Marsupials: diagnostic characters and diversity. Eutherians: diagnostic characters. Adaptive radiation of Eutherians.

PRACTICAL PROGRAMME

FIELD PRACTICAL

Practical 1.- Advanced arthropod sampling techniques.

LABORATORY PRACTICALS

Practical 1.- Learning the use of dichotomous identification keys. Morphology of Chelicerata and Myriapoda.

Practical 2.- Morphology of Pancrustacea: "Crustacea". Mantis shrimp dissection.

Practical 3.- Morphology of Pancrustacea: Hexapoda. Dissection of a cricket or cockroach.

Practical 4.- Observation and interpretation of the anatomy of Cephalochordates and Urochordates. General vertebrate characters: dissection of a river trout. External anatomy and identification of Chondrichthyans and Osteichthyans.

Practical 5.- External anatomy and identification of the main groups of Amphibians and Squamates.

Practical 6.- Anatomy of Birds and Mammals.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Field practices	5	0.2	CM15, CM16, KM20, KM21, SM20, SM21

Analysis and study of bibliographic materials	60	2.4	CM15, KM20, KM21, SM22
Classroom practices	6	0.24	CM15, CM16, KM21, SM21, SM22
Tutorships	6	0.24	CM15, CM16, KM20, SM21, SM22
Problem solving and preparation of works	25	1	CM15, KM20, KM21, SM21, SM22
Lectures	27	1.08	CM15, CM16, KM20, KM21, SM22
Laboratory practices	12	0.48	KM21, SM19, SM22

The teaching methodology of this course is designed to promote active and autonomous learning. Students will work using the information provided by the teaching staff, together with the recommended learning resources and materials. The role of the teaching staff is to facilitate knowledge acquisition, guide the learning process, and encourage the development of analytical, integrative, and critical-thinking skills. To achieve these objectives, the course is organized into the following activities:

Lectures:

Lectures provide the fundamental scientific and technical knowledge of the course. These contents must be complemented by students' independent work through personal study and consultation of the recommended bibliography and learning materials.

Classroom practical sessions:

Classroom practical sessions are intended to deepen and consolidate the contents covered in lectures through activities such as the analysis and discussion of audiovisual materials, problem-solving exercises, and the analysis of zoological information. These activities aim to foster analytical and synthetic skills, critical thinking, and problem-solving abilities.

Laboratory and field practical sessions:

During practical sessions, students will work with zoological material both in the laboratory and in the field. Activities will include observation of specimens and preparations, anatomical and morphological study of different zoological groups, dissections, specimen identification, and the application of terrestrial sampling techniques. These practical sessions are intended to reinforce and complement the knowledge acquired during lectures and seminars, while also developing observational, analytical, and zoological identification skills. At the same time, environmental awareness and sensitivity toward biodiversity conservation will be promoted.

Tutorials:

Students will have access to tutorial sessions to resolve questions, clarify concepts, and receive guidance on recommended materials and information sources. Tutorial schedules will be arranged with the teaching staff through the virtual campus.

Note:

Fifteen minutes of a teaching session, within the timetable established by the faculty or degree programme, will be reserved for students to complete the institutional teaching and course evaluation surveys.

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Partial exam I (final I)	30%	2	0.08	CM15, CM16, KM20, SM22
Partial exam II (final II)	30%	2	0.08	CM15, CM16, KM20, SM22
Practices (laboratory and field)	20%	2	0.08	CM15, CM16, KM20, KM21, SM19, SM20, SM21, SM22
Classroom practices	20%	3	0.12	CM15, CM16, KM20, SM21, SM22

This course follows a continuous assessment system throughout the semester, including several assessment activities of different types. No single activity accounts for more than 50% of the final grade.

Theory

Midterm examinations:

These examinations assess students' acquired knowledge, as well as their analytical, synthetic, and critical-thinking skills. Each examination will include multiple-choice questions and open-ended questions, including conceptual questions and diagram-based exercises. Two midterm examinations covering separate course contents will be held: one corresponding to the Arthropods block and the other to the Chordates block. Each examination will account for 30% of the final grade.

Final reassessment examination:

Students who obtain a grade lower than 4 out of 10 in either midterm examination may retake the corresponding part in the final reassessment examination. Students wishing to improve the grade obtained in one or both parts may also sit the final examination. In this case, taking the final examination will imply renouncing the previously obtained grade for that part. Each theoretical block will retain a weighting of 30% of the final grade. To average the theory grade with the remaining assessment activities, the average theory grade must be at least 4 out of 10.

Classroom practical sessions

Both submitted assignments and the individual and group activities carried out during the sessions will be assessed. This activity is not reassessable.

The classroom practical sessions will account for 20% of the final grade.

Laboratory and field practical sessions

Attendance at practical sessions is mandatory. At the end of each practical session, students must complete an individual test or assessment activity related to the contents and competences covered. The practical sessions corresponding to the Arthropods and Chordates blocks will each account for 10% of the final grade, resulting in an overall weighting of 20% for practical activities.

To average the practical grade with the remaining assessment activities, the average practical grade must be at least 4 out of 10. This activity is not reassessable.

Single assessment

Students opting for the single assessment system must complete the laboratory practical sessions (PLAB) and field practical sessions (PCAM) in person. These practical activities must be passed and will account for 20%

of the final grade. Likewise, attendance at classroom practical sessions (PAUL) will be mandatory and will have the same weighting as in continuous assessment (20%). The single assessment will consist of a comprehensive examination including multiple-choice and open-ended questions covering all theoretical course contents. The comprehensive examination will account for 60% of the final grade, while laboratory and field practical sessions will account for 20% and classroom practical sessions for the remaining 20%. The single assessment examination will take place on the same date scheduled for the final continuous assessment examination, and the same reassessment system will apply.

To pass the course, students must obtain a minimum final grade of 5 out of 10 overall and a minimum grade of 4 out of 10 in the theory component. The review of final grades will follow the same procedure as for continuous assessment. The same "Not assessed" criteria used in continuous assessment will apply.

Final considerations

The minimum overall grade required to pass the course is 5 out of 10. To be eligible for reassessment, students must previously have been assessed in activities representing at least two-thirds of the final course grade. Therefore, students whose completed assessment activities account for less than 67% of the final grade will receive a "Not assessed" mark.

Students who are unable to attend an individual assessment activity for justified reasons and provide the corresponding official supporting documentation will be entitled to complete the assessment on an alternative date.

Use of artificial intelligence (AI): restricted use. In this course, the use of artificial intelligence tools is permitted only as support for tasks such as bibliographic or information searches, language correction, or translations. Students must explicitly indicate which parts of the work have been produced with the support of these tools, specify the technologies used, and include a brief critical reflection on their influence on the preparation process and the final outcome of the activity.

Any irregularity in an assessment activity -including academic fraud, plagiarism, or misuse of AI- that may lead to a significant alteration of the assessment outcome will result in the activity being graded with a 0. If such irregularity occurs in an assessment activity for which a minimum grade is required, or if multiple irregularities are detected throughout the course, the final course grade will be 0. Regardless of the grade obtained, the university may initiate the corresponding disciplinary procedures in accordance with academic regulations.

Bibliography

ARTHROPODS:

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Foelix R.F. 2011. Biology of Spiders. Oxford University Press. 3rd ed.

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Krantz G.W. and Walter D.E. 2009. A manual of Acarology. Texas Tech University Press. 3rd ed.

CHORDATES:

De Iuliis G. and Pulerà D. 2019. The dissection of Vertebrates. Elsevier/Academic Press. 3rd ed. (accessible on-line i descarregable en pdf des del web de la Biblioteca de la UAB)

Hildebrand M. et al. 2001. Analysis of Vertebrate structure. Wiley. 5th ed.

Kardong K.V. 2018. Vertebrates: comparative anatomy, function, evolution. McGraw-Hill Education. 8th ed.

Kent G.C. and Carr R.K. 2001. Comparative anatomy of the Vertebrates. McGraw Hill. 9th ed.

Pough F.H. et al 2022. Vertebrate life. Oxford University Press. 11th ed.

Weichert C.K. y Presch W. 1981. Elementos de anatomía de Cordados. McGraw-Hill. 2a ed.

Web pages:

- Adena/World Wildlife Found: <http://www.wwf.es/>
- Animal Diversity Web: <http://animaldiversity.ummz.umich.edu/>
- ARKive, Images of life on Earth: <http://www.arkive.org>
- Biodidac: <http://biodidac.bio.uottawa.ca>
- California Academy of Sciences: <http://www.calacademy.org>
- Comissió Internacional de Nomenclatura Zoològica: <http://www.iczn.org/>
- Enciclopedia Virtual de los Vertebrados Ibéricos: <http://www.vertebradosibericos.org/>
- FishBase: <http://www.fishbase.org>
- Ibero Diversidad Entomológica Accesible: <http://sea-entomologia.org/IDE@/>
- Museu Nacional de Ciències Naturals de Madrid (CSIC): <http://www.mncn.csic.es/>
- Natural History Museum, Londres: <http://www.nhm.ac.uk/>
- The Ant Wiki: https://www.antwiki.org/wiki/Welcome_to_AntWiki
- The Bug Guide: <https://bugguide.net/node/view/15740>
- Zoología de los artrópodos (wikiversidad): https://es.wikiversity.org/wiki/Zoolog%C3%ADa_de_los_artr%C3%B3podos

Software

No specific software is used in this subject.

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	22	Catalan	first semester	afternoon
(PAUL) Classroom	221	Catalan	first	morning-mixed

practices	semester			
(PLAB) Practical laboratories	221	Catalan	first semester	morning-mixed
(PCAM) Field practices	221	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	222	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	222	Catalan	first semester	morning-mixed
(PCAM) Field practices	222	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	223	Catalan	first semester	morning-mixed
(PCAM) Field practices	223	Catalan	first semester	morning-mixed