

Degree programme	Type	Course
Biology	OB	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 be able to take this subject.

Objectives

The general objective of this subject is that students acquire theoretical and practical knowledge that gives a vision as most complete as possible of the diversity of Arthropods and Chordates from a morphological, functional and systematic perspective.

The specific aims are:

- To know the basic structural pattern of Arthropods (especially Insects) and Chordates (especially Vertebrates).
- To know the differential and defining features of the main Arthropod and Chordate groups, as well as the modifications of the different systems in the main subgroups of Chordates (especially Vertebrates) and

Arthropods (especially Insects).

- To know the possible functional base, and therefore adaptive, of the differential characteristics of the main Arthropod and Chordate groups.

- To obtain a preliminary vision of the main phylogenetic hypotheses that aim to explain the diversification processes leading to the current groupings (large groups) of Arthropods and Chordates.

Learning outcomes

- CM14 (Evaluate the temporal and spatial patterns and dynamics observed in animals, relating them to environmental factors and assessing the environmental impact of anthropic action.) Evaluate the temporal and spatial patterns and dynamics observed in animals, relating them to environmental factors and assessing the environmental impact of anthropic action.
- CM15 (Act in accordance with the Sustainable Development Goals in the process of management and conservation of animal communities.) Act in accordance with the Sustainable Development Goals in the process of management and conservation of animal communities.
- KM23 (Identify animal species, applying current techniques of classification of living beings.) Identify animal species, applying current techniques of classification of living beings.
- SM20 (Apply dissection methods for the observation and analysis of the internal anatomy of representative specimens of the main animal groups.) Apply dissection methods for the observation and analysis of the internal anatomy of representative specimens of the main animal groups.
- SM21 (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.
- SM22 (Carry out reports and analysis of samples and data in the field of zoology, presenting them in written and oral form.) Carry out reports and analysis of samples and data in the field of zoology, presenting them in written and oral form.
- SM23 (Analyse the origin, evolution and diversity of animals.) Analyse the origin, evolution and diversity of animals.

Contents

ARTHROPODS

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

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

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

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

Unit 5.- Myriapoda: diversity, systematics, ecology and evolution.

Unit 6.- "Crustacea": diversity, systematics, ecology and evolution.

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

Unit 8.- Detailed study of the diversity, ecology and evolution of the four mega diverse orders of insects: Coleoptera, Hymenoptera, Diptera and Lepidoptera.

CHORDATES

Unit 9.- Chordates. Position of the Chordates within the animal world, abundance and diversity. Basic characters and general organization.

Unit 10.- The concept of "Prochordate". Cephalochordates. Diagnostic characters. General organization and development.

Unit 11.- Olfactores. Urochordates. Diagnostic characters. General organization of ascidians. Diversity of Urochordates. Representative biological cycles.

Unit 12.-Vertebrates. Definition. Interpretation of its structure in an evolutionary framework. General diversity. General considerations about its classification.

Unit 13.- "Agnathans": the Vertebrates without jaws. Myxiniiformes. Petromyzontiformes. Gnathostomes: the conquest of the aquatic environment. Acquisition of jaws and paired fins. Adaptations to life in the water. Chondrichthyes: diagnostic characters and diversity. The evolutionary success of the Osteichthyes. Actinopterygii: diagnostic characters and diversity.

Unit 14.- The conquest of the terrestrial environment. Sarcopterigii: diagnostic characters and diversity. The dipnoans and the coelacanth. Tetrapods: origin, diagnostic characters and adaptations to the terrestrial environment. Amphibians: diagnostic characters and diversity. Lissamphibia: Anura, Urodela and Gymnophiona.

Unit 15.- The expansion of terrestrial vertebrates. Evolutionary criteria for the diagnosis of large groups of Amniotes. The first Amniotes. The concept of "Reptile". Diagnosis characters and diversity of the diapsids. Lepidosauria: Sphenodontia and Squamata. Diapsids without fenestrae: the turtles.

Unit 16.- Archosaurs: diagnostic characters and diversity. Crocodiles. Dinosaurs. Birds: origin and fundamental characteristics. Feathers. *Archaeopteryx* and the Cretaceous Birds. Diversity of modern Birds.

Unit 17.- Synapsids. Origin and diagnostic characters of Mammals. Monotremes: oviparous mammals.

Therians: diagnostic characters. Marsupials: diagnostic characters and diversity. Eutherians: diagnostic characters. The adaptive radiation of the Eutherians.

PROGRAM OF PRACTICES

Field practice:

Practice 1.- Arthropod sampling techniques

Laboratory practices:

Practice 1.- Learn how to use dichotomous identification keys. Morphology of Chelicerata and Myriapoda

Practice 2.- Morphology of Pancrustacea: "Crustacea". Dissection of a mantis shrimp.

Practice 3.- Morphology of Pancrustacea: Hexapoda. Dissection of either a grasshopper or a cockroach.

Practice 4.- Observation and interpretation of the anatomy of Cephalochordates and Urochordates. General characteristics of Vertebrates: dissection of a trout. External anatomy and identification of the main groups of Chondrichthyans and Osteichthyans.

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

Practice 6.- Anatomy of Birds and Mammals.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Problems solving and works preparation	20	0.8	CM14, CM15, SM22, SM23
Theoretical classes	28	1.12	CM14, CM15, KM23, SM22, SM23
Field practices	4	0.16	CM14, CM15, KM23, SM21, SM22, SM23
Laboratory practices	12	0.48	CM15, KM23, SM20, SM22, SM23
Tutorships	6	0.24	CM14, CM15, SM22, SM23
Study and reading of bibliographic material	65	2.6	CM14, CM15, SM22, SM23

The methodology used in this subject to achieve the learning process is based on students working on the provided information. The function of the teacher is to give them the information or to indicate where they can get it and to help and tutor them so that the learning process can be carried out effectively. To achieve this goal, the subject is based on the following activities:

Master classes:

With these classes the students acquire the basic scientific-technical knowledge of the subject, which must be complemented with the personal study.

Seminars:

In the seminars, students work on the scientific-technical knowledge presented in the master classes to complete their understanding and deepen in it, by developing various activities such as the analysis and discussion of videos on zoological topics, the resolution of issues related to the topics covered, analysis of zoological information, etc. The mission of the seminars is to promote the capacity for analysis and synthesis, critical reasoning and the ability to solve problems.

Practices:

During the practical sessions, the students work with the zoological material in the laboratory (observation of preparations and specimens, study of anatomy and morphology of groups, dissections, identifications of specimens, etc.) and in the field (terrestrial sampling techniques), complementing their study by means of information and questions posed in the practice script. The objective of the practical classes is to complete and reinforce the zoological knowledge acquired in the theoretical classes. In the practical sessions students are stimulated and they develop empirical skills such as the ability to observe, analyze and recognize the zoological diversity.

Tutorships:

In a complementary way, the students will have additional hours of teacher attention, in order to answer questions, clarify basic concepts and guide them about the documentary sources that have been recommended. The schedule of individualized tutorships will be specified with the teachers through the virtual campus.

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
Evaluation of practices	20% of final mark	1.5	0.06	CM14, KM23, SM20, SM21, SM22, SM23
Second partial (final II)	30% of final mark	2	0.08	CM14, CM15, KM23, SM22, SM23
First partial (final I)	30% of final mark	2	0.08	CM14, CM15, KM23, SM22, SM23
Individual and group exercises/activities in seminars	20% of final mark	3.5	0.14	CM14, CM15, KM23, SM22, SM23

This subject has a continuous evaluation process throughout the course that includes more than three evaluation activities of different types. None of them represents more than 50% of the final grade.

1.- Seminars:

Both the work to be presented on the seminar days and the activities (group and individual) that take place throughout the seminar are evaluated. This activity has no possibility of recovery. The grade corresponding to the seminars has an overall weight of 20% of the final grade.

2.- Theory:

- Partial exams: These exams assess individually the knowledge gained by students in the subject, as well as their ability to analyze, synthesize, and critical reasoning. The exam has a part of test-type questions and another of conceptual questions, schemes, etc. There will be 2 partial eliminatory exams, one corresponding to the part of Arthropods and the other to that of Chordates.
- Final exam: Students who do not pass one of the two partial exams (minimum mark: 4 out of 10), will have the opportunity to recover the part or parts not passed in the final exam. Likewise, students who wish to improve their grade in one or both parts may do so by taking the final exam. However, taking the final exam implies renouncing the grade previously obtained. The mark corresponding to each of the two exams has a weight of 30% of the final mark. In order to be able to average with the other evaluative activities (seminars and practices) the average mark of the two exams must be equal or superior to 4.

3.- Practices: Attendance at the practical sessions is mandatory. At the end of each practical session, only the students who have attended the session will take an individualized test that assesses the utilization and achievement of the specific competencies of each practice. Each part (Arthropods and Chordates) will account for 10% of the final grade. Therefore, the overall weight of the practical sessions will be 20% of the final grade. In order to average with the other assessment activities, the average grade of the laboratory practicals must be equal to or greater than 4. This activity cannot be retaken.

Single evaluation:

Students who take the single evaluation must do the laboratory (PLAB) and field (PCAM) practices in in-person sessions and it is necessary to have them approved and they will have a weight of 20%. Classroom practices (PAUL) will also be compulsory attendance, which will have a weight on the final grade that will be the same as that of the continuous assessment (20%).

The single evaluation consists of a single exam (with multiple choice and open-ended questions) on the contents of the entire theory program.

The grade obtained in the exam is 60% of the final grade of the course, the grade obtained in the laboratory practicals 20%, and the classroom practicals the remaining 20%.

The single evaluation exam will coincide with the same date fixed in the calendar for the last continuous assessment exam and the same recovery system will be applied as for the continuous assessment.

To pass the subject you must obtain a final grade of at least 5 out of 10 in all the assessment activities and a minimum grade of 4 out of 10 in the theory part.

Final considerations:

To participate in the recovery, students must have been previously assessed in a set of activities whose weight is equivalent to a minimum of two thirds of the total grade of the subject. Therefore, students will obtain the grade of "Not evaluable" when the evaluation activities carried out have a weighting of less than 67% in the final grade.

Students who can not attend to an evaluation activity for a justified cause and provide the corresponding official documentation, will be allowed to take the evaluation activity on another date.

Use of Artificial Intelligence

For this course, the use of Artificial Intelligence (AI) technologies is permitted exclusively in the classroom practical session where the accuracy of different AI tools in arthropod identification is evaluated, an activity in which the use of these tools is an integral and required part of the task. Outside of this case, the use of any other AI technology is not permitted in the assessable activities of this course.

Students must clearly identify which parts have been generated using this technology, specify the tools used, and include a critical reflection on how these have influenced the process and final outcome of the activity. Lack of transparency regarding the use of AI in this assessable activity will be considered a breach of academic integrity and may result in a partial or total penalty on the activity's grade, or more severe sanctions in serious cases.

Any irregularity committed during an assessment activity (academic misconduct, plagiarism, or improper use of AI, unless such use is expressly authorized in the course syllabus) that could lead to a significant alteration of the grade will result in that activity being graded as 0. If the course syllabus stipulates that obtaining a minimum mark on this assessment is an essential requirement for passing the course, or if multiple irregularities occur in the assessment activities of the same course, the final grade for the course will be 0. Furthermore, disciplinary proceedings may be initiated against any student who commits any of these irregularities.

Bibliography

ARTHROPODS:

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Blas M. et al. 1986. Història Natural dels Països Catalans. Enciclopèdia Catalana. Vol. 10.

Brusca, R., et al. 2016. Invertebrates (3 rd edn), Sinauer Associates Inc., Publishers, Sunderland.

Grimaldi D. and Engel M.S. 2005. Evolution of the Insects. Cambridge University Press. 1st ed. (accessible on-line i descarregable en pdf des del web de la Biblioteca de la UAB)

Gullan P.J. and Cranston P.S. 2010. The Insects: an outline of entomology. Blackwell. 4th ed.

Hickman C.P. et al. 2017. Integrated principles of zoology. McGraw-Hill. 17th 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. 2019. Vertebrate life. Oxford University Press. 10th 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>
- 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>
- IberoDiversidad 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	12	Catalan/Spanish	first semester	afternoon
(PAUL) Classroom practices	121	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	121	Catalan/Spanish	first semester	morning-mixed
(PCAM) Field practices	121	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	122	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	122	Catalan/Spanish	first semester	morning-mixed
(PCAM) Field practices	122	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	123	Catalan/Spanish	first semester	morning-mixed
(PCAM) Field practices	123	Catalan/Spanish	first semester	morning-mixed

practices			semester	
(PLAB) Practical laboratories	124	Catalan/Spanish	first semester	morning-mixed
(PCAM) Field practices	124	Catalan/Spanish	first semester	morning-mixed