

Zoology Extension Course

Code: 100791
ECTS Credits: 6

Degree	Type	Year	Semester
2500250 Biology	OB	2	1

Contact

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Use of Languages

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

Other comments on languages

Some teaching materials (informative texts, articles, videos, etc.) may be in English or Spanish

Teachers

Marc Martin Perez
Ricardo Caliri Oliveira

Prerequisites

There are no specific official prerequisites to be able to take this subject.

Objectives and Contextualisation

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.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Analyse and interpret the origin, evolution, diversity and behaviour of living beings.
- Be able to analyse and synthesise
- Be able to organise and plan.
- Describe and identify the levels of organisation of living beings.
- Develop a sensibility towards environmental issues.
- Identify and classify living organisms.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Obtain, manage, conserve and observe specimens.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Learning Outcomes

1. Analyse a situation and identify its points for improvement.
2. Analyse and interpret animal diversity and the phylogenetic lines of the metazoa.
3. Analyse the sex- or gender-based inequalities and the gender biases present in one's own area of knowledge.
4. Apply dissection methods to observe and analyse the internal anatomy of representative samples of the principal animal groups.
5. Apply methods for identifying and classifying the principal animal groups.
6. Apply techniques for the study of animal anatomy.
7. Be able to analyse and synthesise.
8. Be able to organise and plan.
9. Critically analyse the principles, values and procedures that govern the exercise of the profession.
10. Describe and identify the levels of organisation of animals.
11. Develop a sensibility towards environmental issues.
12. Identify and classify animals from morphological features.
13. Propose new methods or well-founded alternative solutions.
14. Propose projects and actions that incorporate the gender perspective.
15. Propose viable projects and actions to boost social, economic and environmental benefits.
16. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
17. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
18. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
19. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.

20. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.

Content

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. Petromyzontiiformes. 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. *Archeopteryx* 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.

Methodology

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Field practices	4	0.16	9, 2, 1, 5, 10, 12, 13, 19, 16, 17, 11, 8
Laboratory practices	12	0.48	9, 5, 4, 6, 10, 12, 19, 16, 11, 8
Seminars	6	0.24	9, 2, 15, 19, 18, 16, 17, 11, 7, 8
Theoretical classes	28	1.12	2, 10, 12
Type: Supervised			
Tutorships	6	0.24	2, 6, 10, 11
Type: Autonomous			
Problems solving and works preparation	20	0.8	2, 1, 5, 10, 13, 20, 18, 16, 17, 11, 7, 8
Study and reading of bibliographic material	65	2.6	9, 2, 10, 12, 20, 11, 8

Assessment

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: 5 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 laboratory and field practices is mandatory. At the end of each practice, students will take an individualized test that assesses the use and achievement of the specific skills of each session. Each of the parts (Arthropods and Chordates) will have a value of 10% in the final grade. Therefore the overall weightof the practices will be 20% inthe final grade. This activity has no possibility of recovery.

Final considerations:

The minimum overall grade required to pass the course is 5 out of 10.

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 evaluaction activity for a justified cause and provide the corresponding official documentation, will be allowed to take the evaluation activity on another date.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of practices	20% of final mark	1.5	0.06	2, 5, 4, 6, 12, 19, 7, 8
First partial (final I)	30% of final mark	2	0.08	2, 10, 12, 15, 20, 7
Individual and group exercices/activities in seminars	20% of final mark	3.5	0.14	9, 2, 3, 1, 12, 13, 14, 18, 16, 17, 11, 7, 8
Second partial (final II)	30% of final mark	2	0.08	2, 10, 12, 15, 20, 7

Bibliography

ARTHROPODS:

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Hickman C.P. et al. 2017. Integrated principles of zoology. McGraw-Hill. 17th ed.

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

CHORDATES:

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

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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.