Universitat Autònoma de Barcelona

2019/2020

Biology and Diversity in Terrestrial Vertebrates

Code: 100850
ECTS Credits: 6

Degree	Type	Year	Semester
2500251 Environmental Biology	OT	4	0

Contact

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Use of Languages

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

Teachers

Francesc Muñoz Muñoz

Prerequisites

To have passed the subjects of "Zoology" and "Extension of Zoology" of the Degree of Biology or the Degree of Environmental Biology.

Objectives and Contextualisation

In this subject, the students will acquire theoretical and practical knowledge on the anatomy, diversity and evolution of the main groups of tetrapods (see Theory section). They will also know the most relevant biological aspects and, in particular, the adaptations to the environment and life strategies of the most diversified groups.

The specific training aims are the following:

- To consolidate and to expand the knowledge on the general morphological characteristics of the main tetrapod lineages.

- To know the diagnostic features of the main taxa.

- To know the appearance in the fossil record of the main lineages and the essential factors involved in their subsequent diversification.

- To obtain an overview of the internal phylogenetic relationships of the main lineages.

- To understand the adaptations to the environment of representative taxonomic groups.

- To know essential aspects abount the biology and the ecological importance of representative taxonomic groups.

Competences

- Adopt an ethical stance.

- Communicate efficiently, orally and in writing.
- Develop a sensibility towards environmental issues.
- Identify and interpret the diversity of species in the environment.
- Identify organisms and recognise the different levels of biological organisation.
- Integrate knowledge of different organisational levels of organisms in their functioning.
- Obtain, observe, handle, cultivate and conserve specimens.
- Recognise and analyse phylogenetic relations.

Learning Outcomes

1. Adopt an ethical stance.
2. Collect, determine and conserve specimens and collections of invertebrates and vertebrates.
3. Communicate efficiently, orally and in writing.
4. Develop a sensibility towards environmental issues.
5. Interpret and recognise the different states of development of invertebrates and vertebrates.
6. Interpret the distribution and the interactions in the environment of invertebrates and vertebrates and their impact on biological diversity.
7. Interpret the evolutionary processes that have led to the diversity of invertebrates and vertebrates.
8. Interpret the origin and functioning of organic structures in the different groups of invertebrates and vertebrates.
9. Recognise the characteristics that distinguish the principal groups of invertebrates and vertebrates.

Content

Theory

Topic 1. The transition to terrestrial life by the vertebrates. Origin and radiation of the tetrapods.

Topic 2. Adaptations, biology and diversification of lissamphibians.

Topic 3. Amniotes. Sauropsids and synapsids: two approaches to terrestrial life.

Topic 4. Testudinates. Diversification and biology.

Topic 5. Phylogenetic relationships among the diapsids. Lepidosauromorphs. Diversification and biology of sphenodontids and squamates.

Topic 6. Arcosauromorphs. Diversification and biology of crocodilians. Radiation of dinosaurs.

Topic 7. Origin and diversification of birds.

Topic 8. Adaptations of birds.

Topic 9. Synapsids. Diversification of non-mammalian synapsids. Origin of mammals and main lineages.

Topic 10. Biology and diversification of monotremes. Biology and diversification of marsupials. Radiation of the eutherians. Biology and adaptations of representative taxonomic groups of eutherians.

Practical classes

Practice 1. Comparative study of the tetrapod skeleton I.

Practice 2. Comparative study of the tetrapod skeleton II.

Practice 3. Identification of amphibians and sauropsids.

Practice 4. Identification of mammals.

Field practices

Field trips to identify bird species in the natural environment and/or visits to research or conservation centers.

Methodology

The methodology used to achieve the learning process is based on the combination of lectures, seminars, personal study, and individual and group work.

Theory

With these classes the students acquire the basic theoretical knowledge of the subject, which must be complemented with the personal study of the topics explained by the teacher. These classes highlight and address the essential points of each teaching unit. Subsequently, the student will have to supplement the conceptual map established during the classes with the information from different sources that will be provided to them. Classes last 50 minutes and in them audiovisual material prepared by the teacher will be used.

Seminars

The aim of the seminars is to promote the capacity for analysis and synthesis, critical reasoning, and the capacity to solve problems. In the seminars, one or some of the following activities may be developed: oral and written presentation of works, resolution of issues related to topics of the theory, and analysis and discussion of articles, cases or problems. Seminars are designed for students to work in small groups and acquire mainly the skills associated with this type of teaching activity. Working groups will be set up that will deal with specific topics, which once developed and prepared will be presented orally in class. Afterwards, relevant aspects of each topyc will be discussed in common.

Practices

During the lab sessions students will work on zoological material and will complement their knowledge with the study and the response of the issues raised by the teacher. The field practices will allow the students learn techniques of observation and identification of species. The objective of the practical classes is to complete and reinforce the zoological knowledge acquired in the master classes and seminars. Practical sessions will stimulate and develop specific skills, such as the ability to observe, analyze and interpret anatomical structures, detect adaptive characters or phylogenetic importance, and taxonomic identification of individuals. For its correct execution, students will be provided with a script for each of the established sessions.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Field practices	12	0.48	1, 5, 6, 9, 4
Laboratory practices	16	0.64	3, 8, 9, 4
Lectures	18	0.72	7, 5, 8, 6, 9
Seminars	6	0.24	3, 5, 6, 9, 4
Type: Autonomous			
Preparation of works and resolution of issues	34	1.36	
Study and resolution of issues	53	2.12	3, 7, 5, 8, 6, 9

Assessment

The evaluation of this subject will be carried out by means of the the following procedures:

1. Evaluation of the theoretical contents

The theoretical knowledge acquired will be evaluated individually. This evaluation will be carried out by means of two midterm exams (each with a weight of 37% of the final mark) that will contain test-type questions and/or short or medium development questions. Students who do not pass any of these exams (minimum mark: 5 out of 10) will have to recover them in a final exam that will contain questions of the same type as those of the midterm exams. Likewise, students who wish to improve the mark of any of these exams may take a final exam, but the previously obtained mark will be lost. The evaluation of the theoretical contents has an overall weight of 74% (corresponding to the sum of the percentages of each midterm exam) of the final mark. It is essential to pass the theory (minimum score: 5 out of 10) to be able to count the marks of the seminar and the practical exam. To participate in the final exam, students must have been previously evaluated in a set of activities, which weight equals a minimum of two thirds of the total mark of the subject. Therefore, the students will obtain the "Not Evaluable" qualification when the evaluation of the activities performed have a weight lower than 67% in the final mark.

2. Evaluation of the seminars

The content and quality of the works, and the answers to the questions that arise during the seminars will be evaluated. The corresponding mark has an overall weight of 10% of the final grade. To be able to count the seminar mark in thefinal mark of the subject, it is essential to have passed the theoretical exam (minimum score: 5 out of 10).

3. Evaluation of practices

An individual exam will be conducted on the content of laboratory and field practices. The students could increase the mark by doing a practical work that will be specified during the first practice session. The mark corresponding to the practices has a global weight of 16% of the final mark. In order to be able to count the mark of the practices in the final mark of the subject, it is essential to have passed the theoretical exam (minimum score: 5 out of 10).

Final considerations

Who, due to justified cause (illness, death of a first degree relative or accident, etc.), can not attend an individual exam and provides the corresponding official documentation to the Grade Coordinator, will have the right to perform this exam in another date.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Individual evaluation (first midterm exam)	37% of the final mark	2.5	0.1	3, 7, 5, 6, 9
Individual evaluation (second midterm exam)	37% of the final mark	2.5	0.1	3, 7, 5, 6, 9
Laboratory and field practices	16% of the final mark	2	0.08	1, 3, 8, 2, 9, 4
Seminars	10% of the final mark	4	0.16	1, 3, 7, 6, 9, 4

Bibliography

Basic bibliography

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Hildebrand, M., 1988. *Analysis of Vertebrate structure*. John Wiley & Sons, New York.

Jollie, M., 1973. *Chordate Morphology*. Robert E. Krieger Publishing Company, Huntington, New York.

Kardong, K. V., 2007. *Vertebrados. Anatomía comparada, función y evolución*. McGraw-Hill. Interamericana, Madrid.

Liem, K., Bemis, W., Walker, W. F., Grande, L., 2000. *Functional Anatomy of the Vertebrates; an evolutionary perspective*. Brooks/Cole, Philadelphia.

Linzey, D., 2001. *Vertebrate biology*. McGraw-Hill International Edition, Biological Sciences Series, Singapore.

Nadal, J., 2001. *Vertebrados. Origen, organización, diversidad y biología*. Edicions Universitat de Barcelona i Ediciones Omega, Barcelona.

Pough, F. H., Janis, C. M., Heiser, J. B., 2009. *Vertebrate life.* Pearson Prentice Hall. Upper Saddle River, NewJersey.

Romer, A. S., Parsons, T. S., 1983. *Anatomía comparada*. Nueva editorial Interamericana, México.

Some web sites of general interest

Animal Diversity Web: http://animaldiversity.ummz.umich.edu/

Asociación Herpetológica Española: http://www.herpetologica.es/

International Comission on Zoological Nomenclature: http://www.iczn.org/

Museo Nacional de Ciencias Naturales de Madrid (CSIC): http://www.mncn.csic.es/

Natural History Museum, Londres: http://www.nhm.ac.uk/

Palaeos: http://palaeos.com/vertebrates/

Sociedad Española para La Conservación y Estudio de los Mamíferos: http://www.secem.es/

SEO/BirdLife (Sociedad Española de Ornitología): http://www.seo.org/

Societat Catalana d'Herpetologia: http://soccatherp.org/

Tree of life Web Project (1996-2008): http://tolweb.org/tree