Universitat Autònoma de Barcelona

2023/2024

Biology and Diversity in Terrestrial Vertebrates

Code: 100788
ECTS Credits: 6

Degree	Type	Year	Semester
2500250 Biology	OT	4	2

Contact

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Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject. Please note that this information is provisional until 30 November 2023.

Teachers

Jessica Martinez Vargas

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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

The main goal of this subject is that the students acquire theoretical and practical knowledge on the anatomy, diversity and evolution of the main groups of tetrapods (see Theory section). In addition, that they learn 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 about the biology and the ecological importance of representative taxonomic groups.

- To identify the main species of Catalan terrestrial vertebrates, know how to relate their morphology and biology to the habitat they occupy, and know their state of conservation.

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.
- Control processes and provide services related to biology.
- Develop a sensibility towards environmental issues.
- 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 handling and conserving animal specimens.
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. Develop a sensibility towards environmental issues.
11. Propose new methods or well-founded alternative solutions.
12. Propose projects and actions that incorporate the gender perspective.
13. Propose viable projects and actions to boost social, economic and environmental benefits.

14. Provide services related to zoology.
15. 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.
16. 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.
17. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
18. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
19. 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

Theory

Topic 1. Origin and radiation of the tetrapods. The transition of vertebrates to the terrestrial environment: transitional fossils, possible causes, and adaptations to the terrestrial environment.

Topic 2. Adaptations, biology and diversification of lissamphibians.

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

Topic 4. Sauropsids. Phylogenetic relationships. Lepidosauromorphs. Diversification and biology of sphenodonts and squamates.

Topic 5. Phylogenetic position of turtles. Archaelosaurs. Testudinates. Evolution, diversification and biology.

Topic 6. Arcosauromorphs. Diversification and biology of crocodilians.

Topic 7. Dinosaurs: origin, synapomorphies and phylogeny. Origin and diversification of birds.

Topic 8. Avian specializations.

Topic 9. Synapsids. Diversification of synapsids. Mammals: synapomorphies 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. Amphibians: morphology, diversity and identification.

Practice 2. Sauropsids: morphology, diversity and identification of squamates and turtles.

Practice 3. Mammals: morphology, diversity and identification.

Practice 4. Comparative study of the tetrapod skeleton.

Field practices

Field trips to observe terrestrial vertebrate species and their signs in the natural environment and/or visits to research or conservation centres.

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. The seminars are designed for students to work in small groups, so that they mainly acquire the skills associated with this type of activity. During the seminars, topics related to the theoretical program will be actively worked and some of the following activities may be carried out: oral and/or written presentation of a topic, resolution of questions and problems, analysis and discussion of articles, cases or problems.

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. Forits correct execution, students will be provided with a script for each of the established sessions.

Tutorships

Tutorships will serve to clarify concepts, to establish acquired knowledge, to facilitate the study to the students and to solve possible eventualities that can arise during the development of the subject. The schedule of individualized tutorships will be specified with the teacher via email or orally.

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	12	0.48	2, 14, 16, 10, 7
Laboratory practices	16	0.64	2, 4, 5, 6, 14, 19, 10, 7, 8
Lectures	18	0.72	9, 2, 3, 14, 17, 10
Seminars	6	0.24	9, 2, 3, 1, 14, 11, 12, 13, 18, 17, 15, 16, 10, 7, 8
Type: Autonomous			

Preparation of works and resolution of issues	34	1.36	9, 2, 3, 1, 11, 12, 13, 19, 18, 17, 15, 16, 10, 7, 8
Study and resolution of issues	53	2.12	2, 18, 16, 7, 8

Assessment

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

Evaluation of the theoretical contents

The theoretical knowledge acquired by the students will be assessed individually. This evaluation will be carried out by means of two midterm exams (each with a weight of 30% of the final mark) that will contain test-type questions and/or short or medium development questions. Students who do not obtain a minimum mark of 4 (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 will have the opportunity to do it in the final exam, but the previously obtained mark will be lost. The evaluation of the theoretical contents has an overall weight of 60% (corresponding to the sum of the percentages of each midterm exam) 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 greater than 4. 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.

Evaluation of the seminars

The content and quality of the works presented on the seminar days will be evaluated, as well as the evaluation tests (group and individual) that will be carried out during the course of the seminars. The grade corresponding to seminars has an overall weight of 15% of the final grade.

This activity has no possibility of recovery.

Evaluation of practices

Attendance to laboratory practice sessions and field trips is mandatory. After each practice, students will takean individualtest that assesses the use and achievement of the specific skills of each practcie.

The grade corresponding to the practices has an overall weight of 25% of the final grade.

This activity has no possibility of recovery.

Single evaluation

The students who take advantage of the single evaluation must carry out the laboratory practices (PLAB) and field practices (PCAM) presentially and will have a weight of 25%. Whenever the activity requires it, the seminars (SEM) will also be of compulsory attendance, which will have a weight on the final grade that will be the same as that of the continuous evaluation (15%).

The single assessment consists of a single synthesis test (with multiple choice and develop questions) on the contents of the entire theory programme.

The mark obtained in the synthesis test is 60% of the final mark of the subject, the one obtained in the practices 25% and the seminars the remaining 15%.

To pass the subject it is necessary to obtain a minimum final mark of 5 points out of 10 in the set of evaluation activities and a minimum mark of 4 out of 10 in the theory part.

Final considerations

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

Anyone who, due to a justified cause (illness, death of a relative, accident, etc.), can not attend an individual assessment test and provides the corresponding official documentation, will have the right to perform this exam on another date.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Individual evaluation (first midterm exam)	30% of the final mark	2.5	0.1	2, 17, 10, 7, 8
Individual evaluation (segon midterm exam)	30% of the final mark	2.5	0.1	2, 17, 10, 7, 8
Laboratory and field practices	25% of the final mark	2	0.08	2, 4, 5, 6, 14, 19, 18, 16, 10, 7, 8
Seminars (individual or group tests)	15% of the final mark	4	0.16	9, 2, 3, 1, 14, 11, 12, 13, 19, 18, 17, 15, 10, 7, 8

Bibliography

Basic bibliography

De Iuliis, G., Pulerà, D. 2019. The dissection of Vertebrates. 3rd ed. Academic Press, Elsevier, Oxford. (available in electronic format at the UAB library)

Hildebrand, M. 2001. Analysis of Vertebrate structure. 5th ed. John Wiley & Sons.

Kardong, K. V. 2008. Vertebrates: comparative anatomy, function, evolution. 8th ed. McGraw-Hill Education.

Liem, K., Bemis, W., Walker, W. F., Grande, L. 2000. Functional Anatomy of the Vertebrates: an evolutionary perspective. 3rd ed. Harcourt College Publishers.

Linzey, D. 2012. Vertebrate biology. 2nd ed. Johns Hopkins University Press.

Mayr, G. 2017. Avian evolution. John Wiley & Sons, New York. (available in electronic format at the UAB library)

Nadal, J. 2001. Vertebrados. Origen, organización, diversidad y biología. Omega.

Pough, F. H., Janis, C. M., Heiser, J. B. 2019. Vertebrate life. 10th ed. Oxford University Press.

Schoch, R. R. 2014. Amphibian evolution. John Wiley & Sons (available in electronic format at the UAB library)

Some web sites of general interest

AmphibiaWeb: https://amphibiaweb.org/

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

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

Catàleg d'amfibis i rèptils: https://pagines.uab.cat/3dvirtualherp/ca

Enciclopedia Virtual de los Vertebrados Ibéricos: http://www.vertebradosibericos.org/

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

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

Museu de Ciències Naturals de Granollers: https://mcng.cat/

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/

The Reptile Database: http://www.reptile-database.org/

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

Software

R software will be used at a basic level in one of the seminar sessions. In another of the seminars students will be introduced to the use of the app KiriEngine for the obtention of 3D models.