

Zoology

Code: 100851
ECTS Credits: 6

Degree	Type	Year	Semester
2500251 Environmental Biology	FB	1	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

Fernando Garcia del Pino

Prerequisites

It is recommended to review the concepts related to Zoology of the Biology course studied at high school.

To attend the practices of this course, the student must justify having passed the biosafety and security tests that can be found in the Virtual Campus and has to know and accept the Laboratory operating of the Faculty of Biosciences.

Objectives and Contextualisation

Throughout this course, student must acquire the theoretical and practical knowledges to have a vision as complete as possible of Zoological knowledge bases and the diversity of non-arthropod invertebrate animals from anatomical, functional, systematic and phylogenetic perspectives.

Equally, it should allow placing each animal group in an ecological context, in relation to the number of species, habitat and way of life, position within the ecosystems as well as their importance in relation to their interest in applied sciences and of the environment and economics.

The specific training objectives are:

- To introduce the main structuring concepts of the science of Zoology.
- To understand the systematics and phylogenetic relationships between the main groups of animals as a result of evolutionary and adaptive processes.

- To know the main levels of organization and the architectural patterns of non-arthropod invertebrates.
- To transfer knowledge about the morphological characteristics, life cycles, the ecological importance and the interactions with the man of the main groups of non-arthropod invertebrates.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Communicate efficiently, orally and in writing.
- Describe, analyse and interpret the vital adaptations and strategies of the principal groups of living beings.
- Develop analysis and synthesis skills.
- Develop strategies of analysis, synthesis and communication in order to teach biology and environmental studies.
- Identify organisms and recognise the different levels of biological organisation.
- Recognise and analyse phylogenetic relations.
- Sample, characterise and manipulate populations and communities.
- 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. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Actuar en l'àmbit de coneixement propi avaluant les desigualtats per raó de sexe/gènere.
3. Communicate efficiently, orally and in writing.
4. Develop analysis and synthesis skills.
5. Identify the large animal groups and their phylogenetic relationships.
6. Know and interpret the development, growth and biological cycles of the principal animal taxons.
7. Observe, handle and conserve animal specimens and populations.
8. Recognise the basic principles of animal biology that must be conveyed in the field of secondary education.
9. Recognise the molecular, genetic, tissue- and organism-based levels of organisation.
10. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.

Content

I. INTRODUCTION TO ZOOLOGY. BASIC CONCEPTS:

Unit 1. Zoology: concept of animal. Historical development of Zoology. Disciplines.

Unit 2. Animal Diversity. Species concept. Speciation mechanisms. Natural, sexual and group selection. The evolution generating diversity. Zoogeographical regions.

Unit 3. The organization of the animal world. Classification and nomenclature. Concepts and methods for the study of animals. Animal phylogeny.

Unit 4. Animal architecture. Organization levels. Symmetry. Cephalization. Metamería.

Unit 5. Animal reproduction, development and biological cycles.

II. DIVERSITY OF NON-ARTHROPOD INVERTEBRATES

Unit 6. The origin of Animals. Protists of animal character.

Unit 7. Metazoans. Poriferans. Origin. Cellular organization and morphological types. Ecological importance and applications.

Unit 8. Cnidarians. Body models. The alternation of generations. The function of coral reefs.

Unit 9. Protostomes. Spiralia (Lofotrocozoans). Platyzoans. Platyhelminthes. Life cycles. Adaptation to parasitism.

Unit 10. Gnatiferans and Lophophorates. Rotifers. Briozoans. General characters and biological cycles.

Unit 11. Trocozoans. Mollusks. The mantle and the shell. The radula. The coelomic cavity. General organization and biology. Groups of Mollusks. Adaptive strategies. Importance of the groups.

Unit 12. Annelids. Metamerie and hydrostatic skeleton. Diversity and adaptations to the environment.

Unit 13. Ecdisozoans. Nematodes. Function of the pseudocoeloma. Biological importance and adaptations to parasitism.

Unit 14. Deuterostomes. Echinoderms. Pentaradial symmetry. Ambulacral system. Diversity.

PRACTICAL CLASSES:

Laboratory practices:

Practice 1: Observation of Fresh-Water Microfauna and Protozoans. Observation and recognition of Poriferans and Cnidarians.

Practice 2: Observation and recognition of Platyhelminthes and Nematodes.

Practice 3: Observation and recognition of Molluscs.

Practice 4: Observation and recognition of Annelids and Echinoderms.

Field practice:

Practice 5: Sampling techniques and observation of marine invertebrates.

Methodology

The methodology used in this course to achieve the learning process is based on student work with available information. The function of the professor is to give the information or indicate where student can get it, helping and supervising the student during the learning process. To achieve this goal, the course is based on the following activities:

Lectures:

In these classes the student acquires the basic scientific-technical knowledge of the course that must be complemented with personal study of the topics explained.

Seminars:

In the seminars, students work in the scientific and technical knowledge exposed in the lectures to complete and deepen their understanding, developing various activities: analysis and discussion of videos on zoological topics, resolution of issues related to the topics discussed, analysis of zoological information, etc.

The aim of the seminars is to promote the capacity for analysis and synthesis, critical reasoning and the capacity to solve problems.

Practices:

During the practice sessions students work the zoo material in the laboratory (observation of preparations and specimens, study of anatomy and morphology of groups, dissections, identification of specimens, etc.) and in the field (sampling techniques of invertebrate fauna), and they complement it with the study and the questions raised in the practice script.

The objective of the practical laboratory and field classes is completed and reinforced the zoological knowledge acquired in the theoretical classes and seminars. During the practical sessions, students' empirical skills are stimulated and developed, such as the ability to observe, analyse and recognize zoological diversity.

Tutorials:

The objective of these sessions is to solve doubts, to review basic concepts not explained in classes and to guide about the sources consulted by the students. The schedule of individualized tutorials is specified with the professor 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			
Fieldwork	4	0.16	3, 6, 4, 5, 7, 9, 8
Laboratory practical classes	8	0.32	3, 6, 4, 5, 7, 9, 8
Lectures	33	1.32	6, 5, 9, 8
Seminars	7	0.28	3, 6, 4, 5, 9
Type: Supervised			
Tutorships	6	0.24	3, 6, 4, 5, 9, 8
Type: Autonomous			
Problem solving	52	2.08	6, 5, 9
Written Reports, answer to questions	32	1.28	3, 6, 4, 5, 9

Assessment

ASSESSMENT

To pass the course, a minimum mark of 5 points out of 10 possible is required from the sumatori of theory exam + seminars + practical.

ATTENTION Attendance to the practices and the seminars is mandatory. Non-attendance to practicals and seminars without justification will imply that the student will NOT be able to pass the subject.

1- CONTINUOUS ASSESSMENT

The programmed continuous assessment activities are:

1.1- THEORY

Partial theory exams: Each of the two partial exams will represent 30% of the final grade and will assess the acquired knowledge during the course, as well as analytical and synthesis skills, and critical reasoning. The exam may include multiple-choice questions, short-answer questions, conceptual questions, or schemes.

- To obtain the average of the two partial exams, the minimum grade for each exam must be equal to or higher than 5.0. If the student obtains a grade lower than 5.0 in a partial exam, student will be allowed to re-assess that exam on the day of the recovery exam. In the case of the exam was not re-assessed, the average cannot be calculated with the rest of the course activities.

Re-assessment of theory exam: This exam will be used to re-assess the necessary partial exams.

- To re-assess an exam, the student must have been evaluated in a set of activities equaling at least at least two-thirds of the total evaluation activities of the course.
- For the theory, to be averaged with the practical and seminar activities, the average of the two partial exams must be equal to or higher than 4.0.
- Students who wish to improve a grade in one or both parts can do the final exam, but they will lose the previous grade.

1.2- SEMINARS

Seminar assignments (questions) that must be presented on the days of the seminar, and the evaluative tests (groups and individuals) that are conducted during the seminar classes will be assessed. The grade corresponding to the seminars will represent 25% of the final grade of the course.

- Attendance to seminars is mandatory.
- This activity cannot be re-assessed.
- For the seminars, to be averaged with the other course activities, the average seminar mark must be equal to or higher than 4.0.

1.3 - PRACTICES

Laboratory and field practices: Practices represent 10% of the final grade of the course. To evaluate the practical work, the students will have to complete a questionnaire at the end of each practical session.

- Attendance at lab sessions and field practices is mandatory.
- This activity does not have the possibility to be re-assessed.
- For the practices, to be averaged with the other course activities, the average practices mark must be equal to or higher than 4.0.

Visu identification test: This test represents 5% of the final grade. It is a test where it presents a list of species of invertebrates that the students have seen in theory classes, seminars, or practices and that they have to recognize.

- This activity cannot be re-assessed.
- This activity does not require a minimum grade to be averaged with the other course activities.

SUMMARY TABLE OF THE WEIGHT OF EACH COMPONENT:

1st partial theory exam	30%
2nd partial theory exam	30%
Seminars	25%
Practices	15%

1.4- OTHER CONSIDERATIONS

- To pass the course, the final grade must be equal to or higher than 5.0.
- NO ASSESSMENTS: It is considered as not assessed the students who carry out less than 50% of the assessment activities described above.
- For students who do not pass the theoretical part of the course but pass the part of practices and/or seminars (obtaining a minimum of 5 points out of 10), this mark will be kept for a three additional registration periods (but student will have to register for the ENTIRE course again).
- The students who could not attend an individual assessment test for justified reasons (such as a health problem, death of a family member, accident, have the status of eliteathlete and have a competition or sports activity with compulsory attendance, etc.) and provide the official documentation corresponding to the professor and the coordination of the degree (official medical certificate stating the incapacity to take an exam, police certificate, justification of the competent sports body, etc.), will have the right to take the test in a later date. The coordination of the degree will ensure for the concretion of this test, after consulting with the professor of the course.

2- SINGLE ASSESSMENT

The students who choose the single-assessment option must request it within the terms and forms indicated by the Faculty.

2.1- THEORY

This part represents 60% of the final grade of the course, and will be evaluated through:

Unique theory exam: The unique theory assessment will consist of an exam that will take place on the day of the 2nd partial exam of the course. The exam may include multiple-choice questions, short-answer questions, conceptual questions, or schemes.

Re-assessment of theory exam: The recovery of the single assessment will be the same day and time that the continuous assessment recovery test.

- For the theory, to be averaged with the practical and seminar activities, the grade of the exam must be equal to or higher than 4.0.
- Students who wish to improve the grade of the exam can do the re-assessment exam, but they will lose the previous grade.

- To re-assess an exam, the student must have been evaluated in a set of activities equaling at least at least two-thirds of the total evaluation activities of the course.

2.2- SEMINARS

IMPORTANT: Even if students choose the unique evaluation, they must attend the seminar sessions of this course.

Seminar assignments (questions) that must be presented on the days of the seminar, and the evaluative tests (groups and individuals) that are conducted during the seminar classes will be assessed. The grade corresponding to the seminars will represent 25% of the final grade of the course.

- Attendance to seminars is mandatory.
- This activity cannot be re-assessed.
- For the seminars, to be averaged with the other course activities, the average seminar mark must be equal to or higher than 4.0.

2.3- PRACTICES

IMPORTANT: Even if students choose the unique evaluation, they must attend the practice sessions of this course.

Laboratory and field practices: At the end of each laboratory practice session, students will complete an evaluation questionnaire. Attendance at the laboratory practices is MANDATORY and ESSENTIAL to take the unique theory exam. Practices represent 10% of the final grade of the course.

- Attendance at lab sessions and field practices is mandatory.
- This activity does not have the possibility to be re-assessed.
- For the practices, to be averaged with the other course activities, the average practices mark must be equal to or higher than 4.0.

Visu identification test: This test represents 5% of the final grade. The unique evaluation of the Visu identification test will consist of an exam that will take place on the day of the 2nd partial exam of the course. It is a test where it presents a list of species of invertebrates that the students have seen in theory classes, seminars, or practices and that they have to recognize.

- This activity cannot be re-assessed.
- This activity does not require a minimum grade to be averaged with the other course activities.

SUMMARY TABLE OF THE WEIGHT OF EACH COMPONENT:

Unique theory exam	60%
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Seminars	25%
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Practices	15%
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2.4- OTHER CONSIDERATIONS

- To pass the course, the final grade must be equal to or higher than 5.0.

- For students who do not pass the theoretical part of the course but pass the part of practices and/or seminars (obtaining a minimum of 5 points out of 10), this mark will be kept for a three additional registration periods (but student will have to register for the ENTIRE course again).
- The students who could not attend an individual assessment test for justified reasons (such as a health problem, death of a family member, accident, have the status of elite athlete and have a competition or sports activity with compulsory attendance, etc.) and provide the official documentation corresponding to the professor and the coordination of the degree (official medical certificate stating the incapacity to take an exam, police certificate, justification of the competent sports body, etc.), will have the right to take the test in a later date. The coordination of the degree will ensure for the concretion of this test, after consulting with the professor of the course.
- Students who have passed the theory part and have a grade of 4.0 or higher in both the practical and seminar parts may take the recovery exam to improve their grade. To be eligible, they must formally renounce (via email) the previous grade, notifying the responsible professor of the course at least three days before the re-assessment exam. The theory grade that will be considered is the one obtained in the most recent exam taken by the student.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of laboratory practices and visu exam	15%	1.5	0.06	3, 6, 4, 5, 7, 9, 8
Partial exam I (final exam I)	30%	1.75	0.07	3, 6, 4, 5, 9
Partial exam II (final exam II)	30%	1.75	0.07	3, 4, 5, 9
individual and group-work evaluations at the seminars.	25%	3	0.12	1, 2, 10, 3, 6, 4, 5, 9, 8

Bibliography

Basic Resources:

- ***Integrated Principles of Zoology***. Hickman, C.Jr., Keen, S., Larson, A., Eisenhour, D., l'Anson, H., Roberts, L., 2020 (última edició: 18ª edició). McGraw-Hill Education, Washington, EEUU. (http://www.ingebook.com.are.uab.cat/ib/NPcd/IB_Escritorio_Visualizar?cod_primaria=1000193&libro=4152).
- ***Invertebrates***. Brusca, R.C., Moore, W., Shuster, S.M., 2016 (última edició: 3ª edició). McGraw-Hill Education, Washington, EEUU.
- ***Invertebrats no Artròpodes, volumen 8. Història Natural dels Països Catalans***. Altaba, C.R., Alòs, C., Alvà, V., Armengol, J., Baguñà, J., et al., 1991. Editorial Enciclopèdia Catalana. Barcelona.
- ***Fauna i flora de la mar Mediterrània***. Ballesteros, E., Llobet, T., 2015. Editorial Brau. Barcelona.

Complementary resources:

- ***I. Complementary theory Textbooks:***
 - Anderson, D.T., 2001. *Invertebrate Zoology*. Oxford University Press. 2ª edició, (referencia en biblioteca UAB: 592 Inv Reimp. 2010).
 - Barnes, R.S.K., 2009. *Zoología de los Invertebrados*. Editorial MacGraw-Hill/ Interamericana. 7ª edició (referencia en biblioteca UAB: 592 Bar).
 - Barnes, R.S.K., Calow, P., Olive, P.J.W., 1988. *The Invertebrates: a new synthesis*. Editorial Blackwell Scientific Publications (referencia en biblioteca UAB: 592 Bar).

- Meglitsch, P.A., Schram, F.R., 1991. Invertebrate Zoology. Oxford University Press, New York (referencia en biblioteca UAB: 592 Meg).
- Miller, S.A., Harley, J.H., 2015. Zoology. Editorial MacGraw-Hill. 10ª edición (referencia en biblioteca UAB: 59 Mil).

• **II. Complementary practices Guides and Textbooks:**

- Bergbauer, M., Humberg, B., 2002. Flora y fauna submarina del mar mediterráneo. Ed. Omega.
- Grassé, P.P., 1982. Manual de Zoología. I. Invertebrados. Ed. Toray-Masson.
- Munilla, T., 1992. Prácticas de Zoología General I. Invertebrados no Artrópodos. Ed. Oiokos-Tau.
- Needham, J.G., Needham, P., Altimira, C., 1978. Guía para el estudio de los seres vivos de las aguas dulces. Ed. Reverte.
- Ocaña, A., Sánchez, L., 2000. Guía submarina de invertebrados no artrópodos. Ed. Comares.
- Riedl, R., 2000. Fauna y flora del mar Mediterráneo. Omega, Barcelona.

• **III. Consultation web pages:**

- Animal Diversity Web (University of Michigan): <https://animaldiversity.org/>
- Discover Life: <https://www.discoverlife.org/>
- International Commission on Zoological Nomenclature: <https://www.iczn.org/>
- Museo Nacional de Ciencias Naturales (Madrid): <https://www.mncn.csic.es/es>
- Natural History Museum (Londres): <http://www.nhm.ac.uk/>
- Shape of Life. The Story of the Animal Kingdom (Sea Studios Foundation): <https://www.shapeoflife.org/>
- Tree of Life Web Project: <http://tolweb.org/tree/>
- University of California Museum of Paleontology (EEUU): <https://ucmp.berkeley.edu/>
- World Register of Marine Species: <http://www.marinespecies.org/>
- World Wildlife Foundation: <http://www.wwf.es/>

Software

No specific software is required.