

**Zoology**

Code: 100786  
ECTS Credits: 6

Degree	Type	Year	Semester
2500250 Biology	OB	1	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

**Contact**

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**Use of Languages**

Principal working language: spanish (spa)  
Some groups entirely in English: No  
Some groups entirely in Catalan: No  
Some groups entirely in Spanish: No

**Other comments on languages**

Part of the course is taught in Catalan and part in Spanish.

**Prerequisites**

There are not official prerequisites, but it is recommended to review the concepts related to Zoology of the Biology course studied at high school.

**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.
- Analyse and interpret the development, growth and biological cycles of living beings.
- 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 and interpret the development, growth and biological cycles of animals.
4. Analyse the sex- or gender-based inequalities and the gender biases present in one's own area of knowledge.
5. Apply dissection methods to observe and analyse the internal anatomy of representative samples of the principal animal groups.
6. Apply methods for identifying and classifying the principal animal groups.
7. Apply techniques for the study of animal anatomy.
8. Be able to analyse and synthesise.
9. Be able to organise and plan.
10. Critically analyse the principles, values and procedures that govern the exercise of the profession.
11. Describe and identify the levels of organisation of animals.
12. Describe the principles and methods of animal classification.
13. Develop a sensibility towards environmental issues.
14. Identify and classify animals from morphological features.
15. Propose new methods or well-founded alternative solutions.
16. Propose projects and actions that incorporate the gender perspective.
17. Propose viable projects and actions to boost social, economic and environmental benefits.
18. 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.
19. 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.
20. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
21. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.

22. 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.
23. Work in teams.

## **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.

\*Unless the requirements enforced by the health authorities demand a prioritization or reduction of these contents.

## 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.

If possible, during the second part of the course, there will be seminar sessions where the students will present their work in English.

Practices:

Laboratory 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.

Field practices: in this practice the students will know the main methods of wildlife sampling in the sea environment, and will recognize and identify the animal organisms "in situ".

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.

\*The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

## Activities

Title	Hours	ECTS	Learning Outcomes
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Type: Directed

Fieldwork practices	4	0.16	3, 2, 6, 7, 11, 14, 13, 8, 9, 23
Laboratory practical classes	8	0.32	6, 5, 7, 11, 14
Lectures	32	1.28	3, 2, 6, 12, 11
Seminars	6	0.24	3, 2, 6, 7, 12, 11
Type: Supervised			
Tutorials	5	0.2	3, 2, 6, 7, 12, 11
Type: Autonomous			
To study and to solve problems	50	2	3, 2, 6, 7, 12, 11
Written Reports, answer to questions	34.5	1.38	3, 2, 6, 7, 12, 11

## Assessment

There is a continuous evaluation process throughout the course that includes more than three evaluation activities, of different typologies, distributed throughout the course, and none of the activities represents more than 50% of the final grade.

### 1. Evaluation of seminars:

All written reports that should be presented during the seminar days and the activities (in group and individual) developed during the seminars are evaluated.

In this activity there is no chance for re-assessment.

The grade corresponding to the seminars has a global weight of 20% of the final grade.

### 2. Evaluation of the exams:

#### Partial exams:

With these exams, the knowledge acquired by the students during the course is evaluated individually, as well as their capacity for analysis and synthesis, and critical reasoning. The exam has part of test questions and other of conceptual questions, schemes, etc.

#### Final exam:

Students who do not pass one of the two partial exams (minimum grade: 5 out of 10) can re-assess the exam failed in the final exam. Likewise, students who wish to improve a grade in one or both of the parts can do the final exam, but they will lose the previous grade.

The corresponding grade for each of the two exams weighs 30% of the final grade. To be able to make the average with the other evaluative activities (seminars and practices) the average mark of the two exams must be equal to or greater than 4.

### 3. Evaluation of the practices:

Attendance at lab sessions and field practices is mandatory.

After each laboratory practice the students perform an individualized test that assesses the use and achievement of the specific skills of each practice (15% of the final grade).

In this activity there is no chance for re-assessment.

#### 4. Visu test

A final visu test of a list of invertebrate species that students will have seen in theory classes, seminars or practices will be done (5% of the final grade).

In this activity there is no chance for re-assessment.

The overall evaluation of the practices has a weight of 5% of the final grade.

Final considerations:

The minimum global grade needed to pass the course is 5 out of 10.

To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course or module. Thus, the student will be graded as "No Avaluable" if the weighthin of all conducted evaluation activities is less than 67% of the final score.

\*Student's assessment may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of practices	15%	2	0.08	10, 4, 6, 5, 7, 11, 14, 16, 21, 13, 8, 9
Individual and group-works evaluation in the seminars	20%	2.5	0.1	10, 3, 2, 4, 1, 6, 7, 12, 11, 15, 16, 17, 22, 21, 20, 18, 13, 8, 9, 23
Partial exam I (final exam I)	30 %	2.5	0.1	3, 2, 6, 12, 11, 22, 18, 19
Partial exam II (final exam II)	30%	2.5	0.1	3, 2, 6, 12, 11, 22, 18
Visu exam	5%	1	0.04	6, 7, 11, 14, 8, 9

## 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](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, volum 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 edición, (referencia en biblioteca UAB: 592 Inv Reimp. 2010).
- Barnes, R.S.K., 2009. Zoología de los Invertebrados. Editorial MacGraw-Hill/ Interamericana. 7ª edición (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/>