

Degree	Type	Year
2500502 Microbiology	FB	1

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Teachers

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Teaching groups languages

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Prerequisites

It is recommended to review the subjects of animal diversity (Zoology) and general concepts of genetics, evolution and cell biology studied in high school. It is also recommended to review the lessons studied in high school, about the structure (Anatomy) and the functioning (Physiology) of animal living things, particularly humans.

Objectives and Contextualisation

The course complements the introduction to the study of the morphological and anatomical diversity of the different groups of animals with a description of the function of the major physiological systems of animals, particularly humans. Both approaches complement the systematic and phylogenetic perspectives with the anatomical and functional of the course. By the end of this course student will be able to:

1. Situate each animal group in an eco-physiological context, valuing it in relation to the number of species, habitat and way of life, position within the ecosystems and importance in relation to their interest in the applied sciences and economics.
2. Understand the organization and biological bases of the main physiological systems, understood as highly interrelated, regulated and integrated entities.

Goals:

- (1) To introduce to the student the main structuring concepts of the science of Zoology, with the aim to:
- (I) understand the systematics and phylogenetic relationships among the major animal groups as a result of evolutionary and adaptive processes.
 - (II) know the main levels of organization of animals and their architectural patterns.
- (2) To know the main groups of animals according to:
- (I) its morphological characteristics,
 - (II) biological cycles,
 - (III) ecological importance, and
 - (IV) interactions with man.
- (3) To achieve the basic knowledge of animal physiology, including:
- (I) to know the organization and the anatomical and functional basis of animal physiological systems, with special attention to Humans.
 - (II) to identify the role and importance of major regulatory or control systems.
 - (III) to know the main biophysical, cellular, molecular and biochemical bases of the physiological systems to understand their function.
 - (IV) to understand the different physiological systems as highly interrelated and integrated entities.
 - (V) to understand the physiology of animal organisms, particularly humans, as a basis for the development of studies and microbiological applications.

Learning Outcomes

1. CM05 (Competence) Evaluate the global dynamics of natural systems at different scales of analysis to provide innovative responses to societal demands and care for the environment.
2. CM06 (Competence) Integrate knowledge and skills from the field of biology, working individually and in groups, to prepare and present in writing or orally and publicly a scientific work.
3. KM08 (Knowledge) Define the structure, organization and functioning of the different types of cells, tissues and physiological systems in living organisms.
4. KM09 (Knowledge) Describe the taxonomic, morphological and anatomical diversity of the main groups of living organisms and their position within ecosystems.
5. SM06 (Skill) Relate the main biophysical, cellular, molecular and biochemical bases of physiological systems with their functioning.
6. SM08 (Skill) Interpret the bases of evolution and its relationship with the structure and operation of biological systems at all levels of organization.

Content

MODULE I: Fundamentals of Zoology

- Definition of Zoology. The concept and characteristics of an Animal. Current situation of Animals in the World of living organisms. Concepts of species. Specific qualitative and quantitative variability. Reproductive barriers. The process of speciation: modes and causes. Biodiversity. Concept and notions of Zoogeography. Zoogeographic zones. Cosmopolitan and endemic species.

- Basic Principles of Zoology. Anatomy and Morphology. Concept of Anatomy. Morphological study. Concept of Homology and Homoplasia. Ordering the Animal World: Phylogeny. Systematics. Taxonomy: concept of taxon. Nomenclature: rules of animal nomenclature. Current phylogenetic view of Animals. The architectural pattern of Animals: Structural levels of organization. Archetype and plans of Animal organization. Concept and types of symmetry.
- Animal reproduction. Reproduction and sexuality. Modes of asexual and sexual reproduction. Parthenogenesis. Adaptive meaning of different reproductive patterns.
- Animal development. Embryonic development. Ontogeny. Segmentation. Gastrulation. Formation of the mesoderm. Coelom: importance of the appearance of the coelom. Organogenesis. Postembryonic development. Direct and indirect development. Metamorphosis. Life cycles.

MODULE II: zoological diversity

- Porifera. Cellular organization. Structural types. Representative groups. Evolutionary organization of groups. Functional adaptations to the aquatic environment.
- Diploblastic metazoans. Cnidarians. General characters. Cellular elements. Representative groups. Biological cycles.
- The Triploblastic level. Lophotrochozoan Protostomes. Platyhelminthes. Basic characters. Adaptations of the different groups to parasitism. Life cycles of parasitic species.
- Annelids. Basic characters of Annelids. Main groups and adaptations to different habitats. Importance and utilization of annelids by man.
- Molluscs. Basic characters of the group. Importance of the shell and their evolution. Main groups and adaptations to different habitats.
- Ecdysozoan Protostomes. Nematodes. Basic characters. Adaptations to different ways of life. Most representative life cycles.
- Arthropoda. General characters. Structure and importance of the cuticle. Basic elements of a segment. Tagmosis. General characteristics of the different groups of Arthropods and their environmental adaptations.
- Hexapoda (Insects). Basic characters. Importance of the group. Main groups. Insects and Man.
- Deuterostomes. Echinoderms. General organization of the group and adaptive diversification.
- Chordates. Exclusive characters of the Chordates. Compared characters of Urochordata and Cephalochordata. Biology of the two groups.
- Diversity of Vertebrates I. Agnatha and Gnathostomata. General characters compared. Diversity and environmental adaptations.
- Diversity of Vertebrates II. Amphibians, Reptiles, Birds and Mammals. General compared characters. Diversity and environmental adaptations.

MODULE III: Fundamentals of Animal Physiology

- Introduction to Animal Physiology.
- Intercellular communication.
- Electrical excitability I: neurons.
- Electrical excitability II: muscle.
- Fluid compartments. Blood.
- Cardiovascular physiology.
- Physiology of breathing.
- Renal function.
- Gastrointestinal physiology.
- Endocrine system and reproduction.
- Nervous system.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
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Type: Directed

Lectures	36	1.44	CM05, KM08, KM09, SM06, SM08
Seminars and case studies	9	0.36	CM05, CM06, KM08, KM09, SM06, SM08
Type: Supervised			
Individuals and group tutorials	6	0.24	CM05, KM08, KM09, SM06, SM08
Seminar preparation	2	0.08	CM05, CM06, KM08, KM09, SM06, SM08
Type: Autonomous			
Bibliographic research	6	0.24	CM06, KM08, KM09, SM06
Case studies	7	0.28	CM05, CM06, SM06, SM08
Personal study and solve problems	59	2.36	CM05, CM06, KM08, KM09, SM06, SM08
Reading texts	6	0.24	CM05, CM06, KM08, KM09, SM06, SM08
Written Reports	10	0.4	CM05, CM06, KM08, KM09, SM06, SM08

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

Lectures:

With these classes the students acquire the basic scientific-technical knowledge of the course that must be complemented with personal study of the topics explained.

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, the scientific-technical knowledge exposed in the lectures is worked on to complete and deepen their understanding, developing various activities: videos on zoological themes, resolution of issues related to the topics covered, analysis of ecophysiological and zoological information, etc. ., analysis, discussion and resolution of physiology problems, working in small groups around topics of special interest in animal physiology, zoology, and microbiology.

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.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Seminars Animal Physiology	10%	1.5	0.06	CM06, KM08, SM06, SM08
Seminars Zoology	12,5%	1.5	0.06	CM05, CM06, KM09, SM08
Theory Animal Physiology	40%	3	0.12	KM08, SM06, SM08

This subject/modules do not include the single assessment system, and there is a continuous evaluation process throughout the course. This 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.

The evaluation of this course is done independently by the two parts of the subject, Zoology and Animal Physiology, and each part represents a 50% of the course. For each part, the evaluation is carried out according to the following criteria:

Evaluation of seminars:

There are evaluations of:

- Individual or group written reports that should be presented during the seminars or on subsequent dates.
- Group and/or individual tests, which can be developed throughout the seminars.

The mark corresponding to the seminars has a global weight of 25% in the part of Zoology and 20% in the part of Animal Physiology.

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

Evaluation of theory:

Partial exams:

The knowledge acquired by the students during the course is evaluated individually, as well as their capacity for analysis, synthesis and critical reasoning.

In both parts of the subject, Animal Physiology and Zoology, 2 partial exams are done. The minimum mark of each partial exam in each part of the subject is: 5 over 10 in Zoology, and 4.5 over 10 in Animal Physiology.

The mark corresponding to theory has a global weight of 75% in the part of Zoology and 80% in the part of Animal Physiology.

Retaking exam:

This exam will have to be taken by the students who have not passed one or more partial exams, and those who have obtained a final mark of theory in Animal Physiology below 5 over 10.

Final considerations:

The two parts of the subject will be weighted and the subject will be passed only when the mark of each part equals or is 5 over 10. The minimum global mark to pass the subject is 5 over 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 Non-evaluable" if the weighting of all conducted evaluation activities is less than 67% of the final score".

Bibliography

Infography on how to find e-books: <https://ddd.uab.cat/pub/guibib/224929/bibrecdigitals.pdf>

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De Iuliis G, Pulerà D (2019). The dissection of Vertebrates. 3rd ed. Ed. Academic Press.

Hickman CP, et al (2020). Integrated Principles of Zoology. 18th ed. Ed. McGraw-Hill.

Kardong KV (2018). Vertebrates: comparative anatomy, function, evolution. 8th ed. Ed. McGraw-Hill.

Pough FH, et al (2019). Vertebrate life. 10th ed. Ed. Oxford University Press.

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Hall JE, Hall ME. Guyton y Hall: Tratado de Fisiología Médica. Elsevier, 14a ed, 2021.

Koeppen BM, Stanton BA. Berne & Levy Physiology. Elsevier, 7a ed, 2017.

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Silbernagl S, Despopoulos A. Fisiología. Texto y Atlas. Editorial Médica Panamericana, 7a ed, 2009.

Tortora GJ, Derrickson BH. Principles of Anatomy and Physiology. Médica Panamericana, 15a ed, 2021.

Tresguerres J.A.F. Fisiología Humana. McGraw-Hill Interamericana de España SL, 4a ed, 2010.

Widmaier EP, Raff H, Strang KT. Vander's Human Physiology. The Mechanisms of Body Function. McGraw-Hill Education, 15a ed, 2018.

Web pages

Animal Diversity Web: <https://animaldiversity.org/>

Campus Virtual de la UAB: <https://cv.uab.cat/portada/ca/index.html>

Enciclopedia virtual de los vertebrados ibéricos. <http://www.vertebradosibericos.org/>

Howard Hughes Medical Institute. <https://www.biointeractive.org/classroom-resources>

Software

None.

Language list

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	711	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	712	Catalan/Spanish	first semester	morning-mixed

PROVISIONAL