

Degree	Type	Year
2500253 Biotechnology	OB	1

Contact

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Teaching groups languages

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Prerequisites

There are no official prerequisites, but it is advisable for the student to review the contents related to zoology and botany of the Biology subject of the baccalaureate.

Objectives and Contextualisation

Throughout this course, the student must acquire the knowledge that gives him/her a vision as complete as possible of the zoological and botanical bases and of the diversity of animals, plants and fungi from an anatomical, functional, systematic and phylogenetic perspective. It should also allow it to place each 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.

The specific training objectives are:

- Introduce the student to the main structuring concepts of the sciences of zoology and botany.
- Understand the systematics and phylogenetic relationships between the main groups of organisms as a result of evolutionary and adaptive processes.
- Know the main levels of organization and architectural patterns of organisms.
- Acquire basic knowledge about morphological features, biological cycles, ecological importance, and especially the biotechnological importance of the main groups of organisms.

Learning Outcomes

1. CM01 (Competence) Integrate the function and regulation mechanisms of the cardiovascular, respiratory, excretory, digestive, endocrine and male and female reproductive systems.
2. CM02 (Competence) Assess sex/gender inequalities at experimental level in the fields of human physiology and genetics.
3. CM03 (Competence) Work collaboratively in teams to solve problems and case studies in the field of biology.

4. KM01 (Knowledge) Describe the physiological basis of the organisation and functioning of living organisms.
5. KM03 (Knowledge) Recognise the differentiating elements between animals and plants, both from the cellular point of view and from the point of view of their physiology and functioning.
6. SM01 (Skill) Analyse the behaviour of biological systems from an integrated perspective.
7. SM03 (Skill) Relate relevant scientific data in different areas of biology.

Content

PLANT BIOLOGY

Origin and phylogeny. Origin and classification of living beings. Groups of organisms studied within Animal and Plant Biology.

Classification systems. Taxonomy. Systematics. Taxonomic units. Classification. Species concept. Nomenclature rules.

Reproduction and cycles in the plant world. Asexual reproduction. Spores. Sexual reproduction, gametes, gametangi and types of gammy.

Algae. The main groups of algae. The endosymbiotic origin, its ecology and its morphology. The origin of the chloroplast. Phytoplankton, primary production and blooms (algal toxins).

Heteroconts. General characteristics, criteria of classification and diversity.

The rhodophyta. General characteristics, criteria of classification and diversity. Uses and applications.

The fungi. Origin and phylogenetic situation of fungi. Main groups. Biotechnological importance of fungi. The symbiosis of fungi and its importance in terrestrial ecosystems.

Green plants. The lineage of the higher plants. Chlorophytes and their evolution towards green plants. Bryophytes, ferns, reproduction and ecology. The colonization of terrestrial plants, mechanisms and adaptations. Operation of the corm.

Flowering plants. Origin, reproductive biology and reproductive cycle. Groups of flowering plants. Groups of economic interest and groups that make up the landscape.

Gymnosperms. General characteristics. Description, ecology, geographical distribution and uses of the species of greatest interest.

Angiosperms. General characteristics. Diversity, description, ecology, geographical distribution and uses of the species of greatest interest.

ANIMAL BIOLOGY

Generalities of animals. Zoology as a science. Animal concept. Animal diversity. Basic principles of Zoology. Sorting of animals. Levels of animal organization. Archetype and general plans of animal organization. Types of symmetries.

Animal reproduction and development. Types of asexual and sexual reproduction. Parthenogenesis. Adaptive meaning of the different reproductive modes. Animal development. Ontogeny. Segmentation. Gastrulation. Formation of mesoderm. Organogenesis. Direct and indirect development. Larves and Metamorphosis.

Sponges. General characters. Cell organization. Structural types. Representative groups. Functional adaptations to the aquatic environment.

Cnidaria. General characters. Cellular elements. Representative groups. Biological cycles.

Bilaterals. Protostomes. Lophotrocozoa. Plathelminths. Basic characters. Adaptations of different groups to parasitism. Biological cycles of species with parasitic importance.

Annelids. Basic characters of the annelids. Main groups and adaptations to the different habitats.

Molluscs. Basic characters of the group. Importance of the shell and its evolution. Main groups and their adaptations to the different habitats.

Protostomes. Ecdysozoa. Arthropods. General characters. Structure and importance of the cuticle. Tagmosis. General characteristics of the different arthropod groups and their environmental adaptations.

Deuterostomes. Chordates. Exclusive chordate traits. Comparative characters of Urocordates and Cephalocordates. Biology of the two groups. Vertebrate Diversity: Cyclostomes and Gnathostomes. Compared general characters. Diversity and environmental adaptations. Actynopterygians and Sarcopterygians. Compared general characters. Diversity and environmental adaptations.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lectures	24	0.96	CM01, KM01, KM03, SM01
Type: Supervised			
Tutorials	6	0.24	CM01, CM02, CM03, SM01, SM03
Type: Autonomous			
Preparation and resolution of questions	9	0.36	CM02, CM03, SM01, SM03
Study	25	1	CM01, KM01, KM03, SM01
Text reading	4	0.16	CM01, CM02, SM01, SM03

The methodology used in this subject to achieve the learning process is based on making the student work with the information made available to them. The teacher's role is to give the information or indicate where it can be obtained and to assist and tutor the student so that the learning process can be carried out effectively.

To achieve this goal, the subject is based on the following activities:

Lectures:

The content of the theory program will be mainly delivered in theoretical classes with the support of presentations, videos, and animations related to the topics covered in class. Through these expository classes, the students acquire the basic scientific-technical knowledge of the subject, which must be complemented by personal study of the explained topics. The visual aids used in class will be available on the Virtual Campus.

Question resolution:

Students, individually or in groups, must independently solve a series of questions proposed by the teachers through the Virtual Campus. The objective of these activities is to complete and reinforce the knowledge acquired in the theoretical classes as well as to stimulate empirical skills such as reflection, analysis, and integration of zoological diversity.

Tutorials:

The objective of these sessions is to resolve doubts, clarify basic concepts, and provide guidance on the sources consulted. Likewise, these tutorials provide guidance in the resolution of questions proposed by the teachers.

Note: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to complete surveys evaluating the teacher's performance and the course/modules evaluation.

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
Evaluation of resolved questions	10	3	0.12	CM01, CM02, CM03, SM01, SM03
Partial exam of animal biology	40	2	0.08	CM01, KM01, KM03, SM01
Partial exam of plant biology	50	2	0.08	KM01, KM03, SM01

The evaluation of this subject is carried out throughout the course, following the subsequent criteria:

Partial exams:

In this part, the students' knowledge of the subject will be evaluated individually, as well as their capacity for analysis and synthesis, and of critical reasoning. There will be 2 partial exams, one for the part of plant biology and another one for the part of animal biology.

Resolution of questions:

In this part, students submissions will be evaluated individually or ingroups on their responses. The average of all activitites will account for 10% of the final grade.

Those students who do not pass (minimum mark of 5 from a total of 10) one of the two partial exams must submit to the final exam. If in the final exam one of the notes is less than 4 the student will not pass the subject, resulting in a failing grade for the course. additionally, students that wish to improve the mark of one or both parts will be able to do so by taking the final exam. Applying for the final exam implies that the previously obtained mark will be lost.

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.

Single Evaluation:

The single evaluation consists of a single synthesis test in which the contents of the entire theory program of the subject will be evaluated. The test will consist of multiple choice and/or develop questions. The grade obtained in this synthesis test will account for 90% of the final grade for the subject. The evaluation of the activities carried out through the Moodle Classroom will follow the same process of continuous evaluation. The grade obtainedwill account for 10% of the final grade for the course.

Bibliography

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Links:

- Animal Diversity Web: <http://animaldiversity.ummz.umich.edu/>
- Adena/World Wildlife Found: <http://www.wwf.es/>
- Tree of life web project: <http://tolweb.org/tree/phylogeny.html>
- Understanding evolution: http://evolution.berkeley.edu/evolibrary/article/evo_01
- Comissió Internacional de Nomenclatura Zoològica: <http://www.iczn.org/>
- Curs de Botànica de la Universitat d'Extremadura: <http://www.unex.es/botanica/LHB>
- Museu Nacional de Ciències Naturals de Madrid (CSIC): <http://www.mncn.csic.es/>
- Natural History Museum, Londres: <http://www.nhm.ac.uk/>

Software

No specific software is used in this subject.

Language list

Name	Group	Language	Semester	Turn
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PROVISIONAL