

Animal and Plant Biology

Code: 100946
ECTS Credits: 3

| Degree | Type | Year | Semester |
|-----------------------|------|------|----------|
| 2500253 Biotechnology | OB | 1 | 2 |

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Other comments on languages

Some teaching materials (dissemination articles, scientific articles, videos, etc.) may be in English or Spanish

Teachers

Jessica Martinez Vargas
Juan Goma Martinez

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.
- Give some knowledge about morphological features, biological cycles, ecological importance and highlight the biotechnological importance of the main groups of organisms.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Describe the molecular, cellular and physiological bases of the organisation, functioning and integration of living organisms in the framework of their application to biotechnological processes.
- Read specialised texts both in English and one's own language.
- Reason in a critical manner
- Search for and manage information from various sources.
- 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.
- Think in an integrated manner and approach problems from different perspectives.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Develop a critical approach to anthropic impacts on the biosphere.
3. Identify the principal groups of living beings studied by botany.
4. Identify the principal groups of living beings studied by zoology.
5. Read specialised texts both in English and one's own language.
6. Reason in a critical manner
7. Search for and manage information from various sources.
8. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
9. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
10. Think in an integrated manner and approach problems from different perspectives.

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.

Methodology

The methodology used in this subject to achieve the learning process is based on making the student work the information that is put to his reach. The function of the teacher is to give the information or to indicate where the student can get it and help him so that the learning process can be carried out effectively. To achieve this goal, the subject is based on the following activities:

Master classes:

With these classes, the student acquires the basic scientific and technical knowledge of the subject that must be complemented with the personal study of the topics explained.

Supervised activities:

During the supervised activities, students will work in groups or individually on materials provided by the teacher or that they will search on their own.

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 | | | |
| Master Classes | 24 | 0.96 | 2, 3, 4 |
| Type: Supervised | | | |
| Supervised activities carried out in the framework of the virtual campus | 6 | 0.24 | 1, 9, 8, 7, 2, 3, 4, 5, 10, 6 |
| Type: Autonomous | | | |
| Documentary research and participation in the virtual campus discussion forum | 4 | 0.16 | 7, 5, 10, 6 |
| Study | 30 | 1.2 | 7, 2, 3, 4, 5, 10, 6 |
| Text reading | 6 | 0.24 | 1, 9, 8, 7, 5, 6 |

Assessment

The evaluation of this subject is carried out throughout the course, and it consists of the following evaluating activities:

Partial exams:

In these exams, 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 one for the part of animal biology.

Participation in the Moodle Classroom:

In these tests, the student's participation in different activities will be evaluated, as well as their capacity for analysis and synthesis, and critical reasoning.

Final exam:

Those students who do not pass (minimum mark of 5) 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. Likewise, the students that wish to improve the mark of one or both parts will be able to do it attending to 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.

Assessment Activities

| Title | Weighting | Hours | ECTS | Learning Outcomes |
|--------------------------------|-----------|-------|------|----------------------|
| Partial exam of animal biology | 45 | 1.5 | 0.06 | 8, 7, 2, 4, 5, 10, 6 |
| Partial exam of plant biology | 45 | 1.5 | 0.06 | 8, 7, 2, 3, 5, 10, 6 |

Bibliography

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BARNES, R.S.K. et al. 2001. The Invertebrates: a synthesis. Ed. Blacwell Science. Third edition. (disponible en format electrònic)

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BOLD, H.C. et al. 1988. Morfología de las plantas y los hongos. Omega.

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LLIMONA, X. (ed.) 1991. Fongs i líquens. Història Natural dels Països Catalans. Vol. 5. Enciclopèdia Catalana.

MASALLES, R.M. et al. (eds.) 1988. Plantes superiors. Història Natural dels Països Catalans. Vol. 6. Enciclopèdia Catalana.

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STRASBURGER, E. et al. 2004. Tratado de Botànica. Omega. 9a ed.

VIVES, J. et al. Amfibis, rèptils i mamífers. Història Natural dels Països Catalans. Vol. 13. Enciclopèdia Catalana.

Web 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.