

Animal and Plant Biology

Code: 101956
ECTS Credits: 9

Degree	Type	Year	Semester
2500890 Genetics	FB	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

Teachers

Moisés Guardiola Bufí
Yolanda Melero

Prerequisites

It is recommended to review the concepts related to Zoology and Botany as well as the general concepts to Genetic, Evolution and Cellular Biology shown during this course.

Objectives and Contextualisation

The course has three blocks: Botany, Plant Physiology and Zoology. An introduction to the study of the morphological and biological diversity of the several groups of plants and animals will be made under an evolutionary perspective. In the corresponding part of the Plant Physiology the student will be introduced to the basic knowledge of the biology and functioning of plants as well as their regulation by several factors. In general, throughout this course, the student must acquire a vision as complete as possible of the zoological and botanical bases and of the diversity of animals, plants from an anatomical, functional, systematic and phylogenetic perspective.

Objectives:

Botany:

- 1- Concept of Plants (broadly speaking) and the fields of study of Botany.
- 2- To study the biodiversity and plant systematics from an evolutionary perspective and to discuss the classification methods.
- 3- To learn the main biological processes (life cycles, reproduction, nutritional strategies, dispersion), evolutionary (speciation, evolutionary tendencies, co-evolution) and ecological (habitats, adaptations to the environment) that affect plant biodiversity.
- 4- To provide some knowledge about the applications of the main plants groups.

Plant Physiology:

- 1- To integrate the knowledge of plants at different organizational levels and within the entire organism.
- 2- To introduce the basic vital functions of plants.
- 3- To know the regulation by internal and external factors.

Zoology:

- 1- To introduce the student the main concepts that define the different levels of animal organization, as well as their main architectonic patterns.
- 2- Likewise, to introduce the reproductive and development processes that determine them.
- 3- Obtain an overview of the main animal groups, based on their morphological diversity.

This objective will be divided in three blocks:

- 1- Main groups of non-arthropod invertebrates
- 2- Main groups of Arthropods
- 3- Main groups of Chords

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Apply scientific method to problem solving.
- Be able to analyse and synthesise.
- Be able to communicate effectively, orally and in writing.
- Describe the diversity of living beings and interpret it evolutionally.
- Develop self-directed learning.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Reason critically.
- Recognise and structurally and functionally describe the different levels of biological organisation, from macromolecules to ecosystems.
- 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.
- Use and manage bibliographic information or computer or Internet resources in the field of study, in one's own languages and in English.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Apply scientific method to problem solving.
3. Be able to analyse and synthesise.
4. Be able to communicate effectively, orally and in writing.
5. Describe the morphology and bionomics of the main animal taxa.
6. Develop self-directed learning.
7. Globally explain the functional mechanisms of plants.
8. Identify the differential morphological characteristics of each taxonomic group of plants.
9. Integrate the functional processes of plants, on different organisational levels, to the whole plant organism.
10. Interpret animal and plant diversity, their origin and their evolution.
11. Interpret the biological cycles of animal groups.
12. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
13. Reason critically.
14. Recognise and classify plants and the main types of vegetation.

15. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
16. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
17. Use and manage bibliographic information or computer or Internet resources in the field of study, in one's own languages and in English.

Content

Contents

I: Botany

1. Introduction.
2. Classification systems.
3. Reproduction and Biological Cycles.
4. Cyanobacteria.
5. Euglenoids and Dinoflagellates.
6. Heteroconts: Diatoms and brown algae.
7. The Rhodophyta.
8. The Chlorophyta.
9. The Briophyta.
10. The Vascular Plants.
11. Spermatophyta I. Origen, evolution and morphology of the corm.
12. Spermatophyta II. Origin and evolution of the flower.
13. Spermatophyta III. Gymnosperms Diversity.
14. Spermatophyta IV. Angiosperms Diversity.
15. Fungal phylogeny I. Origin and phylogenetic. Zigomicota and Ascomicota.
16. Fungi phylogeny II. Basidiomycota.
17. Fungal phylogeny III. Ameboides fungi (Mixomicets) and Pseudofongs (Heteroconts: Oomicets).
18. Symbiosis. Lichen and Mycorrhizas.

II: Plant Physiology

1. Introduction to Plant Physiology
2. The plant cell, plasma membranes and cell wall
3. Water needs: concept of water potential, osmotic relationships and growth
4. Water absorption and transport
5. Mineral needs: mineral nutrition of the plant
6. Nutrient absorption and transport
7. Plants and light: photosynthetic pigments; energy transformation
8. Carbon-reducing assimilation: C3 metabolism
9. Reducing Carbon Assimilation: C4 and CAM Metabolism
10. Reductive assimilation of Nitrogen and Sulphur
11. Interactive class to work on concepts of plant nutrition and metabolism
12. Regulation of growth and development by internal factors: phytohormones and genetic regulation
13. Regulation by external factors: Flowering sensor and regulation systems
14. Dormition. Seed germination
15. Fruit formation and ripening
16. Aging and senescence: organ abscission
17. Interactive class to work on concepts of physiology and regulation of plant development

III: Zoology

1. Introduction. General concepts.
2. Architectural Patterns. Main animal groups. Classification criteria.
3. Animal reproduction.
4. Animal development.

5. Non-arthropods invertebrates I: Phylogeny, architectural pattern, morphology and development of:
6. Phylum Porifera
7. Phylum Cnidaria
8. Phylum Platyhelminthes
9. Phylum Annelida
10. Phylum Mollusca
11. Phylum Nematoda
12. Arthropods: Phylogeny, morphology and development.
13. Arthropods: Diversity
14. Non-arthropods invertebrates II. Phylum Echinoderma: Phylogeny, morphology and development
15. Phylum Chordata: Phylogeny, evolution, morphology and development

Methodology

The methodology used to achieve the learning process is based on making the student work the information that is available. The function of the teacher is to give the information or indicate where you can achieve it, by guiding and tutoring it so that the learning process can be carried out effectively. To achieve this goal, the subject is based on the following activities, through the combination of: master classes, seminars, personal study and individual and team work.

Master classes:

With these classes the student acquires the basic scientific-technical knowledge of the subject that must be complemented with the personal study of the topics explained. The theoretical sessions stand out and address the complicated and important points of each didactic unit. Subsequently, the student from the conceptual map will be able to complement it with bibliographic information from his non-contact work. Theoretical sessions are 50 minutes long.

Seminars:

The mission of the seminars is to promote the capacity for analysis and synthesis, critical reasoning and the capacity to solve problems. In seminars, various activities can be carried out, such as analysis and discussion of cases and problems, public presentation of works, commentary of videos, resolution of questions related to the topics covered, etc.

Tutorials:

The tutorials will be carried out in person at the teacher's office (hours to be arranged). Tutorials should be used to clarify concepts, establish the knowledge acquired and facilitate study by students. They can also be used to solve doubts that students have about the preparation of self-learning.

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			
Classes of theory	54	2.16	2, 5, 6, 7, 8, 9, 11, 10, 14, 3
Seminars and case resolution	15	0.6	2, 7, 9, 10, 13, 4, 3

Type: Supervised

Carry out balanced learning exercises	2	0.08	2, 6, 7, 8, 9, 10, 13, 14, 3, 17
Tutories in group and individual	4	0.16	6, 7, 9, 10, 13, 4, 3
Type: Autonomous			
Bibliographic Research	6	0.24	5, 7, 9, 10, 3, 17
Case resolution	7	0.28	2, 5, 7, 8, 11, 10, 13, 14, 4, 3, 17
Drafting of Works	10	0.4	5, 7, 8, 9, 11, 10, 14, 3, 17
Reading of texts	6	0.24	6, 17
Study	60	2.4	6, 7, 9, 13, 3

Assessment

The three thematic modules, Botany, Plant Physiology and Zoology, have an equitable weight of 33% each in the final grade of the course. The weighting of the 3 modules will only be carried out when each of the marks of each module exceeds 5 points out of 10. The mark of each module is the result of theory and seminars / problems.

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

Written test: short/medium development questions or test type where the knowledge acquired by the student in the subject, as well as his capacity for analysis, synthesis and critical reasoning will be assessed individually. Students who do not pass some of the written tests will be able to retake them in the final resit exam. A minimum of 5.0 must be obtained in the written test in order to average the seminars for each module.

Seminars/Problems: The quality of the preparation and presentation of works or public exhibitions will be evaluated as well as the answers of the questions and problems proposed. Seminars/problems are mandatory attendance activities and are not recoverable.

Students who have not passed one of the three modules (grade less than 5 out of 10) will not pass the subject. If you have failed a module but passed the others, the grade will be saved for two courses. Both seminars and theory must be passed to preserve the grade of a module.

Obtaining an A+ will be applied from a grade equal to or higher than 9.0. The number of these qualifications will depend on the number of students enrolled in the current academic year.

Qualification improvement

Students who want to improve their final grade on all or any of the modules, can do so by taking the final exam. In this case, it is understood that the student renounces the previous grades of the modules that are examined and his final mark is calculated from the new mark of the final exam. It is not possible to improve the grade through work or other types of activities.

Definition of not evaluable

It will be considered that a student will obtain the qualification of NOT EVALUABLE when the evaluation activities carried out have a weighting inferior to 67% in the final qualification.

Special cases

If for justified reasons (illness, death of a first-degree relative or accident, etc.) and provide the corresponding official documentation to the Degree Coordinator, they will have the right to take the test in question on another date. The Degree Coordinator will ensure that this is done with the teacher of the subject concerned. However,

if, for the same justified reasons, the student is unable to take the assessment tests at the assigned times, he / she may take them at special times to be agreed with the teacher.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Botany: Individual or group test throughout the course (seminars)	8%	2	0.08	2, 6, 7, 9, 13, 3, 17
Botany: Partial and final tests (individual assessment)	25%	2	0.08	2, 5, 6, 8, 11, 10, 13, 14, 3, 17
Plant Physiology: Individual or group test throughout the course (seminars)	8%	2	0.08	1, 16, 15, 2, 6, 8, 9, 10, 12, 13, 14, 3, 17
Plant Physiology: Partial and final tests (individual assessment)	25%	18	0.72	1, 16, 15, 2, 6, 7, 9, 12, 13, 4, 3, 17
Zoology: Individual or group test throughout the course (seminars)	8%	18	0.72	2, 6, 8, 9, 10, 13, 14, 4, 3, 17
Zoology: Partial and final tests (individual assessment)	25%	19	0.76	2, 5, 11, 10, 13, 4, 3, 17

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Software

None