

26909 - Biology

Syllabus Information

Academic year: 2024/25

Subject: 26909 - Biology

Faculty / School: 100 - Facultad de Ciencias

Degree: 447 - Degree in Physics

ECTS: 6.0

Year: 1

Semester: Second semester

Subject type: Optional

Module:

1. General information

The objective of the subject is that the student acquires essential knowledge about the functioning of living beings at the cellular level, focusing on the structure and function of the main biomolecules, the central metabolism, the structure and function of cellular organelles, and cell proliferation and death.

2. Learning results

The student must acquire the following competencies:

1. To develop working habits in a laboratory with biological material
2. To master the basic terminology of Biology and correctly express biological concepts and principles
3. To understand the general, structural and functional principles shared by living things
4. To know the structure and functions of the organelles of a eukaryotic cell
5. To acquire an integrated overview of cellular functioning and to relate the activity of the different cellular compartments.
6. To become familiar with some basic instrumental techniques of Biology, in particular, to interpret results obtained by optical microscopy.
7. To understand the biological bases on which the application and extension of Biology to various fields is based.
8. To know some current lines of development of Biology in relation to Physics
9. To understand the relationships of living beings with the environment.
10. To understand the basic principles that govern the evolution of living beings.

The student, in order to pass this subject, must demonstrate the following results:

1. Observe and distinguish different cell types: bacteria, animal cells, plant cells and protists.
2. Recognize the structure and know the function of the major groups of biological macromolecules.
3. Distinguish the differences between the various forms of cellular organization.
4. To know how to differentiate the different forms of water and solute transport between cellular compartments.
5. Isolate a cellular organelle.
6. Measure the rate of photosynthesis and/or respiration in isolated chloroplasts and/or mitochondria.
7. To evaluate the growth of a cell culture subjected to drugs that alter the cell cycle.
8. To handle simple computer tools for structural and functional genomics.
9. To evaluate the possible impact of virus cycles on their hosts.

3. Syllabus

Theoretical classes

Origin, organization and classification of living beings. Chemical composition of cells. Proteins. Enzymes.

Carbohydrates. Lipids. Nucleic acids. Basic techniques in Molecular and Cellular Biology. Prokaryotic cells and eukaryotic cells. Cell membranes. Transport across membranes. The endoplasmic reticulum. The Golgi apparatus and vesicular traffic. The core. Cytoskeleton. Introduction to metabolism and cell bioenergetics. General aspects of the main metabolic pathways. Mitochondria, chloroplasts and peroxisomes.

Introduction to molecular genetics. From DNA to proteins. Cell cycle and cell death. Ecology.

Practical classes

Introduction to the use of the optical microscope. Observation of prokaryotes. Observation of unicellular eukaryotes Observation of multicellular eukaryotes. Chromosome staining: observation of mitosis.

Chloroplast isolation and chlorophyll determination.

4. Academic activities

1. Master classes and tutorials: 40 hours (4 ECTS).
2. Laboratory practices and problem solving: 15 hours (1.5 ECTS).
3. Preparation and presentation of seminars: 5 hours (0.5 ECTS)
4. Assessment tests (5 hours)

5. Assessment system

The evaluation of the subject will be based on **seminars** given by the student during the term **periodic tests, laboratory practices** and a final **theoretical exam**. The student may opt for a single final theoretical-practical exam in which they may obtain the maximum grade, having to pass both the theoretical and practical parts in order to pass the subject.

Seminars

Seminars given by students will account for up to 6% of the maximum final grade of the subject. Periodic tests.

There will be three periodical tests, which will represent up to 9% of the final grade of the subject.

Practices

The completion of the practices and the elaboration of the corresponding practice notebook will represent up to 10% of the final grade of the subject.

Theoretical exam

It will consist of multiple-choice and essay questions. Each of the parts must be passed in order to pass the subject. This exam accounts for 75% of the final grade.

In case of failing any of the two parts of the final theoretical examination (test or short answer questions), and if the final grade is equal to or higher than 5, a 4.9 will appear in the transcript.

6. Sustainable Development Goals

- 4 - Quality Education
- 14 - Life Below Water
- 15 - Life on Land