COURSE DATA

Data Subject	
Code	33078
Name	Biology
Cycle	Grade
ECTS Credits	6.0
Academic year	2024 - 2025

Study (s)

Degree	Center	Acad. year	Period
1104 - Degree in Environmental Sciences	Faculty of Biological Sciences	1	First term

Subject-matter

Degree	Subject-matter	Character
1104 - Degree in Environmental Sciences	116 - Biology	Basic Training

Coordination

Name	Department
CASTELLO RUIZ, MARÍA	357 - Cellular Biology and Functional Biology
TOMAS AGUIRRE, JESUS	355 - Zoology

SUMMARY

Biology is a subject of 6 ECTS credits and belongs to a set of subjets that are collectivelly called "General Scientific Basis" in the Degree in Environmental Sciences. Is is taught in the first semester of the first year. This set of subjects are intended for mastering basic general knowledge of the branch of science.

Biology is one of the core disciplines in environmental sciences since living beings are part of the environment and interact with it. The intrinsic value of biodiversity makes necessary its study and its conservation. In addition, advances in the understanding of cellular aspects, and of molecular and functional organization have helped to develop useful applications in environmental monitoring and remediation, among others. The skills acquired through this subject will form the basis for the student to address later in the Degree other more specialized biological subjects (Botany, Zoology, Environmental Microbiology and Ecology) as well as many other subjects with a biological component.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1104 - Degree in Environmental Sciences

- Adquirir, desarrollar y ejercitar destrezas necesarias para el trabajo de laboratorio y la instrumentación básica en física, química y biología.
- Conocer y comprender los niveles de organización de los seres vivos.
- Conocer y comprender la estructura y función de las biomoléculas.
- Conocer y comprender las bases del metabolismo celular.
- Conocer y comprender la estructura y función de los seres vivos.
- Conocer y comprender las bases de la diversidad biológica.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

Performing practical work involving problem solving, data analysis and critical interpretation.

Preparation and presentation of short seminars, both individually and in small groups, involving literature searches, information integration, analysis and synthesis of it. Performing of public oral presentation and defense of it.

Use of bibliographic databases in electronic format, access to journals and other publications in print and electronic format and use at least one presentation software.

Solving problems involving data collection in qualitative and quantitative laboratory analysis of these data and their interpretation in a theoretical context.

Knowledge of levels of organization of living beings.

Knowledge of the structure and function of biomolecules.

Knowledge of the structure and function of living beings.

Knowledge of the foundations of biological diversity.

Instrumental use and management of basic biology.

Use and handling of biological materials

DESCRIPTION OF CONTENTS

1. INTRODUCTION

- Concept and Definition of Biology.
- Hierarchy of biological organization.
- Biology as an end and as a tool in environmental sciences
- Relationship with other subjects of the degree

2. ORGANIZATION AND FUNCTION MOLECULAR AND CELLULAR

- Structure and function of macromolecules.
- The Cell.
- Introduction to cellular metabolism.
- Cellular respiration.
- Photosynthesis.
- Molecular basis of heredity.
- DNA replication and repair.
- Flow of genetic information.

3. ANIMAL AND PLANT PHYSIOLOGY

- Structure of the plants.
- Introduction to Plant Physiology.
- Functional organization of the animals.
- The internal environment and its regulation.
- Bioenergetics.
- Control systems.

4. CONTINUITY OF LIFE

- Chromosomes, mitosis and meiosis.
- Reproduction: definition and types.
- Agamic, gamic and alternating reproduction.
- Life cycles.
- Gametogenesis.
- Fertilization and activation of the ovocyte.
- Basic principles of heredity.
- Mendelian and populational genetics.

5. INTRODUCTION TO BIODIVERSITY

- Theories about the origin of life.
- Domains and Kingdoms. Hypotheses of origin.
- Phylogeny and classification.
- Structural plans. Taxonomy and nomenclature.
- Concept of species. Evolution and natural selection.
- Evolutionary change in populations.
- Speciation and macroevolution. Biomes.
- Biogeography.
- Ethology.
- Migration.
- Sexual selection.
- Social behavior

6. PRACTICAL SESSIONS 1: Biomolecules

Extraction of chlorophyll and hemoglobin and obtaining their absorption spectra.

7. PRACTICAL SESSIONS 2: Observation of cells and tissues

Preparation and microscopic observation of cells and tissues from animals and plants.

8. PRACTICAL SESSIONS 3: Observation and quantification of animal function

Effect of temperature on heart rate in Daphnia.

9. PRACTICAL SESSIONS 4: Animal behaviour.

Observation and study of Apis Mellifera behavior in relation to the search for food. Interaction and communication between individuals within the hive.

10. PRACTICAL SESSIONS 5: Biodiversity

Urban itinerary for observation and identification of flora and fauna. Differences in biodiversity between habitats. Differentiation between autochthonous, colonizing and invasive species.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	45,00	100
Laboratory practices	12,00	100
Tutorials	3,00	100
Development of group work	15,00	0
Development of individual work	2,00	0
Preparation of evaluation activities	28,00	0
Preparing lectures	40,00	0
Preparation of practical classes and problem	5,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

1.- Magistral lessons to be taught sequentially throughout the academic year, so that they are integrated with other proposed activities. The audiovisual material used may include transparencies, powepoint like softwer elaborated presentation or video projections.

2 .- Laboratoy sessions. To be held in 4 sessions of laboratory practices. Students perform the proposed activities after reading the appropriate instructions. After each session they will respond to a questionnaire issued at the end of the same.

3.-A educational tour itinerary will be selected.

4 .- The collective tutorials will be made on completion of thematic teaching. Each of the two planned sessions are one hour and a half and they are used to resolve the doubts raised by the students regarding the topics taught, before proceeding with the agenda and into the next block of items. Interactive activities are also proposed to assist the approach and resolve doubts.

5 .- Interdisciplinary seminar

The students will present a group work as a complementary activity to ensure that at the end of the module they know how to to access to bibliographic databases, and how to make a presentation. This work is done in coordination with the subject of "Incorporación a los estudios en Ciencias Ambientales". Each student will elaborate and present a single work for both subjects and the obtained mark will be considered in the two subjects. The instructions for this activity and the delivery of documents by students will be made through Aula Virtual.

EVALUATION

The evaluation of the course will take into account the different activities in such a way that the total score is obtained based on the following percentages:

- Theory: 65%. This will be assessed by a final examination. The examination may consist of short questions, preferably reasoned, and/or multiple choice questions.
- Practical work: 15%. To be assessed by a final examination. The examination may consist of short questions, preferably reasoned, and/or multiple-choice questions. Attendance and use of practical sessions will also be assessed.
- Tutorials: 10%. This will be assessed by a final exam and by the preparation of and participation in assessment activities (assignments and presentations) proposed by the lecturer to assess the acquisition of the content covered in these sessions.
- Interdisciplinary Seminar: 10%. Preparation, participation and use of the seminars will be assessed.

To pass the course the student must achieve an overall mark of not less than five and must pass each of the activities: practice, theory and seminars independently. Students who fail in the first call may retain the score got in the passed activities.

To apply for the advancement of the exam of this subject, students should be aware that the mandatory activities outlined in this guide have to be accomplished. The mandatory activities are: the seminar and the practices.The evaluation will take place in three different sections: seminars (15%), practical (15%) and examination (70%).

REFERENCES

Basic

- Campbell, N.A., Reece, J.B. (2007). Biología. Séptima edición. Editorial Médica Panamericana. Madrid.
- Freeman, S. (2009) Biología .Pearson Educación. (Pearson, Addison Wesley), Madrid
- Sadava, D., Heller, H.C.; Orians, G.H. & Purves, W.K., Hillis, D. (2009). Vida. La ciencia de la biología, 8ª ed. Ed. Medica Panamericana. Madrid
- Solomon, E.P., Berg, L.R. & Martin, D.W. (2008). Biología. Ed. McGraw-Hill Interamericana. Madrid.

Additional

- Escaso Santos, E., Martínez Guitarte, J.L y Planello Carro, M.R. (2010) Fundamentos básicos de fisiología vegetal y animal. Pearson Educación. (Pearson, Addison Wesley), Madrid.
- Hickman, C.P. & Roberts, L.S. & Larson, A. (2006). Zoología. Principios Integrales. Ed. McGraw-Hill Interamericana. Madrid. 13ª edición.

- Hill, R.W., Wyse, G.A. y Anderson, M. (2006) Fisiología Animal: Adaptación y ambiente. 3ª Edición. Editorial Medica Panamericana. Madrid
- Slater, P.B.J. (2000). El comportamiento animal. Ed. Cambridge University Press.
- Willmer, P.(1996). Invertebrate Relationships. Patterns in animal evolution. Cambridge University Press