COURSE DATA

Data Subject	
Code	33165
Name	Biology
Cycle	Grade
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
1102 - Degree in Biotechnology	Faculty of Biological Sciences	1	First term

Subject-matter

Degree	Subject-matter	Character
1102 - Degree in Biotechnology	80 - Biology	Basic Training

Coordination

Name	Department
MARTINEZ TORRES, DAVID	194 - Genetics

SUMMARY

Biology is a compulsory and basic subject in the Degrees in Biotechnology and in Biochemistry and Biomedical Sciences of the University of Valencia that, taught at the start of the formative process of the students, familiarises them with the scientific theory that unifies and integrates the knowledge taught in the remaining biological disciplines. This is part of the matter Principles of Biology together with the subject Biological Diversity.

The main objective of this subject is to offer an introduction to biotechnology as a biological discipline, as well as a vision of the biology from an evolutionary perspective through several issues of special relevance in the context of current science and society, including:

- Introduction to biotechnology.
- Theory of the evolution.
- Natural selection.
- Adaptation and speciation.
- Other processes of evolutionary change.
- Populations, communities and sustainability.
- Crisis of biodiversity.

- Human diversity.
- Biology and gender.
- Chronobiology

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

OUTCOMES

1102 - Degree in Biotechnology

- Ser capaz de dar una breve charla a un auditorio no especializado sobre un tema general de Biología con impacto actual en la sociedad.
- Be able to place the different living beings in the phylogenetic tree.
- Be able to understand the evolutionary relationships between organisms.
- Be able to understand the biological basis of human diversity and its cultural implications, including gender difference.

LEARNING OUTCOMES

The following personal skills should be accomplished:

- Place Biotechnology and Biology in the context of science through the knowledge of some of its main issues and challenges in today's world
- Capacity of analysis, synthesis and methodical and rigorous work
- Elaborate summaries and critical reviews of texts of biological and scientific content
- Obtain scientific information and be able to evaluate its validity
- Develop the ability to discuss
- Ability to communicate the scientific knowledge

Social skills:

- Skill to work in a team
- Awareness and respectfulness of the human cultural diversity
- Ability to be aware of the environmental risks and of the biodiversity crises
- Commitment with the conservation and with the sustainable development
- Commitment with the defense and practice of equality policies

DESCRIPTION OF CONTENTS

1. Biotechnology, Biology and Evolution

1. Introduction to Biotechnology. Brief historical revision. The colours of Biotechnology. Public perception of Biotechnology. Biotechnology, Biology and Evolution.
2. The discovery and concept of Evolution.- Brief historical summary of evolutionary thought: from fixism to the New Synthesis. Criticism and evidence in favour of evolution. Natural selection as an explanation of diversity and adaptation.
3. Deciphering the Tree of Life.- The phylogenetic perspective of biology: the tree of life. Classification and systematics. Homologies and analogies. Model organisms. Principles of phylogenetic inference. The use of phylogenies to answer evolutionary questions.
4. Genetic processes in Evolution I.- The origin of new alleles. Origin, description and quantification of genetic variability. HardyWeinberg equilibrium.
5. Genetic processes in Evolution II.- Mechanisms of evolutionary change. Selection. Mutation. Migration. Drift. Non-random mating. Evolution of multigenic characters.
6. Evolution of genes and genomes.- Analysis of evolutionary change at the molecular level. Neutral theory. The molecular clock. The origin of new genes. The genome as a unit of evolution. Comparative evolution of genomes.
7. The origin of the species.- The concept of species. Isolation mechanisms. Biogeographic patterns in speciation. Genetic differentiation throughout speciation.
8. The study of adaptation. Trade-offs and restrictions. The origin of complex characters. homeotic genes. Evolution of sex. sexual selection.
9. Chronobiology. The measure of biological time. Biological rhythms. Circadian rhythms. The circadian clock. Annual rhythms. Photoperiodism.
10. Human evolution.- The relationship between current humans and apes. The ancestors of humans. The origin of modern humans.
11. The origin of life.- From the world of RNA to the universal common ancestor.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	46,00	100
Classroom practices	8,00	100
Computer classroom practice	4,00	100
Tutorials	2,00	100
Attendance at events and external activities	4,00	0
Development of group work	10,00	0
Study and independent work	76,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

The subject is organized around different learning activities including the following:

- **Theoretical lessons** in which the lecturers will present the fundamental concepts of each lesson, using audiovisual resources that will be previously accessible for the students through the usual platforms. It will address the students to the suitable bibliography and the resources to use for a deeper study of the presented concepts and will emphasize those aspects related with the conferences and the homework dealed with during the classroom activities..
- **Conferences** on current topics in Biology that will be useful to illustrate concepts introduced in the classroom and will help the students to get an integrated perspective. These conferences will be usually chosen from those offered in conference cycles ongoing in the Faculty of Biological Sciences or other centres of the University of Valencia. Later on, the students will be asked to present a summary of some selected conferences.
- **Classroom Activities.** Students organized in groups will prepare and discuss, with the moderation of the teacher, a series of specific topics based on scientific papers that will be related with the main concepts that appear in the theory sessions. Two practical sessions in the computer room are also scheduled for the analysis of simulated and real data.
- **Group tutoring sessions**. Sessions with reduced student groups to discuss doubts, and/or resulys obtained by the different groups in the classroom activities.
- **On-line individual tutoring**.

EVALUATION

A continuous evaluation of each student will be carried out, based on the different activities described in the Methodology section. Assistance to all the activities will be considered in addition to, the execution and presentation in time of all tasks and complementary activities The degree of participation and of involvement in the process of education-learning will also be considered. The particular aspects to evaluate will be the following:

- **Exam**. An examination of knowledge will be taken with questions on both theory and practical issues. This test will represent a 70% of the final mark. The minimum mark in the exam needed to pass the course will be 5 in a 0 to 10 scale

-The marks obtained on the **homework** and on **the classroom activities** and **computer work** will contribute altogether to **20%** of the global mark.

-Assistance to **interdisciplinary conferences** programmed during the first term, and preparation of a summary will represent a **10%** of the final mark.

REFERENCES

Basic

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Additional

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