# COURSE DATA

## DATA SUBJECT

**Code:** 33165
**Name:** Biology
**Cycle:** Undergraduate Studies
**ECTS Credits:** 6
**Academic year:** 2026-27

## STUDY (S)

| Degree | Center | Acad. year | Period |
|---|---|---|---|
| 1111 - Grado en Biotecnología | Facultat de Ciències Biològiques | 1 | First quarter |

## SUBJECT-MATTER

| Degree | Subject-matter | Character |
|---|---|---|
| 1111 - Grado en Biotecnología | Biología | BASIC |

## COORDINATION

MARTINEZ TORRES DAVID

# SUMMARY

Biology is a required and core subject in the Bachelor's Degree in Biotechnology at the University of Valencia. It is taught at the beginning of students' studies and familiarizes them with the scientific theory that unifies and integrates the knowledge taught in the other biological disciplines. This subject is included in the Biology program, along with Biological Diversity.

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

- Introduction to biotechnology.
- Theory of evolution.
- Natural selection and adaptation.
- Other processes of evolutionary change.
- Species, populations, communities and sustainability.
- Biodiversity crisis.
- Biotechnology, ethics and society.
- 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

## COMPETENCES / LEARNING OUTCOMES

### 1102 -

Be able to place the different living beings in the phylogenetic tree.

Be able to understand the biological basis of human diversity and its cultural implications, including gender difference.

Be able to understand the evolutionary relationships between organisms.

Ser capaz de dar una breve charla a un auditorio no especializado sobre un tema general de Biología con impacto actual en la sociedad.

### 1111 - Grado en Biotecnología

Actuar con autonomía en el aprendizaje, tomando decisiones fundamentadas en diferentes contextos, emitiendo juicios en base a la experimentación y el análisis y transfiriendo el conocimiento a nuevas situaciones

Apply analytical, synthetic and critical thinking skills in the application of the scientific method.

Assimilate ethical and legal principles in scientific research in biotechnology.

Colaborar eficazmente en equipos de trabajo, asumiendo responsabilidades y funciones de liderazgo y contribuyendo a la mejora y desarrollo colectivo

Conocer y comprender, desde el propio ámbito de la titulación, las desigualdades por razón de sexo y género en la sociedad; integrar las diferentes necesidades y preferencias por razón de sexo y de género en el diseño de soluciones y resolución de problemas

Contribuir en el diseño, desarrollo y ejecución de soluciones que den respuesta a demandas sociales, teniendo en cuenta como referente los Objetivos de Desarrollo Sostenible

Demostrar razonamiento crítico y autocrítico en el ámbito de la titulación, considerando aspectos tales como la ética profesional, los valores morales y las implicaciones sociales de las diferentes actividades

realizadas

Disseminate and engage in public debate on issues related to biotechnology and its applications.

Participate in multidisciplinary teams, engaging in teamwork and collaboration.

Propose creative and innovative solutions to complex situations or problems, typical of the area of ¿¿¿¿connection, to donate responses to the various professional and social needs

Que el estudiantado demuestre su capacidad para utilizar las diferentes fuentes bibliográficas y bases de datos biológicos y usar las herramientas bioinformáticas

Saber comunicarse de manera efectiva, tanto de forma oral como escrita, adaptándose a las características de la situación y de la audiencia

Saber situar la Biología en el contexto de la ciencia a través de algunos de sus grandes temas y problemáticas en el mundo actual.

Understand evolutionary relationships among organisms.

Understand the biological foundations of human diversity and its cultural implications, including gender differences.

Use English to write reports and to interpret information from protocols, manuals and databases.

Work in laboratories, including safety procedures, waste management and accurate activity logging.

## DESCRIPTION OF CONTENTS

The syllabus covers a variety of topics covered in Biology, especially those related to Biotechnology and Evolution.

### 1. Introduction to Biotechnology.

Historical perspective. Fields of study and research: the colors of Biotechnology. Public perception of biotechnology. Ethical aspects. Biotechnology: relationship with biology.

### 2. The Theory of Evolution.

The discovery and concept of Evolution. From fixism to the New Synthesis. Criticisms and evidence in favor of evolution. The evolutionary perspective in biotechnology: the fight against HIV.

**3. Molecular Evolution.**

The tree of life: Homologies, analogies, and model organisms. Origin, description, and quantification of genetic variability. Alignment of DNA and protein sequences. Molecular phylogenetics.

**4. Natural Selection.**

Hardy-Weinberg equilibrium. Natural selection as an explanation of diversity and adaptation. Other mechanisms of evolutionary change. Evolution of multigenic traits. Artificial selection.

**5. Genes and genomes.**

Neutral theory. The molecular clock. The origin of new genes. Horizontal gene transfer. Comparative evolution of genomes.

**6. The origin of species.**

The concept of species. Reinforcement. Isolation mechanisms. Biogeographical patterns in speciation. Differentiation throughout speciation. Genetic modification of species (ethical aspects).

**7. The study of adaptation.**

The study of adaptation. Trade-offs and constraints. The origin of complex traits. Evolution of sex. Sexual selection.

**8. The human factor.**

Human interventions and global changes: ecology, species introduction and extinction, biodiversity loss. Biotechnology in environmental conservation.

**9. Sustainability.**

Sustainable Development: origin of the concept, historical background, and guiding principles. Dimensions. Sustainable Development Goals (SDGs). Sustainable agriculture and biotechnology. Biology and gender.

**10. Biological rhythms.**

Circadian rhythms. The clockCircadian. Annual rhythms. Photoperiodism. Other rhythms. Importance of chronobiology in health and agriculture.

## WORKLOAD

### PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Tutorials | 2,00 |
| Theory | 46,00 |
| Computer classroom practice | 4,00 |
| Classroom practices | 8,00 |
| **Total hours** | **60,00** |

### NON PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Attendance at other activities | 4,00 |
| Individual or group project | 10,00 |
| Independent study and work | 76,00 |
| Preparation of lessons | 0,00 |
| Preparation for assessment activities | 0,00 |
| Resolution of case studies | 0,00 |
| **Total hours** | **90,00** |

## TEACHING METHODOLOGY

The subject is based on the use of the following learning activities:

- **Participative lectures** in which faculty members present the fundamental concepts of each topic, using appropriate audiovisual resources, which will be previously accessible through the university's teaching support platform. Students will be guided toward appropriate bibliography and other resources for a more in-depth study of the concepts, and these will be correlated with

the lecture topics and scientific articles covered during classroom activities.

- **Scheduled conferences.** These will cover relevant topics in Biology and of special interest in Biotechnology. They will serve to connect concepts and provide students with an integrated view of them. In addition to encouraging attendance at lectures given within the Faculty of Biological Sciences or other centers of the University of Valencia, two lectures will be scheduled specifically for the subject. Students will subsequently compile a summary of selected lectures.
- **Classroom Practices/Activities.** Students will prepare, study, present, and discuss scientific articles in English with the help of the faculty. Two articles will be discussed in each session. The articles will be used to develop aspects or concepts covered in the topics "Introduction to Biotechnology," "The Human Factor," and "Sustainability." The activities are carried out in groups of students who, at the end, will give a public presentation to the rest of the class, followed by a debate with the other students and the faculty.
- **Informatic sessions** will consist of two sessions in a computer lab for simulation or analysis of real data.
- **In-person tutoring** in small groups. These sessions will be used to discuss doubts and questions related to the syllabus or the preparation of classroom activities.
- **On-line tutoring**.

## EVALUATION

An ongoing assessment will be conducted for each student, based on the various in-person and offline activities described in the Methodology section. This assessment will include attendance at all in-person activities, the completion and presentation of all assignments and complementary activities, participation, and the degree of engagement in the teaching-learning process. The specific aspects to be assessed will be the following:

- **Objective test** on the subject content: This will consist of an exam with theoretical and practical questions. The grade for this test will represent **70%** of the final grade. In this exam, special emphasis will be placed on understanding basic concepts for developing biological training and achieving the overall objective of the subject. Achieving a score of at least 5 out of 10 on this exam is an essential condition for passing the subject.

- The assessment of work completed in **classroom and computer lab activities** will contribute **20%** of the overall grade.

- The assessment of attendance at **interdisciplinary lectures** during the first semester and their comprehension, through the creation of pre-designed worksheets, will represent **10%** of the final grade.

## REFERENCES

## Basics

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## Complementary

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