# 1. OVERVIEW

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|---|---|
| **Subject Area** | Biology |
| **Degree** | Bachelor's Degree in Biotechnology |
| **School/Faculty** | School of Biomedical and Health Sciences |
| **Year** | First |
| **ECTS** | 6 |
| **Type** | Core |
| **Language(s)** | English/Spanish |
| **Delivery Mode** | On campus |
| **Semester** | First semester |
| **Academic Year** | 25 - 26 |
| **Coordinating professor** | Beatriz Moreno García |
| **Professor(s)** | Kissy Guevara-Hoyer y Beatriz Moreno García |

# 2. INTRODUCTION

This subject is included in the Fundamentals of Biology module. It aims to provide a general description of the most important aspects of biology, with particular attention paid to biochemical, molecular and cellular aspects. The subject area is divided into 2 large blocks: it begins with the theory of evolution and the classification and characteristics of living beings; and then moves on to cellular and molecular biology and the different aspects of cellular and molecular pathology. This subject area therefore serves as a key introduction to other subjects on this degree course such as microbiology, biochemistry, immunology and molecular biology.

# 3. LEARNING OUTCOMES (RA, by the acronym in Spanish)

**Knowledge (CON, by the acronym in Spanish)**

**CON02**. Recognise the structure, organisation and function of tissues, organs and systems, viruses and cells, as well as the processes which occur in them. Recognise the principles by which cell function is governed from a molecular perspective.

**Abilities (HAB, by the acronym in Spanish)**

**HAB02**. Use samples and laboratory techniques all the while maintaining the appropriate safety and quality measures in each laboratory.

• Acquire the skills necessary to work in a biology and genetics laboratory, and apply preventative measures to reduce risk involved with the handling of certain biological substances.

• Achieve a written and spoken command of the language and vocabulary to show full understanding of the different types of living organisms and the fundamental differences in their formation, organisation and functions.

• Interpret cellular and subcellular images obtained through an optical and/or electronic microscope.

**Skills**

**COMP01**. Acquire an integral vision of cellular function and its different behaviour with regard to both metabolism and gene expression.

**COMP02**. Identify and describe the structure and function of the different types of cells both in unicellular and pluricellular organisms.

**COMP06**. Develop the skills needed to use the most common equipment, instruments and basic techniques in biotechnology, following quality standards and current biosecurity regulations.

## 4. CONTENTS

- Diversity of life. Domains and kingdoms of living organisms and their characteristics.
- Evolutionary and ecological relationships within and between the different kingdoms. Classification and phylogeny.
- Normal structure and function of eukaryotic cells. Relationships between cells and their environment.
- Organelles and their integration in cellular function. Cellular cytoskeleton.
- Mechanisms of cell division, cell cycle and control mechanisms.
- Fundamental abnormalities in the normal structure and function of cells.
- Stem cells. Cell differentiation.
- Basic laboratory techniques. Optical microscope.
- Introduction to the biochemical processes of obtaining, using and storing energy.

## 5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lecture
- Case studies
- Collaborative learning
- Project-based learning
- Learning based on workshop teaching

## 6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

**On campus:**

| Learning activity | Number of hours |
|---|---|
| Lectures | 32 |
| Asynchronous lectures | 12 |
| Debates and discussions | 4 |
| Case Studies | 4 |
| Problem-solving | 6 |

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|---|---|
| Oral presentations | 2 |
| Written reports and essays | 7 |
| Tutorials | 15 |
| Independent working | 50 |
| Workshops and/or lab work | 8 |
| Research (scientific/case studies) and projects | 4 |
| On-campus knowledge tests | 6 |
| **TOTAL** | **150** |

# 7. ASSESSMENT

The assessment methods, together with how much they each count towards the final grade for the subject area, are as follows:

**On campus:**

| Assessment system | Weight |
|---|---|
| On-campus knowledge tests | 60% |
| Spoken presentations | 10% |
| Reports and written work | 10% |
| Case study/problem | 10% |
| Laboratory work | 10% |

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

## 7.1. Ordinary exam period

To pass the subject area in the ordinary exam period you must obtain a mark of 5.0 or more out of 10.0 in all assessed parts of the subject. Any part you do not pass in the ordinary exam period will need to be recovered in the extraordinary exam period (resits).

Your final grade will be the average of the partial marks in each of the learning activities you have passed. The continuous assessment system for the learning activities requires attendance to at least 50% of the classes.

*It is compulsory for students to accredit attendance to at least 50% of classes. This requirement is essential to the assessment process and qualifies students for the right to obtain academic counselling, support and monitoring from the professor. To this end, students must use the technological means made available by*

*the University to accredit their daily attendance to each of their classes. This system will also serve to guarantee an objective record of the active role of the students in the classroom. Failure to accredit attendance to at least 50% of the classes by any of the means proposed by the University will mean that the professor awarding a fail to the student for that subject area in the ordinary exam period in accordance with the grading system outlined in these regulations. All of the above, without prejudice to the other requirements or higher attendance percentages that other faculties may stipulate in their learning guides or internal regulations.* Regulations for the assessment of official degree programmes, Art. 1 point 4. (http://www.uem.es/myfiles/pageposts/reglamento_evaluacion_titulaciones_oficiales_grado.pdf).

### 7.2. Extraordinary exam period (resits)

To pass the subject area in the extraordinary exam period (resits), the students must obtain a mark equal to or above 5.0 out of 10.0 in all parts of the subject assessment they did not pass during the ordinary exam period.

The student must submit the activities not passed in the ordinary exam period taking into account the corrections or comments made by the teacher. The student must also submit any activities which were not submitted.

The final grade will be the average of the partial marks in each of the activities passed (with a mark equal to or higher than 5 out of 10). The marks for the assessable activities the student passed in the ordinary exam period will be maintained for calculating this grade.

## 8. TIMELINE

The timeline with delivery dates of assessable activities in the subject area is indicated in this section:

| Assessable activities | Date |
|---|---|
| Activity 1. Case study/problem. Microscope workshop | Week 4 |
| Activity 2. Laboratory work. Glucose transport | Week 5-6 |
| Activity 3. Reports and written work. Visualising cells: Eukaryotes v. Prokaryotes | Week 7 |
| Activity 4. Laboratory work.Osmotic processes in animal and vegetable cells | Week 8 |
| Activity 5. Oral presentation | Week 8 |
| Activity 6. Objective test. Midterm | Week 9 |
| Activity 7. Laboratory work. Identifying protozoa | Week 10 |
| Activity 8. Laboratory work. Study of mitosis | Week 11 |
| Activity 9. Reports and written work. Cellular division | Week 12 |
| Activity 10. Case study/problem. Genetically modified organisms | Week 13 |

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| Activity 11. Final test | Week 18 |

The timeline may be subject to modifications for logistical reasons of the activities. Students will be informed of any changes in due time and course.

## 9. BIBLIOGRAPHY

The reference work for following this subject area is:


- COOPER, Geoffrey M. The Cell. A Molecular Approach. 8th Ed.. Ed. Sinauer. 2022.


The recommended bibliography is indicated below:


- ALBERTS, Bray et al. Molecular Biology of the Cell. 6th Edition. Omega Publishing. 2017
- CANO, Alfonso. Biomedical Cell Biology. 2nd Edition. Elsevier. 2023
- BRADLEY, Philip. Biology for the Medical Sciences. 2nd Edition. Scion Publishing. 2013
- COX, Timothy M., Sinclaire. Molecular Biology in Medicine. 1st Edition. Panamericana Publishing. 1998
- CURTIS, Helena; BARNES, N.S. Invitation to Biology. 7th Edition. Panamericana Publishing. 2015
- LEHNINGER. Principles of Biochemistry. 7th Edition. Omega Publishing. 2018
- LEWIN, Benjamin. Genes. 9th Edition. McGraw Hill. 2008
- NUSSBAUM, R.L. et al. Genetics in Medicine. 8th Edition. Masson (Elsevier). 2016
- KARP, Gerald. Cell and Molecular Biology: Concepts and Experiments. 8th Edition. McGraw-Hill. 2018
- KREUZER, H.; MASSEY, A. Recombinant DNA and Biotechnology. 1st Edition. Acribia Publishing. 2005
- THIEMAN, William J. et al. Introduction to Biotechnology. 3rd Edition. Pearson Education. 2018


Resources on the Internet


- http://www.genome.gov/Glossary/index.cfm (Dictionary of genetic terms in English).
- http://www.ncbi.nlm.nih.gov/PubMed (U.S. National Library of Medicine)
- http://www.ensembl.org/index.html (European Genomics Database)
- http://www.sciencedirect.com/ (scientific website)
- http://www.fecyt.es/fecyt/home.do (Spanish Foundation for Science and Technology)
- http://www.nature.com/scitable (Educational website by Nature Group)
- http://www.dnalc.org/ (DNA Learning Center, Cold Spring Harbor Laboratory. Very useful website for watching videos and interactive areas on the molecular basis of DNA).
- http://ghr.nlm.nih.gov/glossary=contig (NIH Scientific Dictionary)

## 10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

The Educational Guidance and Diversity Unit (ODI in Spanish) offers support throughout your time at university to help you with your academic achievement. Other cornerstones of our educational policy are the inclusion of students with special educational needs, universal access in all our university campuses and equal opportunities.

This ODI unit offers students:

1. Support and monitoring through counselling and personalised student plans for those who need to improve their academic performance.
2. Curricular adaptations to uphold diversity, with assistance for those students who require specific educational support, leading to equal opportunities without significant changes to methodology or evaluation.
3. We offer students a range of extracurricular educational resources to reinforce skills which will enhance their personal and professional development.
4. Career guidance by offering tools and advice to students with doubts regarding their professional careers or those who believe they have chosen the wrong line of study.

Students who need educational support can contact us at:
orientacioneducativa@universidadeuropea.es

## 11. SATISFACTION SURVEYS

Your opinion matters!

Universidad Europea encourages you to complete our satisfaction surveys to identify strengths and areas for improvement for staff, degree courses and the learning process.

These surveys will be available in the surveys area of your virtual campus or by email.

Your opinion is essential to improve the quality of the course.

Many thanks for taking part.