# Course guide
# 820021 - BB - Biology

**Last modified:** 04/06/2026

**Unit in charge:** Barcelona East School of Engineering
**Teaching unit:** 702 - CEM - Department of Materials Science and Engineering.
751 - DECA - Department of Civil and Environmental Engineering.

**Degree:** BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Compulsory subject).

**Academic year:** 2026 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

## LECTURER

**Coordinating lecturer:** ELISABET ENGEL LOPEZ

**Others:** Primer quadrimestre:
DANIEL CABRERIZO AGUADO - Grup: M42, Grup: M44
Jordi Guillem - Grup: M41, Grup: M43,

Gonzalez Flo, Eva - Grup M45

## DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

**Specific:**
2. Understand physiology and biology.
CEBIO-200. Identify the functions of the human organism as a whole and by systems.

**Transversal:**
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.

## TEACHING METHODOLOGY

The course uses expository methodology (theory) in 29%, individual or group classroom (lab) in 10%, individual distance in a 47% non-attendance and work in another group 14 %.

## LEARNING OBJECTIVES OF THE SUBJECT

To provide students an overview of aspects of normal cell function to be able to understand the basics of integrating cells into tissues and their functional specialization, and also diseases at the molecular and cellular level.

## STUDY LOAD

| Type | Hours | Percentage |
|---|---|---|
| Hours medium group | 45,0 | 30.00 |
| Self study | 90,0 | 60.00 |
| Hours small group | 15,0 | 10.00 |

**Total learning time:** 150 h

## CONTENTS

### 1 .- An evolutionary framework for Biology

**Description:**
Organisms have changed over hundreds of millions of years. Evolutionary mechanisms. Speciation that has led to diversity

**Full-or-part-time:** 5h 30m
Theory classes: 1h 30m
Self study : 4h

### 2 .- Introduction to molecular and cellular biology

**Description:**
Water properties, relation of life with water, acids, bases, pH, blocked cellular ion balance.

**Full-or-part-time:** 5h 30m
Theory classes: 1h 30m
Self study : 4h

### 3 .- Macromolecules: Their chemistry and biology

**Description:**
Condensation reactions: Proteins: polymers of amino acids, carbohydrates, polymers of sugars, nucleic acids: polymers, lipids, water-insoluble molecules

**Full-or-part-time:** 9h
Theory classes: 3h
Laboratory classes: 2h
Self study : 4h

### 4 .- Cell Organization

**Description:**
The Cell: basic unit of life, Prokaryotes, Eukaryotes. Information processing organelles that process energy, cytoskeleton, extracellular structures.

**Full-or-part-time:** 9h
Theory classes: 3h
Laboratory classes: 2h
Self study : 4h

### 5 .- Cell membranes

**Full-or-part-time:** 7h 30m
Theory classes: 1h 30m
Self study : 6h

### 6 .- Energy and metabolic enzymes

**Full-or-part-time:** 12h
Theory classes: 3h
Laboratory classes: 2h
Self study : 7h

### 7 .- Cellular pathways that produce chemical energy

**Full-or-part-time:** 14h
Theory classes: 3h
Laboratory classes: 2h
Self study : 9h

### 8 .- Chromosomes, cell cycle and cell division

**Full-or-part-time:** 11h
Theory classes: 3h
Laboratory classes: 2h
Self study : 6h

### 9 .- Genetics: Mendel's Laws

**Full-or-part-time:** 9h 30m
Theory classes: 1h 30m
Practical classes: 2h
Self study : 6h

### 10 .- The DNA and its role in heredity

**Full-or-part-time:** 11h
Theory classes: 3h
Laboratory classes: 2h
Self study : 6h

### 11 .- Of the DNA to Protein: Genotype to phenotype

**Full-or-part-time:** 11h
Theory classes: 3h
Laboratory classes: 2h
Self study : 6h

### 12 .- The genome of eukaryotes and their expression

**Full-or-part-time:** 12h
Theory classes: 4h
Laboratory classes: 2h
Self study : 6h

**13 .- Development: Differential expression of genes**

**Full-or-part-time:** 11h
Theory classes: 3h
Laboratory classes: 2h
Self study : 6h

**14 .- Recombinant DNA and biotechnology**

**Full-or-part-time:** 11h
Theory classes: 3h
Self study : 8h

**15 .- Molecular Biology and Medicine**

**Full-or-part-time:** 11h
Theory classes: 3h
Self study : 8h

## GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

The evaluation will be conducted through the assessment by teachers of student work, individual and / or group performed on a face and, appropriately weighting the following activities:
2 individual tests conducted face-off along the course.
guided laboratory exercises.
Weight in the final evaluation:
Two partial checks: 35% + 35%
Lab practices exam: 15%
Oral presentation: 15%

## BIBLIOGRAPHY

**Basic:**
- Sadava, David E.; Fernández Castelo, Silvia. Vida: la ciencia de la biología. 8a ed. Buenos Aires [etc.]: Médica Panamericana, cop. 2009. ISBN 9789500682695.
- Solomon, Eldra Pearl; Berg, Linda R.; Martin, Diana W.; García Hernández, Ana. Biología: novena edición. México, D.F: Cengage Learning Editores, S.A. de C.V., 2013. ISBN 9786074819335.
- Devlin, Thomas M. Bioquímica: libro de texto con aplicaciones clínicas. 4ª ed. Barcelona: Reverté, 2004. ISBN 8429172084.