

## 27117 - Molecular Biology

### Syllabus Information

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**Academic year:** 2024/25

**Subject:** 27117 - Molecular Biology

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 446 - Degree in Biotechnology

**ECTS:** 6.0

**Year:** 3

**Semester:** First semester

**Subject type:** Compulsory

**Module:**

### 1. General information

The general objective of this subject is to familiarize the student with the advances, research, challenges and applications of the knowledge acquired in Molecular Biology.

This objective will be achieved through theoretical classes and seminars. The production of a personal work, intends that students deepen their previous knowledge and acquire additional skills related to the search for information and its critical analysis, writing and communication of scientific content.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), so that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement.

### 2. Learning results

- To know the structures, molecular processes and enzymes involved in the biosynthesis of macromolecules (nucleic acids and proteins) and their regulation.
- To value the advances and capacity to solve biotechnological problems.
- To explore and analyse specific information and convey aspects of the subject. To integrate and argue the foundations of the various aspects that make up the subject.
- To present and exhibit work done individually. This discipline will bring the student closer to the context of molecular biology and its application in biotechnology.

In its development, large-scale experimental approaches through relevant methodologies, lectures by scientists, breakthroughs and seminars, among others, will be fundamental.

### 3. Syllabus

1. Nucleic Acids and Genomes.
2. DNA replication in prokaryotes, enzymes and regulation.
3. DNA replication in eukaryotes, enzymes and regulation.
4. Mitochondrial DNA replication.
5. Virus replication.
6. DNA repair.
7. RNA synthesis in prokaryotes enzymes and regulation.
8. RNA processing of prokaryotes. Maturation of tRNAs and rRNAs.
9. RNA synthesis in eukaryotes, enzymes and regulation.
10. Post-transcriptional modifications, RNA of eukaryotes. Maturation.
11. Synthesis and processing, mitochondrial RNA. Mitochondrial DNA organization and expression in eukaryotes.
12. Genetic code. Alterations.
13. Translation, enzymes and key processes.
14. Protein biosynthesis, prokaryotes.
15. Protein biosynthesis, eukaryotes, mitochondria.
16. Regulation of gene expression, prokaryotes.
17. Regulation of gene expression, eukaryotes. RNA regulation and processing. Translation regulation. Post-translational regulation.

#### 4. Academic activities

Theoretical classes. 4 ECTS. The basic theoretical knowledge of the subject is presented, which will deal with the aspects mentioned in the syllabus.

Practical classes: Presentation and exhibition of a work. 2 ECTS. This activity consists of students collecting information on a specific topic, assisted by the teacher in the resolution of the case. The teacher will supervise at all times the individual work of the students by scheduling tutoring sessions. Finally, the papers will be presented and discussed in class. All students will be informed about work and safety rules of the Prevention Unit of Labour Risks :<http://uprl.unizar.es/estudiantes.html>

#### 5. Assessment system

The evaluation will consist of the following tests:

Performance of an objective test: A written exam with multiple choice and essay questions. The former will filter knowledge, and the latter will evaluate the student's abilities to express and defend arguments. The multiple-choice questions and the short questions will be evaluated out of 25 points and 75 points out of 100, respectively. It will be graded from 0 to 10 and will contribute 80% to the final grade. The exam must be passed (5 points out of 10 to pass the subject).

Presentation and exhibition of an individual work: The work will be on a topic related to the subject, that each student will agree with the teacher. The completion of the written work and its presentation for 15 minutes in front of the class will be mandatory to pass the subject. It will be graded from 0 to 10 and will contribute 20% to the final grade.

In addition to what has been previously described, students will have the possibility of being evaluated in a **global test** that will judge the achievement of the learning results previously mentioned

#### 6. Sustainable Development Goals

- 3 - Good Health & Well-Being
- 4 - Quality Education
- 5 - Gender Equality