

## 27135 - Biotechnology applied to Immunology and Microbiology

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 27135 - Biotechnology applied to Immunology and Microbiology

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

**Degree:** 446 - Degree in Biotechnology

**ECTS:** 6.0

**Year:** 4

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

The general objective of this subject is that the student uses and applies both the molecular knowledge of microorganisms and immunology for the understanding of pathological processes or industrial interest learning the fundamentals and methodology in their applied aspects to the resolution of real problems.

These approaches and objectives are aligned with Goal 3 "Health and Well-being" and 5 "Gender Equality" of the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda ( <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

Use and planning of production strategies for vaccines, antimicrobials and diagnostic and detection tests based on immunochemical methods

Design, at a basic level, industrial production processes for the above mentioned products

Use of basic immunochemical techniques and knowledge of their biomedical applications

Knowledge of polyclonal and monoclonal antibody production

Knowledge of the main biotechnological applications of polyclonal and monoclonal antibodies Knowledge of the regulations for the production of the above mentioned products

### 3. Syllabus

#### Master Class Program

##### Block 1

1.1. Typing and molecular characterization of microorganisms of industrial and sanitary interest.

1.2. Rational design of antimicrobials.

1.3. Rational and up-to-date vaccine design

##### Block 2

2.1. Polyclonal and monoclonal antibody production

2.2. Application of polyclonal and monoclonal antibodies in diagnostic and screening tests

##### Block 3

3.1. Application of monoclonal antibodies in antitumor and autoimmune disease treatment

3.2. Application of monoclonal antibodies in organ transplantation and prevention of immune rejection

#### Program of laboratory practices

Molecular characterization of vaccines and analysis of the immunity conferred

Production, purification and assay of monoclonal antibodies from hybridomas

### 4. Academic activities

Master classes: 32 hours

Laboratory practices: 16 hours

Seminars: 12 hours

Personal study. 90 hours

## **5. Assessment system**

- Written test with multiple-choice questions, resolution of real cases, and short essay questions (50% of the final grade).

To pass the subject it will be necessary to pass this test (5 out of 10)

- Practice report (25% of the grade)

- Presentation of a seminar (25% of the grade)

In addition to the continuous assessment system indicated in the previous points, the student will have the possibility of being evaluated in a global test, which will judge the achievement of the learning results indicated above.

## **6. Sustainable Development Goals**

3 - Good Health & Well-Being

9 - Industry, Innovation and Infrastructure