

Academic Year/course: 2022/23

## 27135 - Biotechnology applied to Immunology and Microbiology

### Syllabus Information

**Academic Year:** 2022/23

**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

### 2. Learning goals

### 3. Assessment (1st and 2nd call)

#### 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

- Final Exam: 50% of the grade
- Presentation: 25% of the grade
- Report of practical sessions: 25% of the grade

### 4. Methodology, learning tasks, syllabus and resources

#### 4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented such as:

- **Lectures** (3 ECTS). In these classes the basic theoretical knowledge of the subject is presented to the students.
- **Practical cases** in the laboratory (1.2 ECTS). Students will take a series of practical courses led by a teacher. Each session will lead to a discussion of the results, which will lead to the development of an individual report.
- **Seminars** (1.8 ECTS). A portion of these classes is reserved for seminars by professionals related to biotechnology companies working with immunochemical applications or manufacture of vaccines. The rest of these classes will be used for students to present seminars that they have prepared in connection with the subject matter of the course. Teachers will propose some topics for seminars, but they also can be proposed by the students.

Students are expected to participate actively in class throughout the semester.

Further information regarding the course will be provided on the first day of class.

**The teaching and assessment activities will be carried out personally unless, due to the health situation, the provisions issued by the competent authorities and by the University of Zaragoza arrange to carry them out electronically.**

#### 4.2. Learning tasks

The course includes the following learning tasks:

- Lectures: computer screen projections (PowerPoint) will be used, including small animations, videos and off-line browsing. In these classes the basic knowledge of the subject is presented to students, which will be grouped into three modules:
  - Topic 1 (Area of Microbiology, 1.15 ECTS)
  - Topic 2 (Areas of Biochemistry and Cell Biology, 1.15 ECTS)
  - Topic 3 (Area of Immunology, 0.7 ECTS)
- Practice sessions in the laboratory.
  - Topic 1 (Area of Microbiology, 0.6 ECTS)
  - Topic 2 (Area of Cell Biology, 0.6 ECTS)
- Seminars.
  - Topic 1. Real cases in companies, solving real problems. At least 3 seminars given by professionals (0.6 ECTS)
  - Topic 2. Seminars given by students and valid for evaluation (1.2 ECTS)

### 4.3. Syllabus

The course will address the following topics:

#### Section 1. Area of Microbiology

- 1.1. Typing and molecular characterization of microorganisms of industrial and medical interest.
- 1.2. Rational design of antimicrobials.
- 1.3. Rational design and updated vaccines.

#### Section 2. Areas of Biochemistry and Cell Biology.

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

#### Section 3. Area of Immunology.

- 3.1. Application of Monoclonal Antibodies in antitumor and autoimmune disorders.
- 3.2. Application of monoclonal antibodies in organ transplantation and prevention of immune rejection.

#### Practical Sessions:

- Area of Microbiology. Molecular characterization and analysis of vaccines and test of the immunity conferred.
- Area of Cell Biology. Production, purification and assay of monoclonal antibodies from hybridomas

### 4.4. Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the Facultad de Ciencias website <https://ciencias.unizar.es/grado-en-biotecnologia>.

These activities will take place in the second semester in the classroom of the Faculty of Science that this center allocated for this purpose. The training activity 1 will be implemented in the classroom in the afternoon, along with other theoretical subjects of the degree. The training activities 2 and 3 will be held in the morning in groups not exceeding 12 students, according to the schedule that will be notified before the start of classes.

### 4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=27135>