

27118 - Cell Culture

Syllabus Information

Academic year: 2024/25

Subject: 27118 - Cell Culture

Faculty / School: 100 - Facultad de Ciencias

Degree: 446 - Degree in Biotechnology

ECTS: 6.0

Year: 3

Semester: Annual

Subject type: Compulsory

Module:

1. General information

The use of cell cultures is essential in many biotechnological processes. The students of the Biotechnology Degree will acquire knowledge and skills that will allow them to establish, maintain and perform experiments with animal cell cultures. In addition, teamwork skills will be fostered.

These approaches and objectives are aligned with Sustainable Development Goals 3 and 11 of the United Nations 2030 Agenda for Sustainable Development <https://www.un.org/sustainabledevelopment/es/>.

2. Learning results

The student, in order to pass this subject, must demonstrate the following results...

Use of equipment and design of a cell culture unit

Use of cell culture strategies.

Design of maintenance procedures for cells in culture.

Application of techniques to preserve and maintain cell lines.

Performing cell transformations.

Observation of cells under optical and fluorescence microscopy.

Knowledge of the main biotechnological applications of cell cultures.

Preparation and defence of reports based on experimental results.

3. Syllabus

Introduction: Possibilities and limitations of cell culture. Microscopy. Cell counts and viability. Cryopreservation. Cell culture applications.

Basic methods: cell isolation, culture maintenance, characterization and preservation. Techniques of immortalization and problematic. Biological safety in laboratories.

Cell modification systems: DNA and protein introduction techniques. Transfection. Stable lines. Transduction.

Infection.

Cultures in three dimensions. Matrices. Organoids.

Contaminations: causal agents, detection and elimination.

Determination of cell viability and proliferation.

Tissue biotechnology: Strategies. Pluripotent cells and specialized cultures. Cell differentiation techniques.

The subject will be completed with seminars by external speakers who will offer an applied vision of cell cultures in different branches

4. Academic activities

The learning process designed for this subject is based on the following activities:

1) Theoretical introduction on the fundamentals and applications of cell culture and the techniques to be performed in each practice.

(1 ECTS)

2) 12 practical sessions. (4,8 ECTS)

3) Preparation of written reports on the practices carried out and the results obtained. Maximum length 40 pages.

4) Oral presentation of one of the practices carried out. (0,2 ECTS)

5) Written assessment test.

5. Assessment system

The learning results will be assessed through the following activities:

1) **Evaluation of the student's work in the laboratory** through:

a) Continuous assessment of the work done daily in the laboratory and practice reports in which the correct presentation and interpretation of the results obtained will be assessed. Reports shall have a maximum length of 40 pages. This section will account for **40%** of the final grade.

c) Oral presentation and discussion with classmates and the teacher of one of the practices carried out. This section will account for **10%** of the final grade.

2) **Completion of a written test.** The written test will consist of a series of problem or case type questions about the contents of the subject. This assessment will account for **50%** of the final grade. A minimum grade of 4.5 in this test will be required to pass the subject.

Given the experimental nature of the subject, it is considered mandatory to complete the laboratory practices in order to pass the subject through the assessment system indicated above. However, in addition to the assessment system indicated in the previous item, the student will have the possibility of being evaluated in a global test, which will be eminently practical and which will judge the achievement of the learning results indicated above.

6. Sustainable Development Goals

3 - Good Health & Well-Being

11 - Sustainable Cities and Communities