Universidad Zaragoza

Academic Year/course: 2024/25

27121 - Genetic Engineering

Syllabus Information

Academic year: 2024/25
Subject: 27121 - Genetic Engineering
Faculty / School: 100 - Facultad de Ciencias
Degree: 446 - Degree in Biotechnology
ECTS: 6.0
Year: 3
Semester: Second semester
Subject type: Compulsory
Module:

1. General information

The objective of this subject is enable the student to know the most used tools and techniques in Genetic Engineering and to be able to apply them correctly in bacterial, yeast, vegetable and animal cells. These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the results of subject learning provides training and competence to contribute somewhat to its achievement.
Goal 1: End of poverty.
Goal 2: Zero hunger.
Goal 3: Health and well-being.
Goal 9: Industry, innovation and infrastructures.
Goal 11: Sustainable cities and communities
Goal 12: Responsible production and consumption.
Goal 13: Climate action
Goal 14: Life Underwater
Goal 15: Life on land ecosystems

2. Learning results

Upon completion of the subject, the student will be able to:

- Perform simple genetic engineering manipulations.
- Design the most appropriate procedure to elaborate a gene library and select the gene of interest.
- Know the methods of gene transfer in microorganisms, plants and animals.
- Know and apply simple methods of gene functional analysis.
- Know the basis of recombinant protein production and the alteration of gene information.
- Search and analyse specific information related to the subject matter

3. Syllabus

MASTER CLASSES

I. BASIC TOOLS AND TECHNIQUES IN GENETIC ENGINEERING.

II. GENETIC ENGINEERING IN BACTERIA AND EUKARYOTES.

III. RECOMBINANT DNA EXPRESSION SYSTEMS

IV. REGULATION OF GENE EXPRESSION

LABORATORY PRACTICES

The following activities will be carried out during the practical sessions:

1-Cloning of an insert in a vector.

2-Measurement of reporter gene expression under different induction or repression conditions.

3-Transfection of a vector derived from the M13 phage in *Escherichia coli* and visualization of the plaques formed by the phage.

4. Academic activities

The subject consists of participatory lectures, laboratory practices, problem classes and seminars, which will be held during the second quarter of the academic calendar.

The schedule of theory classes and exams can be consulted on the website of the Faculty of Sciences, on the section corresponding to the Degree in Biotechnology: https://ciencias.unizar.es/grado-en-biotecnologia.

Theoretical classes will take place during 3 hours per week, during the second semester (see schedules at:

https://ciencias.unizar.es/grado-en-biotecnologia), and will be carried out according to the Academic Calendar approved for the University of Zaragoza. The problem and seminar classes will be integrated in the timetable foreseen for the theoretical classes.

The dates and schedules of the laboratory practices will be announced in due time in the classroom, on the bulletin board of the Biotechnology Degree and in the ADD (Anillo Digital Docente).

The teaching and assessment activities will be carried out face-to-face, unless the provisions issued by the competent authorities and the University of Zaragoza require that they be carried out in another format.

5. Assessment system

The general evaluation system will take into account all the activities carried out by the student:

Theory exam. Examination at the end of the term. It will include a multiple-choice test and another test to solve problems or case studies.

In order to pass the subject it is necessary to obtain a minimum of 5 points out of 10 in the theory exam.

For the grading of the practical sessions, the students will take a questionnaire on them.

The final grade of the subject will be obtained after weighting 80% of the theory exam with 20% of the practical exams . If the theory exam is not passed, the final grade will be that of the theory exam.

Fraud or total or partial plagiarism in any of the evaluation tests will result in the failure of the subject with the minimum grade, in addition to the disciplinary sanctions that the committee of guarantees or the relevant body adopts for these cases.

In addition to the evaluation modality indicated in the previous points, the student may be evaluated in a global test , which will judge the achievement of the learning results indicated above. To pass the subject it is necessary to obtain a minimum of 5 points out of 10 in the global test grade.

The above will also apply in the case of possible telematic evaluation tests. The faculty may use any of the means recommended by the University of Zaragoza to monitor the tests, as well as apply any corresponding sanctions in the case of fraud.

6. Sustainable Development Goals

1 - End of Poverty
2 - Zero Hunger
3 - Good Health & Well-Being