Universidad Zaragoza

Academic Year/course: 2023/24

27149 - Microbial Biotechnology

Syllabus Information

Academic year: 2023/24
Subject: 27149 - Microbial Biotechnology
Faculty / School: 100 - Facultad de Ciencias
Degree: 446 - Degree in Biotechnology
ECTS: 7.0
Year: 4
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The student is expected to know the methods used in microbial biotechnology, the processes and applications of biotechnological interest based on the use of microorganisms, and the main products of microbial origin,

The practical classes aim to encourage critical thinking, and to stimulate students to design processes of biotechnological interest involving microorganisms.

The acquisition of the learning results of the subject provides training and competence to contribute to some extent to the following SDGs:

- 1: End of poverty.
- 2: Zero hunger.
- 3: Health and wellness.
- 5: Gender Equality.
- 6: Clean water and sanitation.
- 7: Affordable and non-polluting energy.
- 9: Industry, innovation and infrastructures..
- 11: Sustainable Cities and Communities
- 12: Responsible production and consumption.
- 13: Climate Action
- 15: Life of terrestrial ecosystems.

2. Learning results

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

1- To learn about various microbiological biotechnological processes, as well as examples of the products of interest that can be obtained.

2- To be able to relate the knowledge of microorganisms of biotechnological interest with the possibilities of action for their improvement and control.

3- To be able to perform experimental approaches to microbial-based biotechnological processes.

4- To develop, combine and fine-tune the appropriate methodology to obtain microorganisms of biotechnological interest.

The student, in order to pass this subject, must demonstrate:

1- To have obtained an integrated vision of the use of microorganisms in biotechnological processes to obtain products of interest

2- To know the most relevant microbiologically based biotechnological processes.

3- To know how to apply the appropriate methodology for the genetic manipulation of model microorganisms

4- To propose action possibilities for the improvement and control of microbial processes

5- To perform small-scale microbial processes in the laboratory

6- To devise new biotechnological applications using microorganisms and/or their products

7- To write and defend reports related to the previous topics

8- To demonstrate the ability to critically discuss the stages or methodology carried out in microbial processes

3. Syllabus

Topic 1. Introduction to Microbial Biotechnology.

Topic 2. Object of study of microbial biotechnology

Topic 3. Genetic manipulation of microorganisms, synthetic biology, omics

Topic 4. Protein production in bacteria and fungi.

Topic 5. Microbial polymers.

Topic 6. Fermentation of foodstuffs

Topic 7. Primary metabolites

Topic 8. Secondary metabolites

Topic 9. Phagotherapy

Topic 10. Microbiota applications

Topic 11. Vaccines

Topic 12. Applications to diagnose and fight bioterrorism

Topic 13. Biofuels

Topic 14. Agriculture.

4. Academic activities

The program offered to the student includes the following activities:

Training Activity 1: Acquisition of basic knowledge of the subject (4 ECTS).

Methodology: Participative master classes in large groups.

Tutorials (small groups and/or individualized).

Use of web-based support material (ADD) Anillo Digital Docente.

Training Activity 2: Laboratory practices (2 ECTS).

Methodology: Problem-based learning and case studies. Team and individual work. Use of web-based support material (ADD) Anillo Digital Docente.

Training Activity 3: Tutorial work (1 ECTS).

Methodology: Evaluation of a project related to the subject. Oral presentation in class. Team and individual work.

5. Assessment system

- The specific competences will be evaluated by means of written tests consisting of exams with essay and multiple choice questions (60% of the grade) To pass the subject it is necessary to obtain a minimum of 5 points out of 10 in the written test.

The evaluation of the laboratory practices and the preparation and defence of reports will account for 40% of the final grade

Passing the subject will imply obtaining 5 points out of 10, resulting from weighting according to the above criteria the written test, the laboratory practices and the writing and defence of reports.

Fraud or total or partial plagiarism in any of the assessment tests will result in not passing the subject and achieving the minimum grade, in addition to the disciplinary sanctions that the university decides for these cases.

The syllabus that students should use to prepare for the different tests can be found in the “Syllabus" section of this teaching guide.