

27128 - Microbial Biotechnology

Información del Plan Docente

Academic Year	2017/18
Faculty / School	100 - Facultad de Ciencias
Degree	446 - Degree in Biotechnology
ECTS	6.0
Year	4
Semester	First semester
Subject Type	Compulsory
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

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

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

1- Acquisition of basic concepts of this subject (3 ECTS)

2- Laboratory work (2 ECTS)

3- Tutorized projects (1 ECTS)

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5.2.Learning tasks

Formative activity 1: Acquisition of basic concepts of this subject (3 ECTS)

Methodology: participative lectures which will be accomplished by the use of supporting material available in the ADD web.

Formative activity 2: Laboratory work (2 ECTS)

Methodology: problems and practical cases in the laboratory. This activity will be evaluated in individual and team work.

Formative activity 3: Tutorized projects (1 ECTS)

Methodology: Design of biotechnological processes involving microorganisms. This work will be accomplished by examining the scientific literature and the basic concepts of the subject and it will be performed in groups of 6-8 students (small group). Presentation of the project and the subsequent scientific discussion will be carried out with the whole student group.

5.3.Syllabus

Lesson 1. Introduction to microbial biotechnology. Microbial diversity. Taxonomy. Culture type collections

Lesson 2. Applications of microbial biotechnology: human therapeutics, agriculture, food science and technology, environmental applications, daily life.

Lesson 3. Microbiota concept and applications. Fecal microbiota transplants and probiotics.

Lesson 4. Genetic manipulations of microorganisms. Synthetic Biology, Omic disciplines

Lesson 5. Protein expression and purification in bacteria and fungi. Biocatalysis

Lesson 6. Microbial biopolymers (polysaccharides and polyesters)

Lesson 7. Primary metabolites (organic acids, vitamins and aminoacids)

Lesson 8. Secondary metabolites. Antibiotics (detection, genetic improvements, scaling, purification) and hormones

Lesson 9. Food fermentations (wine, beer, dairy products)

Lesson 10. Vaccines

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Lesson 11. Applications in diagnostics and bioterrorism

Lesson 12. Biofuels and ethanol production

Lesson 13. Agriculture. Biomass (interactions plant-microorganism, mycorrhizae, bioremediation, *Bacillus thuringiensis*). Biodegradation. Wastewater treatment

5.4.Course planning and calendar

Lectures will take place during the second half of the academic course. Schedules can be downloaded from:

<https://ciencias.unizar.es/grado-en-biotecnologia>

These lectures will be imparted according to the Academic Schedule approved by the University of Zaragoza.

Problems and Seminars will take place during the aforementioned schedule for the Lectures. The deadline to submit works performed by the students is 30th May.

Concerning laboratory sessions and groups, this information will be notified in the classroom and through the ADD web.

5.5.Bibliography and recommended resources

[BB: Bibliografía básica / BC: Bibliografía complementaria]

- [BB] Alexander N. Glazer. Microbial Biotechnology: Fundamentals of Applied Microbiology . 2nd 2007