

Academic Year/course: 2022/23

27126 - Environmental Biotechnology

Syllabus Information

Academic Year: 2022/23

Subject: 27126 - Environmental Biotechnology

Faculty / School: 100 - Facultad de Ciencias

Degree: 446 - Degree in Biotechnology

ECTS: 6.0

Year:

Semester: First semester

Subject Type: Compulsory

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

This subject has an applied approach to provide the student the concepts needed to understand the usefulness of biological systems in the biotechnological processes of environmental interest. The participatory lectures introduce the student in basic aspects of environmental biotechnology. Seminars and practical sessions addressed the study of environmental problems for which biotechnology currently provides solutions or can provide solutions through the development of new technologies or the improvement of existing ones.

4.2. Learning tasks

The course includes the following learning tasks:

- Lectures: This activity is focused to the acquisition of basic knowledge of environmental biotechnology (4 ECTS). It will take place through participatory lectures. The material of lectures will be provided by professors to the students through the UNIZAR learning platform, on the website: <http://add.unizar.es:800/newweb/web/index.html>.
- Seminars and practice sessions. This training activity (1 ECTS) consists in the study of different environmental problems. The methodology used will be: management of bibliography, work individual and/or group, and oral presentation and defense of the selected case.
- Laboratory practices. This activity (1 ECTS) will be developed through laboratory practices and visits to entities such as water-waste treatment plants.

The teaching and assessment activities will be carried out in person unless, due to the health situation, the provisions issued by the competent authorities and by the University of Zaragoza force them to be carried out online.

4.3. Syllabus

The course will address the following topics:

Section I: Current environmental problems and pollution sources

- Topic 1. Introduction to Environmental Biotechnology.
- Topic 2. Water Pollution.
- Topic 3. Atmospheric Pollution.
- Topic 4. Waste Management

Section II: Bioremediation and biodegradation

- Topic 5. Biosensors
- Topic 6. Bioremediation
- Topic 7. Phytoremediation
- Topic 8. Cyanotoxins
- Topic 9. Biodegradation of natural compounds: cellulose, hemicellulose and lignin
- Topic 10. Biodegradation of agro-food industry wastes

Section III: Biotechnology for clean industrial processes and products

- Topic 11. Biotechnology for clean energy production. Microalgae technology
- Topic 12. Clean materials biotechnology; Bioplastics and biodegradable plastics
- Topic 13. Basic concepts of Biocontrol

Activities 2 and 3: Seminars (1 ECTS) and practice sessions (1 ECTS). In this activity the students will gather information on a relevant environmental problem or industrial process where biotechnology can be applied. The analysis of this information will lead to the development of a seminar, which will be presented and discussed in class. Practical sessions (1 ECTS): laboratory sessions and visit to a water-waste treatment plant.

4.4. Course planning and calendar

Schedules of lectures and problems will coincide with the officially established and will be available at: <https://ciencias.unizar.es/grado-en-biotecnologia>.

The places, calendar and groups for training and practical sessions will be established in coordination with the rest of the subjects at the beginning of course. The Coordinator will produce the groups of students for these activities at beginning of course to avoid overlaps with other subjects.

Master classes will be teaching 3 hours per week, while the seminars will be planned jointly with students in 5 sessions of two hours each. The activity 3, visits to industrial plants or research centers will be announced opportunely in the class and UNIZAR learning platform, according to the availability of the corresponding entity. Other activities will be planned in accordance with the temporary occupation of students during the semester.

For students enrolled in the subject, places, times and dates of lectures and practical sessions will be public via Bulletin Board advertisements of the grade on the platform Moodle at the University of Zaragoza, <https://moodle2.unizar.es/add/>, and in the moodle page for the course. These routes will be also used to communicate enrolled students their distribution by groups of practical sessions, which will be organized by the coordination of degree. Provisional dates will be available on the website of the Faculty of Sciences in the corresponding section of the Degree in Biotchnology: <https://ciencias.unizar.es/grado-en-biotecnologia>. In this web there will be also available the dates of exams.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=27126>