27126 - Environmental Biotechnology

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	446 - Degree in Biotechnology
ECTS	6.0
Course	
Period	First semester
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

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 wil 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 Biotechnology : https://ciencias.unizar.es/grado-en-biotecnologia .

In this web there will be also available the dates of exams.

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

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5.1.General methodological presentation

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 master classes 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.

5.2.Learning activities

Learning Activity 1:

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.

Learning Activity 2:

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.

Learning Activity 3:

This activity (1 ECTS) will be developed through laboratory practices and visits to entities such as water-waste treatment plants.

5.3.Program

Activity 1: Theoretical classes (4 ECTS)

Module I: Current environmental problems and pollution sources

1. Introduction to Environmental Biotechnology.

2. Water Pollution.

3. Atmospheric Pollution.

4. Waste Management

Module II: Bioremediation and biodegradation

5. Biosensors

6. Bioremediation

7. Phytoremediation

8. Cyanotoxins

9. Biodegradation of natural compounds: cellulose, hemicellulose and lignin

10. Biodegradation of agro-food industry wastes

Module III: Biotechnology for clean industrial processes and products

11. Biotechnology for clean energy production. Microalgae technology

12. Clean materials biotechnology; Bioplastics and biodegradable plastics

13. Basic concepts of Biocontrol

Activities 2 and 3: Seminars (1 ECTS) and practical 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 (1ECTS): laboratory sessions and visit to a water-waste treatment plant

5.4.Planning and scheduling

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 maters at 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.

5.5.Bibliography and recomended resources

- Biotecnología ambiental / Francisco Castillo Rodríguez (coordinador) ; María Dolores Roldán Ruiz ... [et al.] Madrid : Tébar, D.L. 2005

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- Evans, Gareth M.. Environmental biotechnology : theory and application / by Gareth M. Evans, Judith C. Furlong. . 2nd ed. Chichester : Wiley-Blackwell, 2011.
- Ingeniería de aguas residuales : tratamiento, vertido y reutilización / Metcalf and Eddy ; revisado por George Tchobanoglous, Franklin L. Burton ; traducción y revisión técnica, Juan de Dios Trillo Montsoriu, Ian Trillo Fox ; prólogo de Angel Cajigas . - 3a. ed., [reimpr.] Madrid [etc.] : McGraw-Hill, D.L. 2000
- Rittmann, Bruce E.. Biotecnología del medio ambiente : principios y aplicaciones / Bruce E. Rittmann, Perry L. McCarty ; traducción y revisión técnica Fernando Garralda de Roda Madrid [etc.] : McGraw Hill, D.L. 2001
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- Tchobanoglous, George. Gestión integral de residuos sólidos / George Tchobanoglous, Hilary Theisen, Samuel Vigil ; traducción y revisión técnica Juan Ignacio Tejero Monzón, José Luis Gil Diaz, Marcel Szanto Narea . - [1a. ed. en español, reimpr.] Madrid [etc.] : McGraw-Hill, D.L.1996
- La química verde / coordinador, Paul Colonna ; traducción a cargo de José María Peiró Esteban Zaragoza : Acribia, D.L. 2010
- Energía sin CO2 : realidad o utopía / coordinadores, Rosa Menéndez y Rafael Moliner Madrid : Consejo Superior de Investigaciones Científicas, 2011
- Renneberg, Reinhard. Biotecnología para principiantes / Reinhard Renneberg ; Darja Süà?bier (ilustraciones) ; [versión española por Josep Joan Centelles Serra y Magdalena Ferrer Peralta] Barcelona [etc.] : Reverté, 2008