

Cutting-edge Environmental Technologies

Code: 43329
ECTS Credits: 6

Degree	Type	Year	Semester
4314579 Biological and Environmental Engineering	OT	1	2

Contact

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Use of Languages

Principal working language: spanish (spa)

Teachers

Montserrat Sarra Adroguer
Julián Carrera Muyo
David Gabriel Buguña
Albert Guisasola Canudas
Antonio Javier Moral Vico

Prerequisites

Any especial requirements

Objectives and Contextualisation

The objective of this module is that the student understands the most innovative technologies for environmental remediation and streams valorization. These technologies that are currently under development at the laboratory or pilot scale will surely be the basis of future environmental engineering and their knowledge will allow simultaneous understanding of the main deficits of current technologies.

Competences

- Apply specific methodologies, techniques and resources to conduct research and produce innovative results in the area of biological and environmental engineering.
- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Design and operate systems of purification of urban and industrial waste waters.
- Integrate and use chemical, environmental and/or biological engineering tools to design biological systems for the sustainable processing of waste and/or for industrial biotechnological processes.
- Seek out information in the scientific literature using the appropriate channels and integrate this information, showing a capacity for synthesis, analysis of alternatives and critical debate.
- Use IT tools to acquire further knowledge in the field of biological and environmental engineering.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Use knowledge of chemical engineering to design and optimise processes of pollution remediation in natural environments.
- Work in a multidisciplinary team.

Learning Outcomes

1. Analyze and plan related to solid waste material recovery projects.
2. Analyze and plan related to the recovery of waste effluents for the production of biofuels projects.
3. Apply biofilm principles in environmental remediation processes and their simulation tools.
4. Apply specific methodologies, techniques and resources to conduct research and produce innovative results in the area of biological and environmental engineering.
5. Apply the concepts of remediation by fungi.
6. Assess the feasibility of bioelectroquímicos systems for the treatment of contaminated media.
7. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
8. Identify the advantages and disadvantages of emerging processes in sustainable effluent waste treatment.
9. Plan environmental remediation options with nanomaterials.
10. Seek out information in the scientific literature using the appropriate channels and integrate this information, showing a capacity for synthesis, analysis of alternatives and critical debate.
11. Use IT tools to acquire further knowledge in the field of biological and environmental engineering.
12. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
13. Work in a multidisciplinary team

Content

- Nanotechnology. Applications of nanomaterials to environmental remediation. Toxicity of nanomaterials.
- Bioelectrochemical systems for the production of electricity or hydrogen from waste water
- Technologies based on biofilms for the treatment of liquid and gaseous effluents.
- Bioremediation by fungi. Types of fungi. Intracellular and extracellular enzymes. Application in the degradation of pollutants.
- Production of biofuels
- Residual effluents valorisation

Methodology

Classes will be structured as master classes by different expert teachers in each of the subjects

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Master classes	36	1.44	2, 1, 5, 3, 4, 6, 10, 9, 7, 12
Study and internalization of concepts	77	3.08	2, 1, 5, 3, 4, 6, 10, 8, 9, 7, 12, 13
Type: Supervised			
Self-taught and collective learning	30	1.2	2, 1, 5, 3, 4, 6, 10, 8, 9, 7, 12, 13

Assessment

Scheduled evaluation process and activities

The subject is evaluated through the following activities:

- A written exam. 42% of the grade of the subject
- The realization of three different short works based on scientific literature and that will include team work and oral presentations. 58% of the grade of the subject.

The scheduling of the evaluation activities will be given on the first day of the subject and will be made public through the Virtual Campus.

Recovery process

The recovery of the subject will be done through a written exam of the syllabus not passed in the previous tests or exam.

The student can apply for recovery whenever he has submitted to a set of activities that represent at least two thirds of the total grade of the subject.

Procedure for review of qualifications

For each evaluation activity, a place, date and time of revision in which the student can review the activity with the teacher will be indicated. In this context, claims may be made on the activity grade, which will be evaluated by the faculty responsible for the subject. If the student does not appear in this review, this activity will not be reviewed later.

Ratings

Honor plates. Granting a grade of honor registration is the decision of the faculty responsible for the subject. The regulations of the UAB indicate that MH can only be granted to students who have obtained a final grade equal to or greater than 9.00. You can grant up to 5% of MH of the total number of students enrolled.

A student will be considered not evaluable (NA) if he has not been presented in a set of activities the weight of which equals a minimum of two thirds of the total grade of the subject.

Irregularities by the student, copy and plagiarism

Without prejudice to other disciplinary measures deemed appropriate, the irregularities committed by the student that may lead to a variation of the grade of an evaluation act will be scored with a zero. Therefore, copying, plagiarism, cheating, letting copy, etc. in any of the evaluation activities will involve suspending with a zero. The evaluation activities qualified in this way and by this procedure will not be recoverable. If it is necessary to pass any of these evaluation activities to pass the subject, this subject will be suspended directly, without the opportunity to recover it in the same course.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Works and presentations	58%	4	0.16	2, 1, 4, 6, 10, 9, 7, 13, 11
Written exam	42%	3	0.12	2, 5, 3, 4, 8, 12

Bibliography

The bibliography of this module is mainly based on scientific articles recently published at the time of doing the course.

In order to provide the most novel and cutting-edge references, the bibliography will be specified at the beginning of the module and each teacher will provide the references corresponding to their specialty on the virtual campus.

Innovative Wastewater Treatment & Resource Recovery Technologies: Impacts on Energy, Economy and Environment

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Software

MS Office