

Degree	Type	Year
Biological and Environmental Engineering	OB	2

Contact

Name: Ernesto Marco Urrea

Email: ernest.marco@uab.cat

Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

No specific prerequisites are required.

Objectives and Contextualisation

The main goal is to understand the potential and mechanisms used by microorganisms to degrade environmental pollutants, their application in contaminated sites and the tools for monitoring the success of bioremediation.

Learning Outcomes

1. CA23 (Competence) Compile, adapt and/or combine concepts, strategies, methodologies and/or instruments in a consistent, systematic and integrated manner in order to address the goals of the project and problems raised therein.
2. CA24 (Competence) Summarise and interpret, in a logical and reasoned manner, information from biodegradability or molecular biology studies.
3. KA22 (Knowledge) Interpret the basic concepts of applied microbiology for the design of a biological process.
4. KA23 (Knowledge) Recognise the difference between biodegradation, degradation, mineralisation and other related concepts.
5. SA24 (Skill) Differentiate the role of microorganisms in biodegradation processes, their role as bioindicators and their potential for the implementation of clean technologies.
6. SA25 (Skill) Identify the factors that determine the effectiveness of a biodegradation process.

Content

This module consists of 9 topics:

- Definitions and concepts
- Management of contaminated soils
- Strategies and technologies for implementing bioremediation
- Requirements for bioremediation
- Methods for monitoring bioremediation processes
- Bioremediation based on fungi and bacteria
- Fundamental biological reactions in contaminant degradation
- Phytoremediation
- Case studies and management of a soil bioremediation project.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Case study	37	1.48	CA23, CA24, KA22, KA23, SA24, SA25, CA23
Type: Supervised			
Problem-based learning	15	0.6	CA23, CA24, KA22, KA23, SA24, SA25, CA23
Type: Autonomous			
Theory classes	95	3.8	CA23, CA24, KA22, KA23, SA24, SA25, CA23

The subject is developed through theory classes, problems and tutorials.

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.

Assessment

Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exam	50%	0	0	CA23, CA24, KA22, KA23, SA24, SA25
Attendance and active participation	5%	0	0	
Case study	20%	2	0.08	CA23, CA24, KA22, KA23, SA24, SA25
Oral presentation	25%	1	0.04	CA23, CA24, KA22, KA23, SA24, SA25

Evaluation activities include:

- Attendance and active participation (5%)
- Case study (20%)
- Oral presentation (25%)
- Exam (50%)

The minimum score to pass the course is 5 out of 10.

Retaking Final test: There will be a final test for those students who have not passed the continuous assessment. However, the following activities cannot be re-evaluated:

- Attendance and active participation (5%)
- Case study (20%)
- Oral presentation (25%)

Students have the right to the revision of the final grades of their evaluation activities. The date for reviewing the qualifications will be informed in a timely manner through the Moodle platform.

A distinction can be given to students who score 9.0 or higher in a subject. The number of distinctions awarded to students cannot be higher than 5% of the total number of students enrolled in a subject. If the total number of students is lower than 20 then only one distinction will be awarded.

The returning date of the corrected reports will be informed in a timely manner, so that students can review the correction and improve the aspects that are necessary for the following reports.

Without prejudice to other disciplinary measures, and in accordance with current academic regulations, any irregularities committed by the student that could lead to a variation of the score of an evaluation act will be scored with a zero. Therefore, copying or allowing to copy a practice or any other evaluation activity will imply a zero (0) in the attitude note and, therefore, suspend the course.

Repeaters are obliged to pass the full course.

IMPORTANT:

This subject allows students to take advantage of a single evaluation, and as established by the UAB regulations, all evaluation activities will be carried out on the same day, which will be informed through the virtual campus.

Bibliography

- Adrian, L., & Löffler, F. (2016). *Organohalide-respiring bacteria*. Springer-Verlag Berlin Heidelberg. ISBN: 978-3-662-49873-6.
- Aelion, C. M., Höhener, P., Hunkeler, D., & Aravena, R. (Eds.). (2010). *Environmental isotopes in biodegradation and bioremediation*. CRC Press. ISBN: 978-1-56670-661-2.
- Alvarez, P. J. J., & Illman, W. A. (2006). *Bioremediation and natural attenuation: Process fundamentals and mathematical models*. Wiley-Interscience. ISBN: 978-0-471-44734-7.

- Neilson, A. H., & Allard, A. S. (2007). *Environmental degradation and transformation of organic chemicals* (2nd ed.). CRC Press. ISBN: 978-1-56670-618-6.
- Stegmann, R., Brunner, G., Calmano, W., & Matz, G. (Eds.). (2001). *Treatment of contaminated soil*. Springer. ISBN: 978-3-540-66782-3.
- Stroo, H. F., Leeson, A., & Ward, C. H. (2013). *Bioaugmentation for groundwater remediation*. Springer. ISBN: 978-1-4614-5487-0.
- United States Environmental Protection Agency (EPA). (2009). *A guide for assessing biodegradation and source identification of organic groundwater contaminants using compound specific isotope analysis (CSIA)*. Available at:
https://cfpub.epa.gov/si/si_public_record_report.cfm?LAB=NRMRL&dirEntryID=202171

Software

No specific software is required.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(TEm) Theory (master)	1	Spanish	first semester	afternoon