



Course guide

33111 - EBATR - Bioresources Engineering Applied to the Waste Treatment

Last modified: 04/05/2023

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.
Degree: MASTER'S DEGREE IN NATURAL RESOURCE ENGINEERING (Syllabus 2015). (Optional subject).
Academic year: 2023 **ECTS Credits:** 5.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: M. MONTSERRAT SOLE SARDANS - ANTONIO DAVID DORADO CASTAÑO
Others: ANTONIO DAVID DORADO CASTAÑO -
M. MONTSERRAT SOLE SARDANS -

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. The ability to design natural biotechnological processes for eliminating pollutants in solid, liquid and gaseous media.

Generical:

2. The ability to take the initiative and be creative.
3. The ability to communicate effectively orally and in writing.

TEACHING METHODOLOGY

Lectures, which cover the content of the subject and in which students' active participation is encouraged.

Problem-solving classes and classes involving practical cases.

Technical visits to wastewater and waste gas treatment plants. Debate in the classroom on activities carried out beforehand.

LEARNING OBJECTIVES OF THE SUBJECT

1. To revise some of the environmental applications of biotechnology. To become familiar with the biotechnological processes used in industry.
2. To describe techniques for gaseous pollutants abatement using biological systems.

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	66.67
Hours medium group	15,0	33.33

Total learning time: 45 h

CONTENTS

Subject Area I. Biological processes: applications in wastewater and waste treatment

Description:

1. Introduction to environmental biotechnology
2. Biological treatment of wastewater
3. Biological treatment of waste
4. Biodegradation of xenobiotic compounds
5. Biosorption of metals. Bioleaching

Full-or-part-time: 22h 30m

Theory classes: 15h

Practical classes: 7h 30m

Subject Area II. Techniques for gaseous pollutants abatement using biological systems Competencies of the degree to which the subject contributes

Description:

1. Introduction
2. Non-biological methods
3. Biological treatment of gases and odours

Full-or-part-time: 22h 30m

Theory classes: 15h

Practical classes: 7h 30m

GRADING SYSTEM

Assignments handed in during the course (bibliographic research, comments on articles, exercises and problems): 30%

Written tests 1: 25%

Written tests 2: 25%

Individual bibliographic research assignment: 20%

BIBLIOGRAPHY

Basic:

- Gabriel, David; Sierra, Hugo, eds. Purificación y usos del biogás. Bellaterra: Universitat Autònoma de Barcelona, 2017. ISBN 9788449069628.
- Balaguer, M. Dolors, i altres. Gestió i tractament d'aigües residuals [on line]. Girona: La Universitat, 2008 [Consultation: 21/12/2020]. Available on: <http://hdl.handle.net/10256/761>. ISBN 9788484582601.
- Stuetz, Richard; Frechen, Franz-Bernd, eds. Odours in wastewater treatment: measurement, modelling and control [on line]. London: IWA Publishing, 2001 [Consultation: 28/10/2022]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?docID=3120721>. ISBN 1900222469.
- Devinny, J. S.; Deshusses, M. A.; Webster, T. S. Biofiltration for air pollution control [on line]. Boca Raton: Lewis Publishers, 1999 [Consultation: 25/11/2022]. Available on: <https://www-taylorfrancis-com.recursos.biblioteca.upc.edu/books/mono/10.1201/9781315138275/biofiltration-air-pollution-control-joseph-devinny-todd-stephen-webster-marc-deshusses>. ISBN 1566702895.
- Jagnow, G.; Dawid, W. Biotecnología: introducción con experimentos modelo. Zaragoza: Acribia, 1991. ISBN 842000698X.
- Kennes, C.; Veiga, M. C., eds. Bioreactors for waste gas treatment. Dordrecht: Kluwer Academic, 2001. ISBN 0792371909.
- Rittmann, B. E.; McCarty, P. L. Biotecnología del medio ambiente: principios y aplicaciones. Madrid: McGraw-Hill, 2001. ISBN 8448132807.
- Gostelow, P., i altres. Sampling for the measurement of odours [on line]. London: IWA Publishing, 2003 [Consultation: 17/01/2023]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?docID=3120867>. ISBN 1843390337.
- Bordons, A.; Constantí, M. Introducció a la biotecnologia ambiental: solucions als problemes ambientals mitjançant sistemes biològics. Tarragona: Universitat Rovira i Virgili. Departament de Bioquímica i Biotecnologia, 1999. ISBN 8489866791.
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- Ramalho, R. S. Tratamiento de aguas residuales [on line]. Ed. rev. Barcelona: Reverté, 1996 [Consultation: 28/10/2022]. Available on: https://search-ebshost-com.recursos.biblioteca.upc.edu/login.aspx?direct=true&AuthType=ip,uid&db=nlebk&AN=2757630&site=ehost-live&ebv=EB&ppid=pp_1. ISBN 8429179755.
- Henry, J. G.; Heinke, G. W. Environmental science and engineering. 2nd ed. Englewood Cliffs: Prentice Hall, 1996. ISBN 0133981320.
- Lema, Juan M.; Suárez Martínez, Sonia, eds. Innovative wastewater treatment and resource recovery technologies: impacts on energy, economy and environment [on line]. London: IWA Publishing, 2017 [Consultation: 28/10/2022]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?docID=4939114>. ISBN 9781780407869.