

33111 - EBATR - Bioresources Engineering Applied to the Waste Treatment

Coordinating unit:	330 - EPSEM - Manresa School of Engineering
Teaching unit:	750 - EMIT - Department of Mining, Industrial and ICT Engineering
Academic year:	2019
Degree:	MASTER'S DEGREE IN NATURAL RESOURCE ENGINEERING (Syllabus 2008). (Teaching unit Optional) MASTER'S DEGREE IN NATURAL RESOURCE ENGINEERING (Syllabus 2015). (Teaching unit Optional) MASTER'S DEGREE IN NATURAL RESOURCE ENGINEERING (Syllabus 2009). (Teaching unit Optional)
ECTS credits:	5
Teaching languages:	Spanish

Teaching staff

Coordinator:	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.

33111 - EBATR - Bioresources Engineering Applied to the Waste Treatment

Study load

Total learning time: 45h	Hours large group:	30h	66.67%
	Hours medium group:	15h	33.33%

Content

<p>Subject Area I. Biological processes: applications in wastewater and waste treatment</p> <p>Learning time: 22h 30m Theory classes: 15h Practical classes: 7h 30m</p>	
<p>Description:</p> <ol style="list-style-type: none"> 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 	
<p>Subject Area II. Techniques for gaseous pollutants abatement using biological systems Competencies of the degree to which the subject contributes</p> <p>Learning time: 22h 30m Theory classes: 15h Practical classes: 7h 30m</p>	
<p>Description:</p> <ol style="list-style-type: none"> 1. Introduction 2. Non-biological methods 3. Biological treatment of gases and odours 	

Qualification 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%

33111 - EBATR - Bioresources Engineering Applied to the Waste Treatment

Bibliography

Basic:

- Devinny, J. S.; Deshusses, M. A.; Webster, T. S. Biofiltration for air pollution control. Boca Raton: Lewis Publishers, 1999. 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.
- 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.
- Roldán Ruiz, M. D., i altres. Biotecnología ambiental. Madrid: Tébar, 2005. ISBN 8473602110.
- Metcalf & Eddy. Wastewater engineering: treatment, disposal and reuse. 3rd ed. New York: McGraw-Hill, 1991. ISBN 0070416907.
- Ramalho, R. S. Tratamiento de aguas residuales. Ed. rev. Barcelona: Reverté, 1996. ISBN 8429179755.
- Henry, J. G.; Heinke, G. W. Environmental science and engineering. 2nd ed. Englewood Cliffs: Prentice Hall, 1996. ISBN 0133981320.
- Balaguer, M. Dolors, i altres. Gestió i tractament d'aigües residuals [on line]. Girona: La Universitat, 2008 [Consultation: 22/11/2017]. Available on: <<http://hdl.handle.net/10256/761>>. ISBN 9788484582601.
- Stuetz, Richard; Frechen, Franz-Bernd, eds. Odours in wastewater treatment: measurement, modelling and control. London: IWA Publishing, 2001. ISBN 1900222469.
- Gostelow, P., i altres. Sampling for the measurement of odours. London: IWA Publishing, 2003. ISBN 1843390337.
- Lema, Juan M.; Suárez Martínez, Sonia, eds. Innovative wastewater treatment and resource recovery technologies: impacts on energy, economy and environment. London: IWA Publishing, 2017. ISBN 9781780407869.
- Gabriel, David; Sierra, Hugo, eds. Purificación y usos del biogás. Bellaterra: Universitat Autònoma de Barcelona, 2017. ISBN 9788449069628.