

250460 - TRACTAIGU - Water Treatment

Coordinating unit:	250 - ETSECCPB - Barcelona School of Civil Engineering	
Teaching unit:	751 - DECA - Department of Civil and Environmental Engineering	
Academic year:	2015	
Degree:	MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) MASTER'S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Teaching unit Optional) MASTER'S DEGREE IN CIVIL ENGINEERING (RESEARCH TRACK) (Syllabus 2009). (Teaching unit Optional)	
ECTS credits:	5	Teaching languages: Spanish

Teaching staff

Coordinator:	MARTIN GULLON SANTOS
Others:	MARTIN GULLON SANTOS

Opening hours

Timetable:	Monday from 16:30 to 18:00. e-mail: martin.gullon@upc.edu
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Degree competences to which the subject contributes

Specific:

8205. The ability to plan and dimension water and wastewater processing and treatment systems.

Teaching methodology

The course consists of 3,0 hours per week of classroom activity.

The 25,0 hours in groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 5,0 hours in groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Learning objectives of the subject

Specialization subject in which knowledge on specific competences is intensified.

Knowledge and skills at specialization level that permit the development and application of techniques and methodologies at advanced level.

Contents of specialization at master level related to research or innovation in the field of engineering.

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Knowledge of the fundamental concepts of water treatment, mainly from the point of view of wastewater treatment, but also regeneration and purification. Everything in an appropriate context of integrated water resources management.

Study load

Total learning time: 125h	Theory classes:	19h 30m	15.60%
	Practical classes:	9h 45m	7.80%
	Laboratory classes:	9h 45m	7.80%
	Guided activities:	6h	4.80%
	Self study:	80h	64.00%

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Content

<p>Integrated management of water resources</p>	<p>Learning time: 7h 11m Theory classes: 3h Self study : 4h 11m</p>
<p>Description: Basic concepts Influence of water treatment in the integrated management of water resources</p>	
<p>Water flow and characteristics of water supply and wastewater</p>	<p>Learning time: 14h 23m Theory classes: 6h Self study : 8h 23m</p>
<p>Description: Water flows Microbiological quality parameters Physicochemical quality parameters</p>	
<p>Pretreatment and sedimentation</p>	<p>Learning time: 14h 23m Theory classes: 1h Practical classes: 2h Laboratory classes: 3h Self study : 8h 23m</p>
<p>Description: Pretreatment processes Sedimentation basic concepts Primary treatment design Experimental practice in the laboratory</p>	

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<p>Biological treatment. Activated sludge plants</p>	<p>Learning time: 9h 36m Theory classes: 3h Practical classes: 1h Self study : 5h 36m</p>
<p>Description: Microbiological growth kinetics Activated sludge plants Types of activated sludge Design of activated sludge</p>	
<p>Autonomous treatment: septic tanks and Imhoff tanks</p>	<p>Learning time: 4h 48m Theory classes: 1h Practical classes: 1h Self study : 2h 48m</p>
<p>Description: Autonomous treatment Septic tanks and Imhoff tanks. Concepts Septic tanks and Imhoff tanks. Design</p>	
<p>Natural lagoons and constructed wetlands</p>	<p>Learning time: 7h 11m Theory classes: 1h Practical classes: 2h Self study : 4h 11m</p>
<p>Description: Basic concepts Types of lagoons Types of wetlands Design</p>	

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<p>Sludge treatment and disposal</p>	<p>Learning time: 7h 11m Theory classes: 1h Practical classes: 2h Self study : 4h 11m</p>
<p>Description: Characteristics of the sludge Thickening Dehydration Anaerobic digestion Final destination of sludge</p> <p>Design</p>	
<p>Reclaimed water</p>	<p>Learning time: 7h 11m Theory classes: 3h Self study : 4h 11m</p>
<p>Description: Basic concepts Legislation Treatment processes</p>	
<p>Project for treatment plant</p>	<p>Learning time: 14h 23m Theory classes: 3h Laboratory classes: 3h Self study : 8h 23m</p>
<p>Description: Basic concepts Visit a water treatment plant</p>	
<p>Evaluation</p>	<p>Learning time: 7h 11m Laboratory classes: 3h Self study : 4h 11m</p>

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Qualification system

The mark of the course is obtained from the ratings of continuous assessment and their corresponding laboratories.

Continuous assessment consist in several activities, both individually and in group, of additive and training characteristics, carried out during the year (both in and out of the classroom).

The teachings of the laboratory grade is the average in such activities.

The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the course with regard to knowledge or understanding, and a part with a set of application exercises.

Final Mark = $0,70 * \text{Final Test} + 0,10 * \text{Test} + 0,20 * \text{Assessments}$

Regulations for carrying out activities

Failure to perform a laboratory or continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

Bibliography

Basic:

Metcalf & Eddy / AECOM. Wastewater Engineering: Treatment and Resource Recovery. 5. New York: Mc Graw Hill, 2014. ISBN 9780073401188.

Hernández Muñoz, A.. Depuración de Aguas Residuales. 4. Madrid: Colegio Ingenieros de Caminos, 1998.

Asano T., Burton F.L., Leverenz H.L., Tsuchihasli R. and Tchobanoglous G.. Water reuse: issues, technologies, and applications. 1. New York: Metcalf&Eddy/AECOM. McGraw-Hill, 2007.

Complementary:

Mara, D., Pearson, H.. Design manual for waste stabilization ponds in Mediterranean Countries. 1. 1998: Lagoon Technology International Ltd., 1998.

Crites, R., Tchobanoglous, G.. Small and decentralized wastewater management systems. 1. New York: Mc Graw Hill, 1998.

Droste, R.L. Theory and practice of water and wastewater treatment. New York: Wiley, 1997. ISBN 0471124443.

APHA-AWWA-WPCF. Standard methods for the examination of water and wastewater. 18th Edition. Washington: American Public Health Association, 1992. ISBN 0875532071.