



Course guides

250460 - TRACTAIGU - Water Treatment

Last modified: 06/10/2020

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2009). (Optional subject).
MASTER'S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Optional subject).
MASTER'S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Optional subject).

Academic year: 2020 **ECTS Credits:** 5.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: MARTIN GULLON SANTOS

Others: LAURA FLORES ROSELL, MARTIN GULLON SANTOS, ESTEL RUEDA HERNÁNDEZ

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

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

Transversal:

8559. ENTREPRENEURSHIP AND INNOVATION: Being aware of and understanding the mechanisms on which scientific research is based, as well as the mechanisms and instruments for transferring results among socio-economic agents involved in research, development and innovation processes.

8560. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.

8561. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

TEACHING METHODOLOGY

The subject consists of 3.0 hours per week of classroom lessons in the classroom. They are devoted to theoretical classes most, in which the teacher exposes the concepts and basic materials of the subject, presents examples and carries out exercises. They also dedicate hours to the resolution of problems with a greater interaction with the student. Practical exercises are carried out in order to consolidate the general and specific learning objectives. Support material is used in the format of a detailed teaching plan through the ATENEA virtual campus: contents, programming of assessment activities and directed learning and bibliography.

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.

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

Type	Hours	Percentage
Self study	80,0	63.95
Theory classes	19,5	15.59
Practical classes	9,8	7.83
Laboratory classes	9,8	7.83
Guided activities	6,0	4.80

Total learning time: 125.1 h

CONTENTS

Integrated management of water resources

Description:

Basic concepts
Influence of water treatment in the integrated management of water resources

Full-or-part-time: 7h 11m

Theory classes: 3h
Self study : 4h 11m

Water flow and characteristics of water supply and wastewater

Description:

Water flows
Microbiological quality parameters
Physicochemical quality parameters

Full-or-part-time: 14h 23m

Theory classes: 6h
Self study : 8h 23m

Pretreatment and sedimentation

Description:

Pretreatment processes
Sedimentation basic concepts

Primary treatment design
Experimental practice in the laboratory

Full-or-part-time: 14h 23m

Theory classes: 1h
Practical classes: 2h
Laboratory classes: 3h
Self study : 8h 23m



Biological treatment. Activated sludge plants

Description:

Microbiological growth kinetics
Activated sludge plants
Types of activated sludge

Design of activated sludge

Full-or-part-time: 9h 36m

Theory classes: 2h
Practical classes: 2h
Self study : 5h 36m

Autonomous treatment: septic tanks and Imhoff tanks

Description:

Autonomous treatment
Septic tanks and Imhoff tanks. Concepts
Septic tanks and Imhoff tanks. Design

Full-or-part-time: 4h 48m

Theory classes: 1h
Practical classes: 1h
Self study : 2h 48m

Natural lagoons and constructed wetlands

Description:

Basic concepts
Types of lagoons
Types of wetlands
Design

Full-or-part-time: 7h 11m

Theory classes: 1h
Practical classes: 2h
Self study : 4h 11m

Reclaimed water

Description:

Legislation
Treatment Processes

Full-or-part-time: 7h 11m

Theory classes: 3h
Self study : 4h 11m



Sludge treatment and disposal

Description:

Characteristics of sludge
Thickening
Dehydration
Anaerobic digestion of sludge
Final Destination
design

Full-or-part-time: 7h 11m

Theory classes: 1h
Practical classes: 2h
Self study : 4h 11m

Project for treatment plant

Description:

Basics
visit

Full-or-part-time: 14h 23m

Theory classes: 3h
Laboratory classes: 3h
Self study : 8h 23m

Evaluation

Full-or-part-time: 7h 11m

Laboratory classes: 3h
Self study : 4h 11m

GRADING 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 = 0,65 * Final Test + 0,20 * Test + 0,15 * Assessments

EXAMINATION RULES.

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. Wastewater engineering: treatment and resource recovery. 5h ed. New York: McGraw-Hill, 2014. ISBN 9780073401188.
- Hernández Muñoz, A. Depuración y desinfección de aguas residuales. 6th ed. Madrid: Ibergarceta Publicaciones, 2015. ISBN 9788416228263.
- Hernández Lehmann, A. Manual de diseño de estaciones depuradoras de aguas residuales. 2a ed. Madrid: IberGarceta, 2015. ISBN 9788415452720.

Complementary:

- Mara, D.D.; Pearson, H.W. Design manual for waste stabilization ponds in Mediterranean Countries. Leeds, UK: Lagoon Technology International, 1998. ISBN 9780951986929.
- Crites, R.; Tchobanoglous, G. Small and decentralized wastewater management systems. 1. Boston: McGraw Hill, 1998. ISBN 0072890878.
- Droste, R.L. Theory and practice of water and wastewater treatment. New York: Wiley, 1997. ISBN 0471124443.