

# Water Treatment (250460)

## General Information

<b>School</b>	ETSECCPB
<b>Departments</b>	Departament d'Enginyeria Civil i Ambiental (DECA)
<b>Credits</b>	5.0 ECTS
<b>Programs</b>	MÀSTER UNIVERSITARI EN ENGINYERIA DE CAMINS, CANALS I PORTS (pla 2012) MÀSTER UNIVERSITARI EN ENGINYERIA DE CAMINS, CANALS I PORTS (pla 2012) PARS: ENGINYER/A DE CAMINS, CANALS I PORTS (pla 2022)
<b>Course</b>	2024/25

## Main teaching language at each group

- Group 10ES1 Spanish (Q1)

## Faculty

Responsible Faculty: Joan Garcia Serrano  
Faculty: Joan Garcia Serrano, Maria Solé Bundó

## Objectives of Education

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.

## Competencies

### Especific

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

### Transversal

**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.

**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.

**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.

## Total hours of student work

		Hours	Percentage
Supervised Learning	Large group	25.5 h	56.67 %
	Medium group	9.75 h	21.67 %
	Laboratory classes	9.75 h	21.67 %
	Guided Activities	0.0 h	0.00 %
Self Study		80.0 h	

## Contents

### Integrated management of water resources

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

### Water flow and characteristics of water supply and wastewater

Water flows  
Microbiological quality parameters  
Physicochemical quality parameters

### Pretreatment and sedimentation

Pretreatment processes  
Sedimentation basic concepts  
  
Primary treatment design  
Experimental practice in the laboratory

### Biological treatment. Activated sludge plants

Microbiological growth kinetics  
Activated sludge plants  
Types of activated sludge  
  
Design of activated sludge

### Autonomous treatment: septic tanks and Imhoff tanks

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

### Natural Lagoon and rotating biological contactor (RBC)

Basic concepts  
Types of lagoons  
Types of RBC  
Design

### Reclaimed water

Legislation  
Treatment Processes

### Sludge treatment and disposal

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

## **Project for treatment plant**

Basics  
visit

## **directed activities**

Press release writing

## **Evaluation**

## **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.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

To do the laboratory practices you need the following personal protective equipment (PPE):

\* White lab coat UPC Chemical

## **Grading Rules**

*(\*) The evaluation calendar and grading rules will be approved before the start of the course.*

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

## **Test Rules**

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

## **Office Hours**

Monday from 16:30 to 18:00.  
e-mail: martin.gullon@upc.edu

## 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.
- [Water treatment handbook](#). 7th ed. Malmaison Cedex: Degrémont, 2007. ISBN 9782743009700.

### 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.

## Resources

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You can buy them at UPC Shop ([upc-shop.com](http://upc-shop.com)) or any specialty store."