



## Course guide

### 250460 - TRACTAIGU - Water Treatment

Last modified: 03/10/2023

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

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

**Academic year:** 2023    **ECTS Credits:** 5.0    **Languages:** Spanish

#### LECTURER

---

**Coordinating lecturer:** MARTIN GULLON SANTOS

**Others:** BEATRIZ ALTAMIRA ALGARRA, ANA MARIA JOSE CANDELARIA CANO LARROTTA, MARTIN GULLON SANTOS

#### 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.

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



## 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
Hours small group	9,8	7.83
Hours large group	25,5	20.38
Hours medium group	9,8	7.83

**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 Lagoon and rotating biological contactor (RBC)

**Description:**

Basic concepts  
Types of lagoons  
Types of RBC  
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

### directed activities

**Description:**

Press release writing

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

Theory classes: 6h  
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.
- 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.