Course guides
250460 - TRACTAIGU - Water Treatment

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: 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Hours small group</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Hours large group</td>
<td>19,5</td>
<td>15.59</td>
</tr>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>63.95</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.80</td>
</tr>
</tbody>
</table>

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

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**Project for treatment plant**

**Description:**
- Basics
- Visit

**Full-or-part-time:** 14h 23m
- Theory classes: 3h
- Laboratory classes: 3h
- Self study: 8h 23m

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**Evaluation**

**Full-or-part-time:** 7h 11m
- Laboratory classes: 3h
- Self study: 4h 11m

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**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

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**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:

Complementary: