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: 2019  
Degree: MASTER'S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Teaching unit Optional)  
MASTER'S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Teaching unit Optional)  
MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)  
ECTS credits: 5  
Teaching languages: Spanish

Teaching staff

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

Opening hours

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

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>Total learning time: 125h</th>
<th>Hours large group:</th>
<th>19h 30m</th>
<th>15.60%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>9h 45m</td>
<td>7.80%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>9h 45m</td>
<td>7.80%</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>6h</td>
<td>4.80%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>80h</td>
<td>64.00%</td>
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</tbody>
</table>
# Content

<table>
<thead>
<tr>
<th>Integrated management of water resources</th>
<th>Learning time: 7h 11m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td></td>
<td>Self study: 4h 11m</td>
</tr>
</tbody>
</table>

**Description:**
- Basic concepts
- Influence of water treatment in the integrated management of water resources

<table>
<thead>
<tr>
<th>Water flow and characteristics of water supply and wastewater</th>
<th>Learning time: 14h 23m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Self study: 8h 23m</td>
</tr>
</tbody>
</table>

**Description:**
- Water flows
- Microbiological quality parameters
- Physicochemical quality parameters

<table>
<thead>
<tr>
<th>Pretreatment and sedimentation</th>
<th>Learning time: 14h 23m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 1h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 3h</td>
</tr>
<tr>
<td></td>
<td>Self study: 8h 23m</td>
</tr>
</tbody>
</table>

**Description:**
- Pretreatment processes
- Sedimentation basic concepts
- Primary treatment design
- Experimental practice in the laboratory
### Biological treatment. Activated sludge plants

**Description:**
- Microbiological growth kinetics
- Activated sludge plants
- Types of activated sludge
- Design of activated sludge

**Learning 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

**Learning 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

**Learning time:** 7h 11m
- Theory classes: 1h
- Practical classes: 2h
- Self study: 4h 11m

### Reclaimed water

**Description:**
- Legislation
- Treatment Processes

**Learning time:** 7h 11m
- Theory classes: 3h
- Self study: 4h 11m
### Sludge treatment and disposal

<table>
<thead>
<tr>
<th>Description:</th>
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</table>
| Characteristics of sludge  
| Thickening  
| Dehydration  
| Anaerobic digestion of sludge  
| Final Destination design |

**Learning time:** 7h 11m  
Theory classes: 1h  
Practical classes: 2h  
Self study: 4h 11m

### Project for treatment plant

<table>
<thead>
<tr>
<th>Description:</th>
</tr>
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</table>
| Basics  
| visit |

**Learning time:** 14h 23m  
Theory classes: 3h  
Laboratory classes: 3h  
Self study: 8h 23m

### Evaluation

<table>
<thead>
<tr>
<th>Learning time:</th>
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</table>
| Theory classes: 3h  
| Laboratory classes: 3h  
| Self study: 4h 11m |

### 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 = 0.65 * Final Test + 0.20 * Test + 0.15 * 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:


Complementary:

