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: 2015
Degree: MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
MASTER'S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Teaching unit Optional)
MASTER'S DEGREE IN CIVIL ENGINEERING (RESEARCH TRACK) (Syllabus 2009). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: Spanish

Teaching staff
Coordinator: MARTIN GULLON SANTOS
Others: MARTIN GULLON SANTOS

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.

Teaching methodology
The course consists of 3,0 hours per week of classroom activity.
The 25,0 hours in groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.
The 5,0 hours in groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.
The rest of weekly hours devoted to laboratory practice.
Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

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                     | Total learning time: 125h | Theory classes: 19h 30m 15.60% | Practical classes: 9h 45m 7.80% | Laboratory classes: 9h 45m 7.80% | Guided activities: 6h 4.80% | Self study: 80h 64.00% |
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## Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
<th>Learning time</th>
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</table>
| **Integrated management of water resources** | Basic concepts  
Influence of water treatment in the integrated management of water resources | 7h 11m  
Theory classes: 3h  
Self study: 4h 11m |
| **Water flow and characteristics of water supply and wastewater** | Water flows  
Microbiological quality parameters  
Physicochemical quality parameters | 14h 23m  
Theory classes: 6h  
Self study: 8h 23m |
| **Pretreatment and sedimentation** | Pretreatment processes  
Sedimentation basic concepts  
Primary treatment design  
Experimental practice in the laboratory | 14h 23m  
Theory classes: 1h  
Practical classes: 2h  
Laboratory classes: 3h  
Self study: 8h 23m |
<table>
<thead>
<tr>
<th>Topic</th>
<th>Learning time</th>
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<tbody>
<tr>
<td><strong>Biological treatment. Activated sludge plants</strong></td>
<td><strong>9h 36m</strong></td>
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<tr>
<td>Description:</td>
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<tr>
<td>Microbiological growth kinetics</td>
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<td>Activated sludge plants</td>
<td></td>
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<td>Types of activated sludge</td>
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<td>Design of activated sludge</td>
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<td><strong>Description:</strong></td>
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<tr>
<td><strong>Autonomous treatment: septic tanks and Imhoff tanks</strong></td>
<td><strong>4h 48m</strong></td>
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<td>Description:</td>
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<tr>
<td>Autonomous treatment</td>
<td></td>
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<tr>
<td>Septic tanks and Imhoff tanks. Concepts</td>
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<tr>
<td>Septic tanks and Imhoff tanks. Design</td>
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<tr>
<td><strong>Description:</strong></td>
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<tr>
<td><strong>Natural lagoons and constructed wetlands</strong></td>
<td><strong>7h 11m</strong></td>
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<tr>
<td>Description:</td>
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<tr>
<td>Basic concepts</td>
<td></td>
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<tr>
<td>Types of lagoons</td>
<td></td>
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<tr>
<td>Types of wetlands</td>
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<tr>
<td>Design</td>
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### Sludge treatment and disposal

**Description:**
- Characteristics of the sludge
- Thickening
- Dehydration
- Anaerobic digestion
- Final destination of sludge

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

### Reclaimed water

**Description:**
- Basic concepts
- Legislation
- Treatment processes

**Learning time:** 7h 11m
- Theory classes: 3h
- Self study: 4h 11m

### Project for treatment plant

**Description:**
- Basic concepts
- Visit a water treatment plant

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

### Evaluation

**Learning time:** 7h 11m
- 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 = 0,70 * Final Test + 0,10 * Test + 0,20 * 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:**


