250675 - Management of Infrastructures of Waste Treatment

Coordinating unit: 250 - ETSECCPB - Barcelona School of Civil Engineering
Teaching unit: 713 - EQ - Department of Chemical Engineering
Academic year: 2019
Degree: MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2014). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: MARÍA DOLORES ÁLVAREZ DEL CASTILLO
Others: MARÍA DOLORES ÁLVAREZ DEL CASTILLO

Opening hours
Timetable: Monday 10-11h

Degree competences to which the subject contributes

Specific:
13340. Apply scientific concepts to environmental problems and their correlation with technological concepts.
13347. Dimension unconventional systems and advanced treatment and raise their mass balance and energy.

Transversal:
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.
8563. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Teaching methodology
The course consists of 2.3 hours a week in classes in the classroom and 0.7 hours a week to visit facilities. Engage in lectures 2.3 hours when the teacher explains the concepts and basic raw materials, presents examples and exercises are performed in order to consolidate the general and specific learning objectives. Used material support in the form of detailed syllabus through virtual campus ATENEA: content, programming and evaluation activities directed learning and literature.

Learning objectives of the subject
CE01 - Apply scientific concepts to environmental problems and their correlation with technological concepts.
CE08-Dimension unconventional systems and advanced treatment and raise their mass balance and energy.

Explore scientific concepts and technical principles of quality management of the receiving means, atmosphere, water and soil, and applied to problem solving.
Explore scientific concepts and technical principles of management and treatment of gaseous emissions, water supply, sewage and waste and remediation techniques for groundwater and contaminated soils.
Sized systems for the treatment of major pollutants vectors in specific sectors of activity.
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Interprets rules, identifies goals, assesses technical alternatives proposed unconventional solutions and priority actions.

Infrastructure management. Types, characteristics, advantages and disadvantages. Development programs in the territory as land management and technological development. Alternative systems implemented. Sustainability criteria.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 125h</th>
<th>Hours large group:</th>
<th>15h</th>
<th>12.00%</th>
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<tr>
<td></td>
<td>Hours medium group:</td>
<td>10h</td>
<td>8.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>10h</td>
<td>8.00%</td>
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<td></td>
<td>Guided activities:</td>
<td>10h</td>
<td>8.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>80h</td>
<td>64.00%</td>
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## INDUSTRIAL WASTE. GENERATION, COMPOSITION AND TIPOLOGIES. TEORIA

### Description:

### Specific objectives:
1. Recognize the physical and chemical parameters applicable to the classification of a waste.
2. Take the right way a representative sample of material.
3. Know how the waste leaching test is performed.
4. Successfully manage the different waste that can be generated as a result of the production activity of a company, applying current legislation.
5. Sort the waste properly.
6. Determine the different ways of treatment / recovery and possible to discern between the various possible options one that best fits your priorities.
7. Recognize, use and correctly fill all intercentres standardized documents by an industrial waste management.
8. Recognize the stabilization process of a residue.
9. Identify bag products as a possible route for the waste management.
10. Recognize the major differences in construction and operation of controlled types I, II and III deposits.
11. Know the applicable regulations regarding industrial waste incineration.
12. Know the applicable regulations regarding industrial waste incineration.
13. Recognize the main physical-chemical treatments applied to waste containing cyanide and metals, nitrates, ammonia and ammonium salts, and / or chromate.
14. Correctly apply the rules on cross-border transport of waste.
15. Recognize, use and correctly fill all standardized generated documents for the management of the waste out of the country where it has been produced.

## INDUSTRIAL WASTE. GENERATION, COMPOSITION AND TYPES. PROBLEMS

### Learning time: 9h 36m
- Theory classes: 8h
- Self study : 11h 12m

### Description:
Problems related to Unit 1 and 2

### Specific objectives:
Apply knowledge of the Unit 1 and 2
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<table>
<thead>
<tr>
<th><strong>MUNICIPAL WASTE MANAGEMENT. THEORY</strong></th>
<th><strong>Learning time:</strong> 16h 48m</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 7h</td>
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<td>Self study : 9h 48m</td>
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**Description:**

**Specific objectives:**
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.- Identify the different models of municipal waste management.
.- Know and apply current legislation on municipal waste.
.- Know and apply the characterization systems and its mission.
.- Identify and understand the different infrastructures municipal waste treatment.
.- Discern and calculate the most suitable for different compositions of municipal waste infrastructure.
.- Practical exercises management of these infrastructures.

<table>
<thead>
<tr>
<th><strong>MUNICIPAL WASTE MANAGEMENT. PROBLEMS</strong></th>
<th><strong>Learning time:</strong> 14h 23m</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Practical classes: 6h</td>
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<tr>
<td></td>
<td>Self study : 8h 23m</td>
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</tbody>
</table>

**Description:**
Resolution Unit 3 and 4 problems

**Specific objectives:**
.- Apply the concepts of Unit 3 and 4

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<tr>
<th><strong>Evaluation</strong></th>
<th><strong>Learning time:</strong> 24h</th>
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<tr>
<td></td>
<td>Laboratory classes: 10h</td>
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<td>Self study : 14h</td>
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**Qualification system**

The mark of the course is obtained from the ratings of continuous assessment.

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 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.
Regulations for carrying out activities

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

Bibliography

**Basic:**

Professors asignatura. Legislación europea, estatal, autonómica y local. Planes y programas de infraestructuras. Trabajos de investigación de los profesores.