250717 - Environmental Management

Coordinating unit: 250 - ETSECCPB - Barcelona School of Civil Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering
Academic year: 2019
Degree: MASTER'S DEGREE IN STRUCTURAL AND CONSTRUCTION ENGINEERING (Syllabus 2015).
(Teaching unit Optional)
ECTS credits: 5
Teaching languages: Spanish, English

Teaching staff
Coordinator: MARTA GANGELELLS SOLANELLAS
Others: MIQUEL CASALS CASANOVA, MARTA GANGELELLS SOLANELLAS

Opening hours
Timetable: To be agreed.

Degree competences to which the subject contributes

Specific:
13367. To apply innovative and sustainable technological aspects in the management and implementation of projects and works.
13370. To analyze the multiple technical and legal conditions arising in the construction of public works, and use proven methods and proven technologies with the aim of achieving greater efficiency in construction while respecting the environment and protecting the safety and health of workers and users of public works.

Generical:
13360. To conceive, design, analyze and manage structures or structural elements of civil engineering or building, encouraging innovation and the advance of knowledge.
13361. To develop, improve and use conventional materials and new construction techniques to ensure the safety requirements, functionality, durability and sustainability.
13362. To define construction processes and methods of organization and management of projects and works.
13363. To design plans for safety, quality and environmental and socioeconomic impacts related to the construction process.

Teaching methodology
The course consists of 3 hours per week of classroom activity (large size group).

The 3 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

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
Subject to introduce the engineering in the field of environmental impact management in construction and bring it to the concept of sustainable construction.
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- Knowledge of the basic concepts that make environmental principles an integral whole with complete lifecycle of structures and buildings.
- Ability to quantify the environmental impact of building materials and waste thereof.


The course aims to introduce the engineer within the field of construction environmental impacts management and sustainable construction. The course aims to provide the basic knowledge related to the life cycle impact of buildings taking into account raw materials consumption and waste management. It also aims to highlight the significance of energy consumption in buildings. This course also aims to provide students with the necessary knowledge on environmental management systems in construction companies and provide tools for assessing and monitoring the environmental impact of the construction sector.

### Study load

**Total learning time:** 125h

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes</td>
<td>19h 30m</td>
<td>15.60%</td>
</tr>
<tr>
<td>Practical classes</td>
<td>9h 45m</td>
<td>7.80%</td>
</tr>
<tr>
<td>Laboratory classes</td>
<td>9h 45m</td>
<td>7.80%</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6h</td>
<td>4.80%</td>
</tr>
<tr>
<td>Self study</td>
<td>80h</td>
<td>64.00%</td>
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</table>
# 250717 - Environmental Management

## Content

| Environmental management of construction projects and sites | Learning time: 36h  
Theory classes: 15h  
Self study: 21h |
|-------------------------------------------------------------|----------------------------------------------------------|
| **Description:** | - Introduction to global environmental issues.  
- Dimensions of sustainability in the construction industry.  
- Concept of environmental impact  
- Methodology and contents of the Environmental Impact Assessment  
- Types, indicators and assessment of environmental impacts  
- Analysis of the environment  
- Prevention of the environmental impact  
- Environmental monitoring program  
- Communication of environmental impacts  
- Introduction to Environmental Management Systems.  
- The implementation process of an Environmental Management System.  
- Environmental Management System audits and verification / certification of the system.  
- Integrated management systems.  
- The concept of Life Cycle Assessment  
- Regulatory Framework  
- Description of the methodology of Life Cycle Assessment |
| **Specific objectives:** | - To know the historical references and basic concepts related to sustainable development.  
- To identify the building life cycle, agents and actions affecting the environment.  
- To know the Environmental Impact Assessment methodology.  
- To understand the basic aspects related to the implementation of environmental management systems in construction companies.  
- To understand the basics of the methodology of Life Cycle Assessment |

| Construction material flow analysis | Learning time: 28h 47m  
Theory classes: 12h  
Self study: 16h 47m |
|-------------------------------------|----------------------------------------------------------|
| **Description:** | - Raw materials consumption  
- Earthworks waste management  
- Construction waste management  
- Demolition waste management |
| **Specific objectives:** | - To understand the environmental impact related to the raw materials consumption and waste management in construction projects and sites and corresponding minimization strategies |
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<table>
<thead>
<tr>
<th>Energy flow analysis in construction</th>
<th>Learning time: 28h 47m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 12h</td>
</tr>
<tr>
<td></td>
<td>Self study : 16h 47m</td>
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</table>

**Description:**
- Energy consumption throughout the whole life cycle of the building
- Limitation of the energy demand in buildings
- Certification of the energy demand in buildings

**Specific objectives:**
- To understand the environmental impact related to the energy consumption in construction projects and corresponding minimization strategies.

**Qualification system**

The mark of the course is obtained through continuous assessment.

Continuous assessment consists 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 in questions about concepts related to the learning objectives of the course and 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:**

- Unión Europea. EMAS Reglamento Comunitario de Ecogestión y Ecoauditoría.