Course guides
250723 - 250723 - Using Construction Waste

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: MASTER'S DEGREE IN STRUCTURAL AND CONSTRUCTION ENGINEERING (Syllabus 2015). (Optional subject).

Academic year: 2020   ECTS Credits: 5.0   Languages: Spanish

LECTURER

Coordinating lecturer: MARILDA BARRA BIZINOTTO
Others: DIEGO FERNANDO APONE HERNÁNDEZ, MARILDA BARRA BIZINOTTO, ADRIANA HAYDEE MARTINEZ REGUERO, SUSANA VALLS DEL BARRIO

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
13365. Designing and building using traditional materials (reinforced concrete, prestressed concrete, structural steel, masonry, wood) and new materials (composites, stainless steel, aluminum, shape memory alloys?).
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.

General:
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 2.3 hours per week of classroom activity (large size group) and 0.3 hours weekly with half the students (medium size group).

The 2.3 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.

The 0.3 hours in the medium size 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 references.
LEARNING OBJECTIVES OF THE SUBJECT

Subject to introduce the students to recycling of construction and demolition waste products

- Ability to assess the environmental impact of recycling techniques of construction waste


STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes</td>
<td>19,5</td>
<td>15.59</td>
</tr>
<tr>
<td>Laboratory classes</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Practical classes</td>
<td>9,8</td>
<td>7.83</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.80</td>
</tr>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>63.95</td>
</tr>
</tbody>
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Total learning time: 125.1 h

CONTENTS

Sustainability - Waste - Recycling

Description:

Specific objectives:
Enter the cycle of sustainable construction. Distinguish between primary and secondary materials

Full-or-part-time: 2h 24m
Theory classes: 1h
Self study: 1h 24m
**Construction and demolition waste**

**Description:**
Processing. Situation in Spain and the world linked and unlinked applications of recycled aggregates in road. Tests and experiences.
Present information in international applications CDW roadworks. Prepare a synthesis of information obtained by all groups
Exercise dosing

**Specific objectives:**
Learn landslides processing construction and demolition waste, fixed and mobile plants, recycled aggregates. become acquainted roads with recycled aggregates from Spain

**Full-or-part-time:** 19h 12m
- Theory classes: 5h
- Practical classes: 2h
- Laboratory classes: 1h
- Self study : 11h 12m

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**Soil and water protection. Leaching**

**Description:**
Protection of soil and water. Toxicity of organic and inorganic content. Leaching: General concepts. Essays and legislation. Tendencies
leaching practice

**Full-or-part-time:** 7h 11m
- Theory classes: 2h
- Laboratory classes: 1h
- Self study : 4h 11m

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**Fly ash from thermal power plants**

**Description:**
Production. Classification. Properties. Additions. Alkali activation

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

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**Inerting for implementation**

**Description:**
Inerting for implementation

**Full-or-part-time:** 7h 11m
- Theory classes: 3h
- Self study : 4h 11m
<table>
<thead>
<tr>
<th>Description</th>
<th>Full-or-part-time: 7h 11m</th>
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<tbody>
<tr>
<td><strong>Steel slag</strong></td>
<td></td>
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<tr>
<td>Using waste from other industries: Blast furnace slag and steel slag</td>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td></td>
<td>Self study: 4h 11m</td>
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<tr>
<td><strong>Used tires</strong></td>
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<tr>
<td>Used tires. Use in concrete and asphalt mix</td>
<td>Theory classes: 3h</td>
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<tr>
<td></td>
<td>Self study: 4h 11m</td>
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<tr>
<td><strong>Municipal solid waste</strong></td>
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<tr>
<td>Municipal solid waste</td>
<td>Theory classes: 3h</td>
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<td></td>
<td>Self study: 4h 11m</td>
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<tr>
<td><strong>Other usable waste</strong></td>
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<td>Glass, shell of rice, vegetable fibers</td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td>Practice other recoverable waste</td>
<td>Laboratory classes: 3h</td>
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<tr>
<td>Recycling of asphalt</td>
<td>Self study: 12h 36m</td>
</tr>
<tr>
<td><strong>Classroom assessment</strong></td>
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<tr>
<td></td>
<td>Theory classes: 3h</td>
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<tr>
<td></td>
<td>Laboratory classes: 3h</td>
</tr>
<tr>
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<td>Self study: 4h 11m</td>
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GRADING SYSTEM

Continuous assessment: written questions on the subject of the class that must be delivered on paper at the beginning of the next class will be formulated.
All deliveries will be qualified and skilled absence with a zero.
The subject will be adopted with the average from continuing evaluations, representing 30% of the mark, a test representing 30% of the mark and a final paper that represent 40% of the mark. The work will be delivered on paper and will be presented orally in class (20 minutes).

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: