250475 - ESTMIXCOMP - Mixed and Composite Structures

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 STRUCTURAL AND CONSTRUCTION ENGINEERING (Syllabus 2009). (Teaching unit Optional)
MASTER'S DEGREE IN STRUCTURAL AND CONSTRUCTION ENGINEERING (Syllabus 2015). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: Catalan, Spanish, English

Teaching staff
Coordinator: ENRIQUE MIRAMBELL ARRIZABALAGA
Others: ANTONIO RICARDO MARI BERNAT, ENRIQUE MIRAMBELL ARRIZABALAGA

Degree competences to which the subject contributes

Specific:
8162. Knowledge of all kinds of structures and materials and the ability to design, execute and maintain structures and buildings for civil works.
8228. Knowledge of and competence in the application of advanced structural design and calculations for structural analysis, based on knowledge and understanding of forces and their application to civil engineering structures. The ability to assess structural integrity.

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.

Learning objectives of the subject
### Study load

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

<table>
<thead>
<tr>
<th>Section</th>
<th>Learning time</th>
<th>Theory classes:</th>
<th>Practical classes:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overview</strong></td>
<td>7h 11m</td>
<td>3h</td>
<td></td>
<td>4h 11m</td>
</tr>
<tr>
<td><strong>Structural behavior. Time dependent effects</strong></td>
<td>7h 11m</td>
<td>2h</td>
<td>1h</td>
<td>4h 11m</td>
</tr>
<tr>
<td><strong>The prestressed composite structures. Ultimate limit states</strong></td>
<td>7h 11m</td>
<td>2h</td>
<td>1h</td>
<td>4h 11m</td>
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<tr>
<td><strong>Serviceability limit states</strong></td>
<td>7h 11m</td>
<td>2h</td>
<td>1h</td>
<td>4h 11m</td>
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<tr>
<td><strong>Shear connection</strong></td>
<td>7h 11m</td>
<td>2h</td>
<td>1h</td>
<td>4h 11m</td>
</tr>
<tr>
<td><strong>Construction process</strong></td>
<td>7h 11m</td>
<td>2h</td>
<td>1h</td>
<td>4h 11m</td>
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</tbody>
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## Composite columns

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

## Composite slabs with profiled sheet

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

## Composite bridges

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

## Composite structures with different types of concrete

**Learning time:** 21h 36m  
Theory classes: 9h  
Self study: 12h 36m

## Evaluation

**Learning time:** 7h 11m  
Laboratory classes: 3h  
Self study: 4h 11m
Bibliography

Basic: