250727 - Performance Based Seismic Design and Assessment of 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 STRUCTURAL AND CONSTRUCTION ENGINEERING (Syllabus 2015).
(Teaching unit Optional)
ECTS credits: 5
Teaching languages: English

Teaching staff
Coordinator: JESÚS MIGUEL BAIRÁN GARCÍA
Others: JESÚS MIGUEL BAIRÁN GARCÍA, CLIMENT MOLINS BORRELL, LUCA PELA, MAURO POLIOTTI

Degree competences to which the subject contributes

Specific:
13364. To conceive and design civil and building structures that are safe, durable, functional and integrated into its surroundings.
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?).
13366. To evaluate, maintain, repair and strengthen existing structures, including the historic and artistic heritage.
13369. To apply methods and advanced design software and structural calculations, based on knowledge and understanding of forces and their application to the structural types of civil engineering.

General:
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.

Learning objectives of the subject
## Study load

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

<table>
<thead>
<tr>
<th>Topic</th>
<th>Learning time</th>
<th>Theory classes</th>
<th>Practical classes</th>
<th>Laboratory classes</th>
<th>Self study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basis of structural dynamics</td>
<td>9h 36m</td>
<td>3h</td>
<td>1h</td>
<td></td>
<td>5h 36m</td>
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<tr>
<td>Seismic action and structural effects</td>
<td>21h 36m</td>
<td>7h</td>
<td></td>
<td>2h</td>
<td>12h 36m</td>
</tr>
<tr>
<td>Seismic performance of structures and performance based design</td>
<td>9h 36m</td>
<td>3h</td>
<td>1h</td>
<td></td>
<td>5h 36m</td>
</tr>
<tr>
<td>Seismic design of buildings</td>
<td>9h 36m</td>
<td>3h</td>
<td>1h</td>
<td></td>
<td>5h 36m</td>
</tr>
<tr>
<td>Seismic design of concrete structures</td>
<td>12h</td>
<td>3h</td>
<td>1h</td>
<td>1h</td>
<td>7h</td>
</tr>
<tr>
<td>Seismic design of steel structures</td>
<td>7h 11m</td>
<td>2h</td>
<td>1h</td>
<td></td>
<td>4h 11m</td>
</tr>
</tbody>
</table>
### Facilities and non-structural elements

**Learning time:** 2h 24m  
Theory classes: 1h  
Self study: 1h 24m

### Foundations and retaining walls

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

### Seismic design of bridges

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

### Retrofitting techniques

**Learning time:** 2h 24m  
Theory classes: 1h  
Self study: 1h 24m

### Tests

**Learning time:** 4h 48m  
Laboratory classes: 2h  
Self study: 2h 48m
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Bibliography

Basic:


Complementary:


