240EM025 - Structural Integrity

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering
Teaching unit: 702 - CMEM - Department of Materials Science and Metallurgy
Academic year: 2017
Degree: MASTER'S DEGREE IN MATERIALS SCIENCE AND ENGINEERING (Syllabus 2014). (Teaching unit Compulsory)
MASTER'S DEGREE IN MATERIALS SCIENCE AND ENGINEERING (Syllabus 2014). (Teaching unit Compulsory)
ERASMUS MUNDUS MASTER'S DEGREE IN ADVANCED MATERIALS SCIENCE AND ENGINEERING (Syllabus 2009). (Teaching unit Optional)
ERASMUS MUNDUS MASTER'S DEGREE IN ADVANCED MATERIALS SCIENCE AND ENGINEERING (Syllabus 2014). (Teaching unit Optional)
ERASMUS MUNDUS MASTER'S DEGREE IN ADVANCED MATERIALS SCIENCE AND ENGINEERING (Syllabus 2014). (Teaching unit Optional)
ECTS credits: 4.5
Teaching languages: Spanish

Teaching staff
Coordinator: MARCOS JUAN ANGLADA GOMILA

Opening hours
Timetable: To be agreed according to the time-table and lecturer at the beginning of the course

Teaching methodology
Conventional Theory lectures and exercises

Learning objectives of the subject

Study load

<table>
<thead>
<tr>
<th>Total learning time: 112h 30m</th>
<th>Hours large group: 27h</th>
<th>24.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Hours small group:</td>
<td>13h 30m</td>
<td>12.00%</td>
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<tr>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Self study:</td>
<td>72h</td>
<td>64.00%</td>
</tr>
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**Content**

<table>
<thead>
<tr>
<th>Structural Integrity</th>
<th>Learning time: 3h 20m</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 2h</td>
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<tr>
<td></td>
<td>Practical classes: 0h 40m</td>
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<tr>
<td></td>
<td>Laboratory classes: 0h 40m</td>
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</table>

**Description:**
- Introduction to fracture of materials from a traditional perspective and basic concepts on the mechanics of the continuous elastic solid.
- Fracture of materials with a plastic deformation limited to a small region in front of the crack tip. Plastic zone. Application of elastic fracture mechanics: limitations.
- Experimental determination of fracture toughness.
- Basic concepts on elastoplastic fracture mechanics.
- Fracture mechanisms
- Fatigue crack growth in ductile materials. Influence of loading and microstructure on crack growth.
- Fatigue under different specific conditions: notched specimens, small cracks, variable amplitude loading, fatigue in non-ductile materials, corrosion fatigue.

**Related activities:**
- Lectures, practical laboratory work, exercises and presentation of a fracture or fatigue failure

**Bibliography**

**Basic:**


**Others resources:**

- **Audiovisual material**
  - **Resource name**
  - Resource