320179 - MEMEA - Experimental Mechanics of Advanced Materials and Structures

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 737 - RMEE - Department of Strength of Materials and Structural Engineering
Academic year: 2019
Degree: BACHELOR’S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: English

Teaching staff
Coordinator: Montserrat Sánchez
Others: Luis Gil Espert

Prior skills
Knowledge and use of the basic principles of strength of materials.
Basic knowledge of the main concepts of mechanics and its application to solve engineering problems.

Degree competences to which the subject contributes
Specific:
1. MEC: Students will acquire the skills and knowledge necessary to apply the fundamentals of the elasticity and strength of materials to the behaviour of real solids.
2. MEC: Knowledge and capability for design and calculation of structures and industrial buildings.

Transversal:
4. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
3. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.

Teaching methodology
Lectures with audiovisual support and lab with small groups.

Learning objectives of the subject
The aim of the course is to offer a hands on experimental experience for students, to provide with the knowledge of experimental mechanics and non-destructive testing, and to give an overview of various modelling tools and experimental techniques that can be employed to analyze and estimate properties of mechanical components and structures.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 30h</th>
<th>20.00%</th>
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</thead>
<tbody>
<tr>
<td>Hours small group:</td>
<td>30h</td>
<td>20.00%</td>
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<tr>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
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</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Learning time</th>
<th>Laboratory classes</th>
<th>Self study</th>
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</thead>
<tbody>
<tr>
<td><strong>Mòdul 1: Introducció a la mecànica experimental</strong></td>
<td></td>
<td><strong>8h</strong></td>
<td>4h</td>
<td>4h</td>
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</tbody>
</table>
| **Mòdul 2: Mesura del desplaçament, la força y la deformació** | 1. Force, pressure and displacement transducers  
2. Estensometry  
3. Optical Fibber | **82h** | 32h | 50h |
| **Mòdul 3: Assajos no destructius** | 5. Inspecció ultrasònica  
6. Tècniques d’anàlisi visual  
7. Anàlisi modal experimental | **60h** | 24h | 36h |
### Planning of activities

| (ENG) SESSIONS TEÒRIQUES | Hours: 40h  
| | Laboratory classes: 24h  
<table>
<thead>
<tr>
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<th>Self study: 16h</th>
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| (ENG) SESSIONS PRÀCTIQUES | Hours: 84h  
| | Laboratory classes: 34h  
<table>
<thead>
<tr>
<th></th>
<th>Self study: 50h</th>
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</thead>
</table>
| (ENG) PROJECTE | Hours: 14h  
| | Laboratory classes: 2h  
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<tr>
<th></th>
<th>Self study: 12h</th>
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</table>
| (ENG) AVALUACIONS | Hours: 12h  
| | Laboratory classes: 4h  
| | Self study: 8h |

### Qualification system

Examen parcial: 20 %  
Examen final: 20 %  
Pràctiques de laboratori: 30 %  
Projecte: 30 %

Nota final = 0.2·N_parcial + 0.2·N_final + 0.3·N_laboratori + 0.3·N_projecte

### Regulations for carrying out activities

A satisfactory mark on the labs activities and on the course project are required to pass the course.
Bibliography

Basic:


Others resources: