Course guides
320179 - MEMEA - Experimental Mechanics of Advanced Materials and Structures

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 737 - RMEE - Department of Strength of Materials and Structural Engineering.
Degree: BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).
Academic year: 2021  ECTS Credits: 6.0  Languages: English

LECTURER
Coordinating lecturer: 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>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>30.0</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90.0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30.0</td>
<td>20.00</td>
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</tbody>
</table>

Total learning time: 150 h

CONTENTS

(ENG) Mòdul 1: Introducció a la mecànica experimental

Full-or-part-time: 8h
Laboratory classes: 4h
Self study: 4h

(ENG) Mòdul 2: Mesura del desplaçament, la força y la deformació

Description:
1. Force, preassure and displacement transducers
2. Estensometry
3. Optical Fibber

Full-or-part-time: 82h
Laboratory classes: 32h
Self study: 50h

(ENG) Mòdul 3: Assajos no destructius

Description:
5. Inspecció ultrasònica
6. Tècniques d'anàlisi visual
7. Anàlisi modal experimental

Full-or-part-time: 60h
Laboratory classes: 24h
Self study: 36h

ACTIVITIES

(ENG) SESSIONS TEÒRIQUES

Full-or-part-time: 40h
Laboratory classes: 24h
Self study: 16h
(ENG) SESSIONS PRÀCTIQUES

Full-or-part-time: 84h
Laboratory classes: 34h
Self study: 50h

(ENG) PROJECTE

Full-or-part-time: 14h
Laboratory classes: 2h
Self study: 12h

(ENG) AVALUACIONS

Full-or-part-time: 12h
Laboratory classes: 4h
Self study: 8h

GRADING 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

EXAMINATION RULES.

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

BIBLIOGRAPHY

Basic: