

Course guide

205118 - 205118 - Experimental Mechanics of Advanced Materials and Structures

Last modified: 11/04/2025

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 737 - RMEE - Department of Strength of Materials and Structural Engineering.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).
MASTER'S DEGREE IN RESEARCH IN MECHANICAL ENGINEERING (Syllabus 2021). (Optional subject).
MASTER'S DEGREE IN MECHANICAL ENGINEERING RESEARCH (Syllabus 2024). (Optional subject).
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2025). (Optional subject).

Academic year: 2025 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Gil Espert, Lluís

Others:

TEACHING METHODOLOGY

The course develops through lectures including theoretical sessions using slide presentations. Most of the hours would be devoted to preparing and executing tests at the laboratory. Discussion and public presentations will improve communication skills. According to the research topics some people may join to work in teams.

LEARNING OBJECTIVES OF THE SUBJECT

The main goal of the course is to acquire a work methodology to deal with experimental tests in mechanics. The course has a practical approach to provide hands-on experience in the laboratory. It is expected that students learn how to find information to set them at the cutting edge of technologies, how to prepare experimental tests, how to perform proper measurements and finally, how to produce sci-reports. Students could join existing research projects or can develop their own project according to personal interests. Topics must be related to advanced materials (composites, smart materials, etc.) and advanced structures (self-healing, self-deployable, smart structures, etc.)

STUDY LOAD

Type	Hours	Percentage
Hours large group	16,5	22.00
Hours small group	10,5	14.00
Self study	48,0	64.00

Total learning time: 75 h

CONTENTS

Module 1: State of the art

Description:

This module will present different available sources of information to place your knowledge at the cutting edge of technology. Students will create a short state-of-the-art around a topic related with advanced materials and structures.

Related activities:

Search for information, synthesize, prepare a report.

Full-or-part-time: 20h 30m

Theory classes: 5h 30m

Self study : 15h

Module 2: Developing your project

Description:

From module 1, students will prepare a research project using experimental methodology. A brief project will contain objectives, tests and tasks and finally, results. The project will use the available resources in the laboratory. Students are invited to join one of the current research projects that are developed at the laboratory or they can develop a new one according to their personal interests.

Related activities:

Prepare a plan.

Full-or-part-time: 15h 30m

Theory classes: 5h 30m

Self study : 10h

Module 3: Executing your project

Description:

Students must develop their project. Students will prepare specimens and test setup. Set instrumentation and measurements using devices. Record data and analyze results. Understand the behavior of the system and compare it with analytical or computational simulations. Check errors and potential failures. Safety and risks hazards.

Related activities:

Prepare test setup, execute tests and analyze results.

Full-or-part-time: 20h 30m

Laboratory classes: 10h 30m

Self study : 10h

Module 4: Reporting your project

Description:

Prepare a sci-report according to your analysis. Prepare effective information.

Related activities:

Write a short report and learn how to create journal papers, posters and congress contributions.

Full-or-part-time: 18h 30m

Theory classes: 5h 30m

Self study : 13h



GRADING SYSTEM

Every module will have some deliverables

Module 1: Report of the state of art (4-5 pages). 20%

Module 2: Report of the project (4-5 pages). 10%

Module 3: Presentations of the advances. 30%

Module 4: Report (10 pages), poster, slides presentation (5). 40%