



Course guide

205283 - MEMNS - Experimental Methods for New and Sustainable Materials

Last modified: 15/01/2025

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

Degree: BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2024 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Mercedes Cedeño, Luis Enrique

Others:

PRIOR SKILLS

Knowledge and application of the basic principles of material strength.

TEACHING METHODOLOGY

Lecture sessions with audiovisual support and laboratory practices with small groups.

LEARNING OBJECTIVES OF THE SUBJECT

The objective of this subject is for students to develop the knowledge and skills necessary to apply experimental methods in the characterization and development of materials and structures, with a particular focus on sustainable materials. Students will learn how to design and execute experiments, analyze results, and understand both the properties and environmental impact of materials, ultimately contributing to a more sustainable future in engineering.

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	40.00
Self study	45,0	60.00

Total learning time: 75 h



CONTENTS

Introduction to experimental methods

Description:

New and Sustainable materials
Experimentals experiences

Related activities:

Activity 1

Full-or-part-time: 8h

Theory classes: 4h
Self study : 4h

Measurements sensors

Description:

Force and displacement transducers
Strain gages

Related activities:

Activity 2

Full-or-part-time: 13h

Theory classes: 5h
Self study : 8h

Research methodology

Description:

Search tools
Writing, sci-tech reporting
Design of the test set up

Related activities:

Activity 3

Full-or-part-time: 10h

Theory classes: 5h
Self study : 5h

Non destructive tests

Description:

Ultrasonic inspection
Modal analysis

Full-or-part-time: 5h

Theory classes: 2h
Self study : 3h



Report and presentation of the project

Description:

Development of a final group project that integrates all the manufacturing and testing methodologies for material and structure specimens studied and applied in the laboratory throughout the course. The project will include:

- Design and fabrication of specimens, using the techniques learned to ensure a practical approach aligned with the course objectives.
- Testing of the specimens, following established experimental protocols to evaluate their properties and behavior under different conditions.
- Comprehensive analysis of the results obtained, using statistical and graphical tools to support data interpretation.
- Preparation of final conclusions, linking the results with the theoretical and practical concepts covered during the course, and exploring potential improvements or real-world applications.

This project will foster collaboration, critical thinking, and the integration of theoretical and practical knowledge, culminating in a group presentation to share findings and insights gained.

Full-or-part-time: 39h

Theory classes: 14h

Self study : 25h

GRADING SYSTEM

Theoretical activities: 30% (Activity 1,2 and 3)

Project report: 35%

Project presentations: 35%

EXAMINATION RULES.

*Esta asignatura no tiene examen

RESOURCES

Other resources:

All theoretical content presentations will be delivered using audiovisual material, which will later be uploaded to Atenea as PDF files. The guide for the development of the final project, and the results of the tests conducted in the laboratory, will also be uploaded to Atenea.