

Course guides

220042 - 220042 - Materials Characterization and Surface Engineering

Last modified: 22/04/2021

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 702 - CEM - Department of Materials Science and Engineering.

Degree: 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 TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2021 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: MARIA NURIA SALAN BALLESTEROS - ELISA RUPEREZ DE GRACIA

Others: Juan Muñoz, Jaime

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. An understanding of the fundamentals of science, technology and materials chemistry, as well as the relationship between microstructure, synthesis and processing and the properties of materials.

TEACHING METHODOLOGY

The course is divided into parts:

Theory classes

Practical classes

Self-study for doing exercises and activities.

In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.

In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.

Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.

The teachers provide the curriculum and monitoring of activities (by ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

Know the different techniques of study, analysis and characterization of materials, and the differences between them in order to make a correct choice in case of requirement.

Learn about the latest advances in coatings and different uilitats of each.

STUDY LOAD

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

Total learning time: 75 h



CONTENTS

Module 1: Materials Characterisation Techniques

Description:

- * Optical Microscopy (OM, STEREOSCOPIC)
- * Electronic Microscopy (SEM, TEM)
- * Other techniques (CONFOCAL, AFM, FIB)

Full-or-part-time: 50h

Theory classes: 20h

Self study : 30h

Module 2: Surface Engineering

Description:

- * PVD, CVD
- * TBC (Thermal Barrier Coatings)
- * DLC (Diamond Like Coatings)

Full-or-part-time: 25h

Theory classes: 10h

Self study : 15h

GRADING SYSTEM

Deliverable module I: 30%

Deliverable module II: 30%

Teamwork: 40%