220042 - Materials Characterization and Surface Engineering

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 utilitats of each.
Study load

<table>
<thead>
<tr>
<th>Total learning time: 75h</th>
<th>Hours large group:</th>
<th>30h</th>
<th>40.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self study:</td>
<td>45h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>

Content

Module 1: Materials Characterisation Techniques

Learning time: 50h
Theory classes: 20h
Self study: 30h

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

Module 2: Surface Engineering

Learning time: 25h
Theory classes: 10h
Self study: 15h

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

Qualification system

Deliverable module I: 30%
Deliverable module II: 30%
Teamwork: 40%

Bibliography