29918 - Materials Engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	435 - Bachelor's Degree in Chemical Engineering
ECTS	6.0
Course	2
Period	Second semester
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

1. The lectures are based on the explanation of the subject fundamentals. The teacher uses presentations in ppt, accompanied on occasions of videos.

2. Case studies. The Professor poses them in the classroom for discussion on it, at the time corresponding to the content developed in class.

3. Six 2-hour lab sessions are distributed throughout the course. Before each session, the student must have read the

script and completed a prior questionnaire. During and after each practice session the student must make a report.

4. Work material selection: each student will perform a work, where he must justify the choice of certain materials for a particular application or specific products. This work will be presented in person to the teacher throughout the last week of class or in the days allocated to continuous evaluation

5. Group work using problem based learning methodology. Multidisciplinary work in groups of five/six students with the subjects of Mechanical Engineering and Fluid Mechanics

5.2.Learning activities

5.3.Program

Block A: Study and understanding of the basic concepts associated with the microstructure of materials. Crystalline and noncrystalline materials, crystalline imperfections, diffusion, alloys' types, equilibrium diagrams. The Iron-Iron carbide diagram

Block B: Materials testing and correlation of the properties of a material with its microstructure. This block is mainly developed in laboratory sessions . Tensile tests, hardness tests , micro hardness tests, Charpy impact tests, metallographic microscopic, thermal shock glasses. Strain hardening, annealing. Thermal treatments in steel.

Block C: Metallic materials . Steels: fabrication, forming operations, types, properties and applications. Foundries: types, properties and applications. Non-ferrous alloys: types, properties and applications. Thermal and thermal- chemical treatments. Corrosion prevention

Block D. Ceramics : types, properties and applications. **Polymers** : types, properties and applications. **Composite materials** : types, properties and applications

5.4.Planning and scheduling

5.5.Bibliography and recomended resources

W.D. Callister & D. G. Rethwisch: "Ciencia e ingeniería de materiales". Reverté, 2016

W. F. Smith &, J. Hashemi: "Fundamentos de la ciencia e ingeniería de materiales". McGraw-Hill,

2014

Normas UNE-EN-ISO de Materiales y de Ensayos de materiales