

29810 - Materials Engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura 326 - Escuela Universitaria Politécnica de Teruel
Degree	440 - Bachelor's Degree in Electronic and Automatic Engineering 444 - Bachelor's Degree in Electronic and Automatic Engineering
ECTS	6.0
Course	2
Period	First 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

Learning is based on the following activities:

In class: Lectures, group discussion, open discussion in the classroom, problem solving, case analysis, laboratory practicals in small groups.

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Outside class: Reading and viewing of written documents and multimedia material, study of theory and individual problem solving. Individual or reduced size group preparation of small academic products.

5.2.Learning activities

Lectures (30 in class hours)

The subjects along the learning units will be developed sequentially in the classroom through the following methods:

Discussion and clarification by the instructor of those concepts included in the readings and previous material that the students manifest not have been sufficiently comprehended. Lecturing in formal way of those parts in the learning units having especial difficulty together with open discussions in order to integrate the different concepts of the course.

Problems and case solving (15 in class hours)

Problems will be relative to Materials Engineering, with especial emphasis to those in Electronics and Automation Engineering, as well as cases of materials selection within the same technological context.

Laboratory practicals (12 laboratory hours)

Laboratory work, distributed approximately as two hour sessions, will cover the following subjects:

- Mechanical tests. Treatment of experimental data obtained in the laboratory.
- Mechanical and thermal treatments of metals.
- Thermal properties: Thermal expansion in metals and thermal shock in ceramics.
- Electrical properties of conductors, semiconductors and dielectrics.
- Magnetic properties of selected materials.
- Optical transmission and refraction in glasses and polymers.

Assignments (10 outside class hours)

Study (78 outside class hours)

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It will include personal work of the student with respect to reading and viewing of the provided material, available in the Course Management System, as well as the study of theory and problem solving.

Evaluation (5 in class hours)

5.3.Program

Learning units:

A1. Atomic organization in solids: Crystalline structure.

A2. Defects and diffusion: Microstructure.

A3. Mechanical properties.

A4. Phase diagrams and phase transformations.

B1. Metallic materials.

B2. Ceramic materials.

B3. Polymer materials.

B3. Composite materials.

C1. Thermal properties.

C2. Electrical properties.

C3. Magnetic properties.

C4. Optical properties.

5.4.Planning and scheduling

- Three class hours per week.

- Approximately once every two weeks, the student will attend a laboratory session.

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- Key dates and deadlines for additional activities (assignments, additional exams) during the lecturing period will be published in due advance.

5.5. Bibliography and recommended resources

- Ashby, Michel F.. Materiales para ingeniería. [Vol.] 1, Introducción a las propiedades, las aplicaciones y el diseño / Michael F. Ashby, David R. H. Jones Barcelona : Reverté, D. L. 2008
- Ashby, Michel F.. Materiales para ingeniería. [Vol.] 2, Introducción a la microescala, el procesamiento y el diseño / Michael F. Ashby, David R. H. Jones Barcelona : Reverté, D. L. 2009
- Callister, William D., jr.. Introducción a la ciencia e ingeniería de los materiales / William D. Callister, jr ; [versión española por Pere Molera Solà y Marc J. Anglada Gomila] . - [1ª] ed. en español, reimp. Barcelona [etc.] : Reverté, 2007
- Shackelford, James F.. Introducción a la ciencia de materiales para ingenieros / James F. Shackelford ; traducción, adaptación y revisión técnica, Alfredo Güemes Gordo, Nuria Martín Piris ; revisión técnica para Latinoamérica, Claudio Guillermo Rocco, Daniel Àscar Díaz Madrid [etc.] : Pearson Prentice Hall, D.L. 2010
- Smith, William F.. Ciencia e ingeniería de materiales / William F. Smith ; con la colaboración de Javad Hashemi ; coordinación y revisión técnica, Montserrat Cruells Cadevall, Antoni Roca Vallmajor ; traductores, Montserrat Cruells Cadevall ... [et al.] . - 3ª ed. Madrid [etc.] : McGraw-Hill, cop. 2004
- Ashby, Michel F.. Materiales para ingeniería. [Vol.] 1, Introducción a las propiedades, las aplicaciones y el diseño / Michael F. Ashby, David R. H. Jones Barcelona : Reverté, D. L. 2008
- Ashby, Michel F.. Materiales para ingeniería. [Vol.] 2, Introducción a la microescala, el procesamiento y el diseño / Michael F. Ashby, David R. H. Jones Barcelona : Reverté, D. L. 2009
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- Smith, William F.. Ciencia e ingeniería de materiales / William F. Smith ; con la colaboración de Javad Hashemi . - 4ª ed. Madrid McGraw-Hill, 2004