Universidad Zaragoza

Academic Year/course: 2023/24

29810 - Materials Engineering

Syllabus Information

Academic year: 2023/24
Subject: 29810 - Materials Engineering
Faculty / School: 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
Year: 2
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The aim is to train students in the basic principles of chemistry and physics of materials, to learn about their properties and applications . Those materials that due to their characteristics are of special relevance in the elements, components and devices used in electronic and automatic technology will be considered.

It will also be pursued that the student acquires the ability to reason and relate concepts between some and other properties of materials in the context of their applications.

These approaches and objectives are aligned with some of the Sustainable Development Goals, SDGs, of the 2030 Agenda (https://www.un.org/sustainabledevelopment/es/) and certain specific goals, in such a way that the acquisition of the learning results of the subject provides training and competence to the student to contribute to some extent to their achievement: Goal 7, target 7. Goal 12, target 12.5.

2. Learning results

- To know the fundamentals of science, technology and chemistry of materials commonly used in Industrial Engineering in general and in Electronics and Automation Engineering in particular.
- To understand the relationships between microstructure and macroscopic properties of materials.
- To know how to apply knowledge of science, technology and chemistry to the choice and behaviour of metallic, ceramic, polymeric and composite materials.
- To know the electrical, magnetic and optical materials, as well as their tests and specifications.
- To know how to perform material tests.

3. Syllabus

- Atomic organization in solids: Crystalline structure.
- Defects and diffusion: Microstructure.
- Mechanical properties.
- Phase diagrams and transformations.
- Thermal properties.
- Electrical properties.
- Magnetic properties.
- Optical properties.
- Metallic materials.
- Ceramics.
- Polymers.
- Composite materials.

4. Academic activities

Río Ebro Campus (Zaragoza).

- Lectures (30 horas). Presentation and clarification in the classroom of the fundamental concepts and knowledge of the syllabus.
- Exercise classes (15 hours). Resolution of exercises, especially those that show the most common procedures.
- Laboratory practices (15 hours). Sessions to work on concepts and experimental procedures in the characterization of material properties.

- Personal study and work (85 hours).
- Assessment (5 hours).

Teruel Campus.

- Lectures (30 horas). Presentation and clarification in the classroom of the fundamental concepts and knowledge of the syllabus.
- Exercise classes (18 hours). Resolution of exercises, especially those that show the most common procedures.
- Laboratory practices: (12 hours). Sessions to work on concepts and experimental procedures in the characterization of material properties.
- Personal study and work (85 hours). In the EUPT the personal work will include the completion of exercises/practical evaluable work.
- Assessment (5 hours).

At EUPT, the degree is offered in two different modalities: on-site and blended learning. All the above mentioned applies in the classroom. In the blended learning course, the necessary work material (Moodle platform) will be available to follow the subject in an autonomous way. The resolution of problems and cases, as well as the explanation of the content of the practices of laboratory, will be supported by teaching videos and virtual tutorials.

5. Assessment system

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Laboratory practices (30% of the final grade). There are two ways to pass this part:

1. Optional laboratory practice exam (only students who attend all sessions): 2 partial tests short written tests after the 3rd and 5th lab session. Minimum grade of 4/10 in both tests for averaging.

2. Final exam of laboratory practices: No attendance to all sessions or optional exam failed or not taken : compulsory written test together with the final exam of longer duration than the partial tests. is carried out on the date established for official announcements. Minimum grade of 4/10.

Final Exam (70% of the final grade): Two mandatory parts of equal value: Questionnaire (35%) and resolution of exercises (35%). It is carried out on the date established for the official calls. Minimum grade of 3/10 in each of the tests and minimum average of 4/10 to pass this exam.

To pass the course a minimum grade of 4/10 must be obtained in each of the tests described and a minimum average of 5/10 in the final grade.

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- Laboratory practices (30% of the final grade): Internships will be evaluated through the completion of exercises/practical work focused on the interpretation of experimental data. Minimum grade of 4/10 for averaging. Without attendance to all sessions and/or grade lower than 4 in practical work: compulsory written test together with the final exam (minimum grade of 4/10 for averaging).

In the blended mode of the EUPT, the part of laboratory practices will be evaluated through the completion of teaching tasks related to the content of the practices. Minimum grade of 4/10. A lower grade will mean the performance of a written test along with the final exam.

- Final Exam (70% of the final grade): Two mandatory parts of equal value: Questionnaire (35%) and resolution of exercises (35%). Minimum grade of 3/10 in each of the tests and minimum average of 4/10 to pass this exam.

To pass the subject a minimum grade of 4/10 must be obtained in each of the tests described and a minimum average of 5/10 in the final grade.