

Academic Year: (2019 / 2020)

Review date: 24-04-2020

Department assigned to the subject: Materials Science and Engineering and Chemical Engineering Department

Coordinating teacher: LEVENFELD LAREDO, BELEN

Type: Electives ECTS Credits : 3.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Materials Science and Engineering

OBJECTIVES

By the end of this subject, students will be able to have:

1. Demonstrate a systematic understanding of the key aspects and concepts of materials for energy
2. Have adequate knowledge of materials for energy, including some knowledge at the forefront of its field in mechanical engineering, to develop cutting-edge technologies
3. Be awareness of the wider multidisciplinary context of engineering, opening concepts of materials for energy for their relationship to other areas.
4. The ability to apply their knowledge and understanding to identify, formulate and solve engineering problems of materials for energy using established methods, explaining the performance of materials in different working areas.
5. The ability to design and conduct appropriate experiments of materials for energy, interpret the data and draw conclusions.
6. Workshop and laboratory skills of materials for energy
7. The ability to combine theory and practice to solve problems related to materials for energy.
8. An awareness of the non-technical implications of engineering practice in the field of materials for energy.

DESCRIPTION OF CONTENTS: PROGRAMME

Introduction
Fuel Cells. Solid Oxide Fuel Cells.
Proton Exchange Membrane Fuel Cells I.
Proton Exchange Membrane Fuel Cells II.
Capacitors, Supercapacitors and Ferroelectrics.
Phase Change Materials
Redox Flow Batteries
Lithium Batteries
Post-Lithium Batteries
Superconductors
Magnetic Materials.
Characterization Techniques of Fuel cells.
Characterization Techniques of Batteries.

LEARNING ACTIVITIES AND METHODOLOGY**LEARNING ACTIVITIES**

Theoretical-practical classes
Laboratory practices
Tutorials
Team work
Individual work of the student

METHODOLOGY

Exhibitions in the teacher's class with support of computer and audiovisual means, in which the main concepts of the subject are developed and examples of resolution of exercises or practical cases are given
Critical reading by the student of scientific texts and publications recommended by the teacher
Obtaining experimental results in the laboratory. handling equipment and research techniques, under

the guidance of the teacher
Preparation of works and reports individually or in groups

ASSESSMENT SYSTEM

Lab practices: 10%
Class exercises: 10%
Team work: 20%
Exams: 40%

% end-of-term-examination:	60
% of continuous assessment (assignments, laboratory, practicals...):	40