Materials for Production and Storage of Energy

Academic Year: (2019/2020)

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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

% end-of	term-examination/test: 6	60
% of con	inuous assessment (assigments, laboratory, practicals): 4	0

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