Course guides
820322 - EEEN - Energy Storage

Last modified: 04/06/2021

Unit in charge: Barcelona East School of Engineering
Teaching unit: 748 - FIS - Department of Physics.

Degree: BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2021 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: José López López

Others: Primer quadrimestre:
JUAN ANTONIO GARCÍA-ALZÓRRIZ PARDO - T11
JOSE LOPEZ LOPEZ - T11

Segon quadrimestre:
JUAN ANTONIO GARCÍA-ALZÓRRIZ PARDO - M11, M12, M13
JOSE LOPEZ LOPEZ - M11, M12, M13

REQUIREMENTS

SISTEMES ELECTRÒNICS - Prerequisit

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
2. Analyse and simulate specific energy systems.
3. Understand the fundamentals of automatic control methods.

Transversal:
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

TEACHING METHODOLOGY

- Class of theory where the program is explained and are oriented and discuss the topics studied by students autonomously.
- Practices Laboratory.
- Students will perform two different projects; a transversal project in coordination with the other subjects of the 6th semester of Grade Energy and a second project (distance learning) in group with specific content of the course.

LEARNING OBJECTIVES OF THE SUBJECT

To know the main energy storage technologies and their applications

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours large group	45,0	30.00
Hours small group	15,0	10.00

Total learning time: 150 h

CONTENTS

1.- Introduction. Fields of application: generation, transmission and distribution, final customer.

Description:

Full-or-part-time: 9h
Theory classes: 3h
Self study : 6h

2.- Storage of electricity in batteries. Batteries. Parameters. Regulations.

Description:

Full-or-part-time: 33h 30m
Theory classes: 7h 30m
Laboratory classes: 6h
Self study : 20h

(ENG) 3.- Càrrega i supervisió de bateries. Electrònica de potència. Convertidors estàtics. Sistemes de gestió de bateries (BMS).

Description:

Full-or-part-time: 22h 30m
Theory classes: 3h
Laboratory classes: 6h
Self study : 13h 30m

4.- Thermal Energy Storage. Storage in Tanks. Thermal salts. Thermal Energy Concentration Systems

Description:

Full-or-part-time: 12h
Theory classes: 4h 30m
Self study : 7h 30m

5. Compressed air energy storage (CAES). Geological CAES facilities. CAES facilities in the world

Description:

Full-or-part-time: 12h
Theory classes: 4h 30m
Self study : 7h 30m

6. Other forms of energy storage: Storage superconductors (SMES), pump, flywheel, supercapacitors, fuel cell.

Description:

Full-or-part-time: 31h
Theory classes: 10h 30m
Laboratory classes: 3h
Self study : 17h 30m

7.- Applications: Electric Vehicle, uninterruptible power supplies (UPS), renewable energy, microgrids, smartgrids.

Description:

Full-or-part-time: 30h
Theory classes: 12h
Self study : 18h

GRADING SYSTEM

Final Note: Exam (40%) + Transversal Work (25%) + Laboratory (20%) + Especific Work (15%)
Reevaluation exam is not necessary