Course guide
820322 - EEEN - Energy Storage

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: 2023 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: José López López
Others: Primer quadrimestre:
JUAN ANTONIO GARCÍA-ALZÓRRIZ PARDO - Grup: T11, Grup: T12

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

REQUIREMENTS
SISTEMES ELECTRÒNICS - Prerequisite

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90.0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>45.0</td>
<td>30.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>15.0</td>
<td>10.00</td>
</tr>
</tbody>
</table>

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


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


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