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: 2022 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 - 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>
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</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%)

Rerevaluation exam is not necessary