820148 - EMO - Electric Mobility

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering
Teaching unit: 709 - EE - Department of Electrical Engineering
Academic year: 2015
Degree: BACHELOR’S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: English

Teaching staff
Coordinator: DANIEL MONTESINOS MIRACLE
Others: DANIEL MONTESINOS MIRACLE

Prior skills
Knowledge on electrical circuits is highly recommended.

Degree competences to which the subject contributes

Specific:
7. Analyse and simulate specific energy systems.
8. Assess and compare the energy capacitance and potential of the energy resources available.
9. Design automatic control systems.
10. Determine the best way to store energy on a case-by-case basis.
11. Explain energy resources, their characteristics and where they come from.
12. Model and simulate systems.
13. Perform energy balances and detect losses based on the operating principles of generators and boilers and of energy transformation inside machines.
14. Understand and apply the theory of electrical circuits and machines.
15. Understand automatic regulation and control techniques and their application to industrial automation.
16. Understand the applications of power electronics.
17. Understand the applications of power electronics.

Transversal:
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2. 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.

3. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

4. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 1. Analyzing the world’s situation critically and systemically, while taking an interdisciplinary approach to sustainability and adhering to the principles of sustainable human development. Recognizing the social and environmental implications of a particular professional activity.

5. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

6. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

Teaching methodology

Theory / Problems / Lab presental classes + non-presental exercises

Learning objectives of the subject

Electrical aspects of electric mobility will be addressed, from technology description, modeling and on-board energy management system.

Study load

<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours large group:</th>
<th>Hours medium group:</th>
<th>Hours small group:</th>
<th>Guided activities:</th>
<th>Self study:</th>
</tr>
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<tbody>
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<td><strong>Total learning time:</strong> 150h</td>
<td>30h</td>
<td>0h</td>
<td>15h</td>
<td>15h</td>
<td>90h</td>
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<td>10.00%</td>
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<td>60.00%</td>
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# Electric Mobility

<table>
<thead>
<tr>
<th>Content</th>
<th>Learning time:</th>
<th>Theory classes:</th>
<th>Practical classes:</th>
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<tbody>
<tr>
<td>Electric mobility introduction</td>
<td>4h</td>
<td>4h</td>
<td></td>
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<tr>
<td>Energy sources and storage systems</td>
<td>4h</td>
<td>4h</td>
<td></td>
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<tr>
<td>Electric machines in electric mobility</td>
<td>12h</td>
<td>6h</td>
<td>6h</td>
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<tr>
<td>Power converters</td>
<td>6h</td>
<td>4h</td>
<td>2h</td>
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<tr>
<td>Applications</td>
<td>4h</td>
<td>4h</td>
<td></td>
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<tr>
<td>Modeling</td>
<td>11h</td>
<td>4h</td>
<td>7h</td>
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<tr>
<td>Electric vehicles and the environment</td>
<td>4h</td>
<td>4h</td>
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Qualification system

Final exam 50 %
Non-presential activities 40 %
Lab practices 10 %

Bibliography

Basic:


