240EN32 - Electric Drives with High Efficiency and Low Environmental Impact

Coordinating unit: 240 - ETSEIB - Barcelona School of Industrial Engineering
Teaching unit: 709 - EE - Department of Electrical Engineering
Academic year: 2018
Degree: MASTER’S DEGREE IN ENERGY ENGINEERING (Syllabus 2013). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: Catalan

Teaching staff

Coordinator: PEDRO ANDRADA GASCON

Degree competences to which the subject contributes

Specific:
CEELELEC. Calculate and design machines and electric actuators, with suitable knowledge on the efficient management of electrical systems and effective control of electrical actuators.

Learning objectives of the subject

Introduce to electric drives using a modern perspective, based on power electronics and control systems, which provide a solid theoretical basis and at the same time, enables the selection of control equipment suitable for each application. Initiate in calculation and design of electrical machines following a systematic and rational process, based more in-depth study of the common characteristics than in the calculation of the different types of electrical machines. Provide the basis for finite element analysis of electric machines.
<table>
<thead>
<tr>
<th>TOPIC</th>
<th>Description</th>
<th>Learning time</th>
<th>Topics</th>
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<tbody>
<tr>
<td>1.- Overview about electric drives</td>
<td>content english</td>
<td>10h</td>
<td>Theory classes: 4h  Self study : 6h</td>
</tr>
<tr>
<td>2.- DC drives</td>
<td>content english</td>
<td>14h</td>
<td>Theory classes: 5h  Laboratory classes: 1h  Self study : 8h</td>
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<tr>
<td>3.- General principles concerning AC drives</td>
<td>content english</td>
<td>10h</td>
<td>Theory classes: 4h  Self study : 6h</td>
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<tr>
<td>4.- AC drives with three-phase asynchronous motors</td>
<td>content english</td>
<td>22h 30m</td>
<td>Theory classes: 5h  Laboratory classes: 3h 30m  Self study : 14h</td>
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<tr>
<td>5.- AC drives with three-phase synchronous motors</td>
<td>content english</td>
<td>21h</td>
<td>Theory classes: 4h  Laboratory classes: 3h  Self study : 14h</td>
</tr>
</tbody>
</table>
Qualification system

The final grade will be obtained according the following formula:

FINAL GRADE = 0.25*MARK OF FIRST TEST + 0.15* MARK OF PRACTICAL WORKS + 0.15 *MARK OF ASSESSMENT EXERCICES + 0.45 *MARK OF FINAL TEST

If the final grade is less than 5, then there is the "REVALUACIÓ" TEST, therefore the final grades will be obtained according the following formulas:

Final grade = màx (N1,N2)

N1 = 0.25*MARK OF FIRST TEST + 0.15* MARK OF PRACTICAL WORKS + 0.15 *MARK OF ASSESSMENT EXERCICES + 0.45 *MARK OF "REVALUACIÓ" TEST

N2 = 0.25*MARK OF "REVALUACIÓ" TEST + 0.15* MARK OF PRACTICAL WORKS + 0.15 *MARK OF ASSESSMENT EXERCICES

The mark of "reavaluació" test substitues the mark of the final test and/or the mark of the first term. The practical works and assessment exercises are not object of "reavaluació"
Bibliography

Basic:

Pyrhönen, Juha. Design of rotating electrical machines [on line]. 2nd ed. Chichester: John Wiley and Sons, 2013
978118581575.