820331 - TDEE - Electrical Energy Transmission and Distribution

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering
Teaching unit: 709 - EE - Department of Electrical Engineering
Academic year: 2017
Degree: BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish, English

Teaching staff
Coordinator: ANDREAS SUMPER
Others: Bullich Massagué, Eduard
López Urzainqui, Edorta

Prior skills
Complex numbers

Requirements
Electric systems

Degree competences to which the subject contributes

Specific:
CEENE-250. Knowledge of the principles of operation of electric power transmission and distribution systems.

CEENE-28. Explain the operating principles of power conversion systems and their application to transport and distribution systems.

Transversal:
2. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Teaching methodology
The course uses the methodology exhibition by 30%, laboratories, individual work on self by 60%. We performed a transversal project on the theme of the course.

Learning objectives of the subject
Technologies in the field of transport and distribution of electricity
Application of the technologies of transportation and distribution of electricity to the current electrical systems
# Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 45h 30.00%</th>
<th>Hours medium group: 0h 0.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group: 15h 10.00%</td>
<td>Guided activities: 0h 0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 90h 60.00%</td>
<td></td>
</tr>
</tbody>
</table>
# 820331 - TDEE - Electrical Energy Transmission and Distribution

## Content

<table>
<thead>
<tr>
<th><strong>Introduction</strong></th>
<th><strong>Learning time:</strong> 6h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong> Introduction. Structure components and functions of the distribution system and electricity transmission</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong> Understanding the transmission system and power distribution including economic and comparison of different systems</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Overhead lines and cables 1</strong></th>
<th><strong>Learning time:</strong> 17h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong> Electrical parameters. Equivalent circuits</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong> Knowing the electrical parameters of overhead lines and cables for power transmission</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Overhead lines and cables 2</strong></th>
<th><strong>Learning time:</strong> 35h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong> Overhead lines and cables: Steady state analysis</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong> Ability to perform steady state analysis of overhead lines and cables</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Overhead lines and cables 3: pu</strong></th>
<th><strong>Learning time:</strong> 11h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong> Calculate the system with pu an overhead lines and cables</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong> Ability to perform calculations in pu</td>
<td></td>
</tr>
</tbody>
</table>
### Transformers

**Description:** Transformers: Types, connections, equivalent circuits  
**Specific objectives:** Ability to model transformers for system analysis  

**Learning time:** 35h  
- Theory classes: 12h  
- Laboratory classes: 3h  
- Self study: 20h

---

### Load flow in power grids

**Description:** Load flow in power grids. Admittance and impedance matrices. Statement of the problem, Algorithms resolution.  
**Specific objectives:** Ability to perform load flow in power grids  

**Learning time:** 32h  
- Theory classes: 9h  
- Laboratory classes: 3h  
- Self study: 20h

---

### Electricity distribution

**Description:** Elements and definitions of the distribution system. Radial network structure. Planning.  
**Specific objectives:** Knowing the specific elements of the electrical distribution, namely the differences in the transport system and be able to perform an analysis of the electrical distribution system.  

**Learning time:** 13h  
- Theory classes: 3h  
- Self study: 10h

---

### Qualification system

The evaluation was carried out by the assessment by the teacher. Partial controls account for 40%, the last control 40% and 20% practice of the final grade. Generic competence (solvent use source of information) is a separate grade. This subject has no reassessment test.

### Regulations for carrying out activities

Calculators are permitted.
820331 - TDEE - Electrical Energy Transmission and Distribution

Bibliography

Basic:


