Course guide
295301 - IGSE - Integration and Management of Energy Systems

Unit in charge: Barcelona East School of Engineering
Teaching unit: 709 - DEE - Department of Electrical Engineering.
Degree: BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Compulsory subject).
Academic year: 2022  ECTS Credits: 6.0  Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: MARIA ELENA MARTIN CAÑADAS
Others: Primer quadrimestre:
MARIA ELENA MARTIN CAÑADAS - M11, M12
MONTSERRAT MATA DUMENJO - M11, M12

Segon quadrimestre:
MARIA ELENA MARTIN CAÑADAS - M11
MONTSERRAT MATA DUMENJO - M11

PRIOR SKILLS
Basic knowledge of storing and generating heat and power systems

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEENE-40. Tackle energy saving problems systematically by integrating processes and technologies.

Transversal:
05 TEQ N3. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.
06 URI N3. 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.
07 AAT N3. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

TEACHING METHODOLOGY
The teaching methodology will be project based learning.

LEARNING OBJECTIVES OF THE SUBJECT

- Review and model the main electricity and heat generation and storage integrated technologies.
- Learning systematic methods of thermal systems analysis and design of heat exchanger networks.
- Learning systematic analysis methods of combined thermal and electrical systems.
- Employ tools and systematic identification procedures of opportunities for energy savings and reuse.
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

Integrated technologies.

Description:
Description and modeling of the main generation and storage technologies that will be part of the integrated energy systems.

Full-or-part-time: 3h
Theory classes: 3h

Systematic methods for the analysis of thermal systems and design of heat exchangers networks.

Description:
Exposition of methods for the analysis and design of thermal systems and heat exchangers networks.

Full-or-part-time: 14h
Theory classes: 14h

Systematic analysis methods of combined thermal and electrical systems.

Description:
Exhibition of systematic methods to perform analysis of combined systems of thermal and electric type.

Full-or-part-time: 14h
Theory classes: 14h

Distributed systems.

Description:
Determination of the optimal management of distributed systems.

Full-or-part-time: 14h
Theory classes: 14h
GRADING SYSTEM

The final grade will be obtained from the following equation:

\[ NF = 0.25 \ast 0.25 \ast P_1 + P_2 + P_3 + 0.25 \ast 0.25 \ast PR \]

\( P_1, P_2, P_3 \): Projects 1, 2 and 3
\( PR \): Practices

50% of the mark of each project will result from its oral defense and the remaining 50% of the valuation of the written report. This course will not have a re-evaluation exam.

BIBLIOGRAPHY

Basic:

RESOURCES

Hyperlink:
- Revistes electròniques Elsevier, IEEE. Electronic journals Elsevier, IEEE