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

Last modified: 04/06/2026

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: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: MARIA ELENA MARTIN CAÑADAS

Others:

Primer quadrimestre:
SARA BARJA MARTÍNEZ - Grup: M11, Grup: M12, Grup: M13
MATTEO RANABOLDO - Grup: M11, Grup: M12, Grup: M13

Segon quadrimestre:
SARA BARJA MARTÍNEZ - Grup: T11, Grup: T12
MARIA ELENA MARTIN CAÑADAS - Grup: T11, Grup: T12

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 INFORMATI0N 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 metodology 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

Type	Hours	Percentage
Self study	90,0	60.00
Hours small group	15,0	10.00
Hours large group	45,0	30.00

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

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

The final grade (NF) of the course will be obtained from the following equation: NF = 0.25 Practical part+0.75*Projects
A minimum of 2 projects will be undertaken. 50 % of the mark of each project will result from its written report and the remaining 50% of the valuation of either an oral or a written test.
Since a minimum of 4 different marks will be obtained, this course will not have a re-evaluation exam.

BIBLIOGRAPHY

Basic:
- Dincer, Ibrahim; Midilli, Adnan; Kucuk, Haydar. Progress in Sustainable Energy Technologies: Generating Renewable Energy [on line]. Cham: Springer International Publishing, 2014 [Consultation: 29/05/2020]. Available on: http://dx.doi.org/10.1007/978-3-319-07896-0. ISBN 9783319078960.
- Sørensen, Bent E. Renewable energy : physics, engineering, environmental impacts, economy & planning. 4th ed. Burlington, Massachusetts [etc.]: Elsevier Academic Press, cop. 2011. ISBN 9780123750259.

RESOURCES

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