



# Course guide

## 295301 - IGSE - Integration and Management of Energy Systems

Last modified: 27/05/2024

**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:** 2024    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish

### LECTURER

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**Coordinating lecturer:** MARIA ELENA MARTIN CAÑADAS

**Others:**

Primer quadrimestre:  
MARIA ELENA MARTIN CAÑADAS - Grup: M11, Grup: M12, Grup: M13  
MONTSERRAT MATA DUMENJO - Grup: M11, Grup: M12, Grup: M13

Segon quadrimestre:  
MARIA ELENA MARTIN CAÑADAS - Grup: M11, Grup: M12  
MONTSERRAT MATA DUMENJO - Grup: M11, Grup: M12

### PRIOR SKILLS

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Basic knowledge of storing and generating heat and power systems

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**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

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The teaching methodology will be project based learning.

### LEARNING OBJECTIVES OF THE SUBJECT

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- ? 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

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The final grade will be obtained from the following equation :

$$NF = 0.25 * 0.25 * P1 + P2 + P3 + 0.25 * 0.25 * PR$$

P1 , P2 , P3 : 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

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### Basic:

- Dincer, Ibrahim; Midilli, Adnan; Kucuk, Haydar. Progress in Sustainable Energy Technologies: Generating Renewable Energy [online]. 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

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### Hyperlink:

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