

Course guide

2400214 - 240MEI67 - Integrated Energy Engineering Project

Last modified: 20/07/2026

Unit in charge: Barcelona School of Industrial Engineering

Teaching unit: 724 - MMT - Department of Heat Engines.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2025). (Optional subject).

Academic year: 2026 **ECTS Credits:** 10.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Elisabet Mas de les Valls

Others: Vicente de Medina
Xavier Fernandez
Nicolas Ablanque
Genís Casanova

REQUIREMENTS

Have completed Q1 and Q2 subjects in the field of energy.

TEACHING METHODOLOGY

The core teaching methodology of the course is Project-Based Learning (PBL). However, to help students acquire the knowledge and skills necessary to carry out the projects, these are combined with other types of activities, such as lectures by the faculty, practical classroom work sessions in small groups, and case study discussions. The learning activities are primarily cooperative. Activities will be designed to be inclusive and capable of engaging students in the learning processes.

LEARNING OBJECTIVES OF THE SUBJECT

The two main objectives of the subject are:

- To work from a practical point of view on the implementation of projects in the industrial energy sector.
- To introduce students to the use of data science in the field of energy use and management.

STUDY LOAD

Type	Hours	Percentage
Hours small group	51,0	56.67
Hours large group	39,0	43.33

Total learning time: 90 h

CONTENTS

Data science

Description:

It includes initial training to apply data science in professional practice within the energy sector. The learning approach combines lectures with case study applications. Specifically:

- Fundamentals: operation of a database, querying an SQL database, and data exploitation using Python programming.
- AI and neural networks.
- Application case to define electricity market strategy.

The acquired knowledge will also be applied in the specific Integrated Project activity.

Full-or-part-time: 66h

Theory classes: 23h

Self study : 43h

Specific integrated project

Description:

The activity consists of carrying out a project in the field of energy, conducted in groups of 8 to 10 people.

The project topics are proposed by the teaching staff and will involve applying the knowledge gained in the other courses of the specialization.

Cooperative sessions will be combined with lectures covering aspects such as:

- A holistic view of sustainability
- The evaluation of alternatives using a multi-criteria matrix or a cost-benefit analysis
- Economic viability
- Environmental impact analysis
- Social impact analysis
- Risk analysis
- Energy audits and certifications
- Digital twins in energy projects

The concepts learned in the Data Science activity will be applied at various points throughout the development of the project. Given the large size of the working groups, team management and teamwork become key elements of the course.

Full-or-part-time: 162h

Theory classes: 14h

Laboratory classes: 45h

Self study : 103h

Project presentation

Description:

The proposal presentation phase is key in the life of an engineering professional. This involves knowing how to justify the proposed solution to different audiences, from the body approving the proposal (whether it is the certifying authority or the contracting party) to the general public in cases of public participation processes.

The fundamentals will be provided to guide the presentation of the completed projects, and a series of defenses will be conducted in various formats to equip students to present the solution obtained during the development of the specific integrated project. Furthermore, it will be an opportunity to discover the solutions of other groups and evaluate them in the form of formal comments and allegations.

Full-or-part-time: 22h

Theory classes: 2h

Laboratory classes: 6h

Self study : 14h

GRADING SYSTEM

The final grade for the course will be the weighted average of the marks obtained in each of the activities.

The weighting will depend on the allocated time, including both contact hours and independent study.

Attendance is compulsory for collaborative sessions.

EXAMINATION RULES.

The rules for carrying out the activities, as well as the assessment criteria, will be communicated to students along with the activity description.