



Course guide

240295 - 240EN48 - Data-Driven Challenges for Energy Engineering

Last modified: 03/07/2024

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 709 - DEE - Department of Electrical Engineering.
Degree: MASTER'S DEGREE IN ENERGY ENGINEERING (Syllabus 2022). (Optional subject).
Academic year: 2024 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: Prieto Araujo, Eduardo
Others: Prieto Araujo, Eduardo

PRIOR SKILLS

Prior knowledge in project management (BSc level)
Basic Python or programming knowledge is highly recommended but not required

REQUIREMENTS

None

TEACHING METHODOLOGY

At the beginning of the course, work groups will be defined. Each group will define a project to be developed throughout the course, which will have a significant component of data utilization and/or analysis in the field of energy engineering. Gradually, students will work on the conceptualization of the project (in the form of a challenge), defining its motivation, setting the objectives, developing the project itself, drawing final conclusions, preparing periodic progress presentations, and writing a technical report.

LEARNING OBJECTIVES OF THE SUBJECT

- Understand the main phases of a project, at an organizational, planning, and team work level.
- Provide basic project management knowledge, particularly collaborative tools like Github.
- Provide students with the necessary knowledge to appropriately use data science tools and apply them to energy engineering challenges.
- Enable students to select the most suitable analysis methods to address the challenges posed.
- Enable students to analyze and interpret results from the application of data science tools.
- Foster creativity and innovation in addressing challenges, in the proposed solutions, and in the methods used.



STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	100.00

Total learning time: 45 h

CONTENTS

Challenges Based on Data for Engineers - Syllabus

Description:

Project structure
Project phases
Project development planning
Tools for organizing a project
Collaborative tools (Github)
Challenge formulation and objective definition
Project development
Technical-economic, social, environmental, and gender study
Ways to communicate the project

Specific objectives:

Successfully develop the project
Provide students with tools to execute the project correctly
Foster teamwork and organization

Related activities:

Project: Challenges based on data for engineers - Group work

Full-or-part-time: 125h

Practical classes: 30h
Guided activities: 15h
Self study : 80h



ACTIVITIES

Challenges based on data for engineers

Description:

The key objective of this group is to teach students the basic principles of project development in the context of energy engineering, focusing on the use of 'data-driven' tools and the utilization of data in general as a central element of the project. They will learn to apply criteria for defining options, selecting appropriate tools for data processing, decision-making, evaluation, and organization while completing the project. Projects will be organized in groups of diverse students working to promote teamwork.

The selection of the project topic will be discussed and agreed upon at the beginning of the course, considering the use of data within the energy sector as an essential part. The topic can be adjusted to the motivations and particular interests of the group. The project will be developed during the semester, including three presentations: conceptual proposal of the project, intermediate proposal, and final presentation. At the end of the course, the complete project report must be submitted. During the presentations, groups will receive feedback from both students and the instructor to improve the project's quality.

Specific objectives:

- Learn the fundamental stages of a project.
- Learn basic techniques for organizing teamwork.
- Carry out independent work to achieve project objectives.
- Practice communication skills during project presentations.
- Improve the quality of written report preparation.

Material:

The use of personal computer/tablet equipment is recommended

Delivery:

Three presentations and a final report

Full-or-part-time: 125h

Self study: 80h

Guided activities: 15h

Practical classes: 30h

GRADING SYSTEM

Work completed throughout the course: 80%

This includes both the evaluation of results and reports, as well as their oral presentation and the final report. The grading can be different and personalized for each member of a project group.

Active participation in classes: 20%

This is an individual grade that includes the assessment of active participation in classroom activities and active participation in periodic project follow-up meetings. The latter may include the degree of fulfillment of the objectives of each follow-up meeting, evaluating the active participation of each student or group of students in the tasks to be carried out during the course.

EXAMINATION RULES.

No additional tests will be conducted apart from continuous assessment.

The course grade will be based on class participation, progress reports, presentations, and the final report.

There will be an option for reevaluation, where the teacher may ask the student for a review of the submitted content (presentations and/or report).