Universidad Zaragoza

Academic Year/course: 2024/25

66360 - Wind, hydroelectric and marine energy

Syllabus Information

Academic year: 2024/25
Subject: 66360 - Wind, hydroelectric and marine energy
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 636 - Master's in Renewable Energies and Energy Efficiency
ECTS: 6.0
Year: 1
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The main objective of the subject is to ensure that students are able to manage the information on wind and hydraulic resources from different databases and its subsequent processing, to identify and know the basic operation of the main components that are part of the hydroelectric, wind and marine generation systems, as well as their sizing, taking into account the technical and economic aspects.

2. Learning results

To know the basic aspects related to the use of wind energy.
To know the electrical generation systems based on wind energy.
To understand the characteristics of the wind resource, how it is measured and analysed.
To understand the structure and operation of a wind turbine and a wind farm and to analyse the process of locating wind turbines in a wind farm.
To understand the characteristics of the water resource, how it is measured and analysed.
To understand the classification and operation of the different types of hydraulic turbines and to analyse the selection process of the appropriate turbine for each use. To analyse the regulation and control systems of a hydroelectric power plant.
To know the operation, maintenance and safety of hydroelectric power plants.
To know the ways of exploiting the technologies that use marine energy resources.

3. Syllabus

Wind energy:
basic aspects and analysis of wind resource.
Wind turbine technology.
Building of wind farms.
Operation and maintenance. Economic aspects.
Integration with other energy sources
Hydroelectric power:
basic aspects of hydroelectric generation.
Hydraulic concepts and civil works.
Electromechanical equipment.
Marine energy:
basic aspects of marine energy resource assessment.
Description of the technologies for energy use.

4. Academic activities

A01. Master class (12 hours): presentation of contents by the teaching staff or external experts to all students of the subject.
A02. Problem solving and case studies (30 hours): practical exercises with all the students of the subject.
A03. Laboratory practice (15 hours): practical exercises in small groups of students.
A05. Work related to the practical sessions or to the subject in general (24 hours).
A07. Study (63 hours).
A08. Assessment tests (6 hours)

The hours indicated are only illustrative and will be adjusted depending on the academic calendar.

5. Assessment system

In the first call, the evaluation will consist of: academic papers (including those derived from the practical sessions) 30% and an open-ended written test 70%.

Students who do not opt for the assessment method described above in the first call are entitled to take a global assessment test (the subject will be completely evaluated in a single test).

The second call will be carried out by means of a global test during the period established for this purpose in the academic calendar.

6. Sustainable Development Goals

7 - Affordable and Clean Energy
9 - Industry, Innovation and Infrastructure
13 - Climate Action