

30035 - Renewable Energies

Syllabus Information

Academic year: 2023/24

Subject: 30035 - Renewable Energies

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 436 - Bachelor's Degree in Industrial Engineering Technology

ECTS: 6.0

Year: 4

Semester: First semester

Subject type: Optional

Module:

1. General information

The main objective is to understand the basic aspects and the elements that make up the installations of the different types of Renewable Energies, selecting the most suitable ones according to the needs. At specifically concerning solar thermal energy, solar photovoltaic energy, wind energy, hydroenergy and biomass energy

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), specifically, the learning activities planned in this subject will contribute to the achievement of target 7.2 of Goal 7, target 11.6 of Goal 11, target 12.2 of Goal 12, and targets 12.3 and 13.3 of Goal 13.

2. Learning results

- Know a wide range of energy production and distribution systems and their applications in the energy industry or as an auxiliary part of other industries.
- Identify the relationship between the knowledge and skills on various industrial technologies acquired in previous subjects and their application in the specific field of renewable energies.
- Apply techniques and methods from various disciplines for the analysis and design of renewable energy processes
Learn how to analyze the solar resource and properly dimension solar thermal and photovoltaic installations of various sizes.
- Know the basic thermochemistry of biomass combustion
- Learn how to analyze the wind resource and calculate the production with wind generators

3. Syllabus

Introduction.

Photovoltaic solar energy: The solar resource. Current situation. Fundamentals. Components of the park. Dimensioning of stand-alone and grid-connected systems

Wind energy: The wind resource. Current situation. Fundamentals. Wind turbine components. Obtainable energy.

Isolated, grid-connected and offshore farms.

Hydraulic Power Plants: Hydropower potential. Current situation. Types of plants. Components. Evaluation of use.

Solar Thermal Energy: The solar resource. Low temperature solar collectors. Solar thermal installations for heating and DHW. Solar thermal power plants.

Biomass Energy: Resource evaluation. Pretreatments for dry biomass. Thermochemical use.

Biofuel production. Biogas production. Special engines for biogas.

4. Academic activities

A01. Lectures (presentation of contents by the teaching staff or external experts to all the students of the subject): 34.5 hours

A02. Problem solving and case studies: practical exercises with all the students of the subject. 18h
A03. Laboratory practice (carrying out practical exercises in small groups of students of the subject) 31.5 h
A05 Practical application or research work. 18.2h

A07 Self-study by the student. 52 h

A08 Assessment tests. 4 h

5. Assessment system

Continuous assessment (only during the term):

Two partial eliminatory tests, one in the month of November and the other during the week of continuous assessment. Each one of them will account for 35% of the final grade. To eliminate a subject, a minimum grade of 5 must be obtained in the midterm.

Short quizzes by ADD at the end of each theory session (solar thermal and biomass)

Practice scripts and tutored work: 30% of the final grade. Practice scripts and work must be submitted by on the dates specified for this purpose.

Global assessment (first and second call)

Theoretical-practical written exam: 70 %

Practice exam: 30%