

30035 - Renewable Energies

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	436 - Bachelor's Degree in Industrial Engineering Technology
ECTS	6.0
Course	4
Period	First semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

5.2.Learning activities

5.3.Program

1. Introduction to Renewable Energies

1.1 Introduction

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1.2 Future forecast

1.3 Status of Renewable Energies: in the world, in the European Union, in Spain

2.
Solar Energy

2.1 General concepts of the Solar Energy: Sun-Earth geometry

2.2 Solar Irradiance

3.
Solar Thermal Energy

3.1 Active Systems for solar collection.

3.1.1 Thermal solar installation of medium and high temperature

3.1.1.1 Thermosolar power stations

3.1.2 Thermal solar installation of low temperature

3.1.2.1 Selection of a Thermal solar installation of low temperature

3.2. Solar Thermal Energy: Bioclimatic architecture

3.2.1 Natural architecture. Thermal comfort

3.2.2 Bioclimatic architecture

3.2.2.1 Pasive solar systems: Direct and indirect gain, and greenhouses

3.2.2.2 Energy analysis in buildings. The 5000 method

4.
Biomass energy

4.1. Introduction

4.2. Energy transformation of biomass

4.3. Biofuels

5.
Geothermal energy

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5.1 Systems of thermal exploitation

6.
Photovoltaics

6.1 Introduction to photovoltaics.

6.2 Potential of photovoltaics and current status

6.3 Technologies for photovoltaic solar energy exploitation

6.4 Solar cells fundamentals

6.5 Photovoltaic modules

6.6 Stand alone and grid connected PV systems.

6.7 Solar inverters and dc/dc converters.

6.8 Other sub-systems: solar tracking, structures, energy storage, protection and measurement systems

6.9 Sizing of stand alone PV systems.

6.10 Sizing of grid-connected PV systems.

7.
Wind energy

7.1 Introduction to wind energy

7.2 Wind resource.

7.3 Wind energy applications

7.4 Potential of wind energy for electricity generation and current status.

7.5 Wind Energy Conversion systems

7.6 Power curve in a wind generator

7.7 Energy estimation

7.8 Grid connected wind farms. Civil and electrical infrastructure

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7.9 Offshore wind farms

8.
Hydroelectric energy

8.1 Potential of hydroelectric energy. Current status of the exploitation of the water energy.

8.2 Types of hydro power stations

8.3 Sub-systems of hydro power stations

8.4 Energy generation estimation in an hydropower station

9.
Tidal energy

9.1 Generation of electricity from wave energy.

9.2 Potential and current situation of wave energy

9.3 Wave energy technologies

9.4 Potential of tidal energy and current status

5.4.Planning and scheduling

5.5.Bibliography and recommended resources