

60804 - Energy Technology

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	532 - Master's in Industrial Engineering
ECTS	4.5
Course	1
Period	Half-yearly
Subject Type	Compulsory
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

There will 30 hours of lessons (oral presentations), 2 hours per week, where technological questions will explained to the whole group

There will be 12.5 hours of computer lab sessions (5 sessions of 2.5 hours each one) in medium size groups (15-20 students). In each sessions a complex (master level) practical case will be explained and solved with specific software (EES).

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5.2.Learning activities

- Lessons (oral presentations) where the syllabus is developed (see section 5.3). Technological questions and legal and environmental issues, are explained.
- Computer lab sessions to develop complex problems in groups
- Group work (calculation and technical reports) of subjects presented in computer lab sessions than must be submitted to the professor in the date due..

5.3.Program

1- Introduction: Energy resources. Thermodynamic properties and energy balances in engineering systems. Second principle of thermodynamics. Primary and final energy. Earth energy balance. Quantification of fossil resources. Proved reserves. Ratios reserves / consumption. Production peaks

2- Fossil fuels. Coal, oil and liquid fuels. Natural Gas and PLG. Interchangeability of fuel gases

3- Renewable energy sources and technologies. Solar energy (low temperature, concentrated solar energy and PV). Wind energy. Biomass.

4- Steam power plants. Types of power plants. Steam generator. Steam cycle. Cooling cycle. Balance of plant. Flue gas cleaning systems: DeNox, DeSOx systems.

5- Combined cycle power plants.

6- Energy systems in industry. Heat exchangers networks. Cogeneration.

5.4.Planning and scheduling

Lessons and computer lab sessions schedule and timetable will be published in the school of engineering and architecture web page http://eina.unizar.es/intraneteina/index.php?r=calendarioExtN/index_oficial

5.5.Bibliography and recomended resources