

60804 - Energy Technology

Syllabus Information

Academic Year: 2020/21

Subject: 60804 - Energy Technology

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 532 - Master's in Industrial Engineering

ECTS: 4.5

Year: 1

Semester: 532-First semester o Second semester

107-First semester

Subject Type: Compulsory

Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, computer lab sessions, case studies, and assignments.

4.2.Learning tasks

The course includes the following learning tasks:

- **Lectures** (30 hours). Whole group two-hour sessions. Presentation of the main theoretical contents (section 5.3.) such as technological questions and legal and environmental issues.
- **Computer lab sessions** (12.5 hours). 5 sessions of 2.5 hours each where students solve complex problems in groups using the computer.
- **Group work**. Calculation and technical reports done in computer lab sessions that must be submitted to the professor in the due date.

4.3.Syllabus

The course will address the following topics:

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.

4.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website (http://eina.unizar.es/intraneteina/index.php?r=calendarioExtN/index_oficial)

4.5.Bibliography and recommended resources