Academic Year 11/12	25702	ENERGY TECHNOLOGY
Department:	721 Physics and Nuclear Engineering	
Coordinator:	Lluís Batet	
Typology:	Block 1. Engineering Courses	Language: English
ECTS: 5	Offered in other degrees: Industrial Engineering	Year 1; Semester 1 Autumn Semester[1]

OBJECTIVES

General objective

To present the different forms of energy used in human activities. To analyze the primary sources of energy, with particular emphasis on processing and end-use technologies. We study also the specific characteristics of each energy technology as well as policy and economic aspects, and environmental impacts.

Specific objectives

- By the end of the course, the student will know about the opportunities and alternatives for selecting and implementing a variety of energy systems and power converters to meet the energy needs of different productive sectors under different economic, social and environmental circumstances.
    - There is a strong emphasis on the knowledge of performance and costs arising from the use of a variety of systems and power converters, as well as on the use of fuels.
- It is also intended that students learn the technical and economic aspects associated with the management of so-called network industries: electricity and natural gas within the liberalization of these sectors in Spain.
- The course aims to bring students to the issues of rationalization and optimization of energy utilization in the industry and services sectors.

COURSE DESCRIPTION

1: Structure of energy resources. Energy sustainability
2: The energy degradation processes. Converters and energy storage systems.
3: Coal fuels and derived products. Steam generators and steam turbines. Environmental impacts.
4: Products of petroleum and natural gas.
5: Use of nuclear energy.
6: Renewable energy sources and utilization: wind, solar and hydro.
7: The electricity sector. Sector analysis and regulation of the electricity system in Spain.
8: Saving and optimization of energy consumption. Heat and power cogeneration facilities. Energy Planning.

METHODOLOGY

The theoretical aspects are addressed through lectures. In the digital campus, students can find lecture notes and slides, which facilitate the monitoring of these lectures.

Furthermore, the teachers lead problem solving sessions (and also a simulation exercise) to bring students to real problems and orders of magnitude of some characteristic parameters of various energy systems. These are practical sessions, working in small groups, in which students work with the teacher's advice.

The approach to the exploration and eventual resolution of a given aspect of energy systems is accomplished through the performance, also in small groups, of supervised short projects that students present at the end of the semester.

In addition, each year there are three lectures given by energy professionals, with assistance of some external personalities. They focus on energy related issues or their social implications, allowing to provide an overview of aspects of current interest.

[1] Also available during the Spring Semester

COURSE EVALUATION

The evaluation elements are:

- Mid-semester exam.
- Evaluation of the activities carried out in the classroom.
- Evaluation of supervised short projects.
- Final exam at the end of the semester.

FACULTY

Lluis Batet Miracle
http://directori.upc.edu/directori/dadesPersona.jsp?id=1002339

ADDITIONAL INFORMATION