

66346 - Advanced thermoelectric generation. Zero emissions plants. Emissions trading

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	535 - Master's in Renewable Energies and Energy Efficiency
ECTS	5.0
Course	1
Period	Second 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

Theoretical lectures/discussions: explanation of the most relevant topics of the subject, by oral presentations given by the professors, supported by Power-Point files. They will be complemented with the resolution of short examples and cases.

Case-studies: several problems will be solved by the students, using computing and simulation tools. They will

66346 - Advanced thermoelectric generation. Zero emissions plants. Emissions trading

encompass multidisciplinary questions related to the subject contents, addressing energy efficiency and/or emissions issues.

Subject work: a deeper work will be done by the students, serving as a first approach to a research topic. The scope and methodology will be suggested or approved by the professors. The students will defense and discuss the work with the professors and the rest of the classmates.

5.2.Learning activities

Main activities (out of 42 hours schedule):

Theoretical discussions: 22 hours

Problems resolution: 8 hours

Case-studies: 12 hours

Moreover, the professors will support the development of the **subject work** (3,5 hours)

5.3.Program

- 1) Thermoelectric generation in conventional power stations
- 2) Thermoelectric generation in combined-cycle power stations
- 3) Thermoelectric generation in advanced power stations
- 4) Control of emissions in power stations: primary and secondary techniques
- 5) Golbal warming: international agreements
- 6) CO 2 capture technologies

66346 - Advanced thermoelectric generation. Zero emissions plants. Emissions trading

6.1) Oxy-fuel combustion

6.2) Post-combustion

6.3) Pre-combustion

7) CO₂ storage and uses

5.4.Planning and scheduling

February 2017 - Kick-off

March 2017 - First Case-Study

April 2017 - Second Case-Study

May 2017 - Subject Work Discussion

June 2017 - Final Exam, first call

September 2017 - Final Exam, second call

5.5.Bibliography and recommended resources

Centrales térmicas de carbón pulverizado / Cristóbal Cortés Gracia ... [et al.] Zaragoza : Prensas Universitarias de Zaragoza, 2009.

Captura y almacenamiento de CO₂ / Luis Miguel Romeo... [et al.] Zaragoza : Prensas Universitarias de Zaragoza, 2010.

Waste Heat Boilers Deskbook. V. Ganapathy. Prentice Hall.

Thermal Environmental Engineering. Kuehn H., Ramsey, J. W., Threlked. Prentice Hall.

Combined-Cycle Gas & Steam Turbine Power Plants. Kehlhofer, R.H., Warner, J., Nielse, H., Bachmann, R. 1999. Pennwell.

66346 - Advanced thermoelectric generation. Zero emissions plants. Emissions trading