

Academic Year/course: 2021/22

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

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 66346 - Advanced thermoelectric generation. Zero emissions plants. Emissions trading

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 535 - Master's in Renewable Energies and Energy Efficiency

**ECTS:** 5.0

**Year:** 1

**Semester:** Second semester

**Subject Type:** Optional

**Module:**

### 1. General information

### 2. Learning goals

### 3. Assessment (1st and 2nd call)

### 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:** Professor's presentations of the most relevant topics of the course, supported by Power-Point files. They will be complemented with the solving of short examples and cases.
- **Case studies:** several problems will be solved by the students, using the computer and simulation tools. They will consist on multidisciplinary questions related to the course contents, addressing energy efficiency and/or emissions issues.
- **Assignment:** students will prepare an assignment, working as a first approach to a research topic. The scope and methodology will be suggested or approved by the professors. The students will defend and discuss it with the professors and the rest of the class.

#### 4.2. Learning tasks

The course includes the following learning tasks:

- A01 Lectures (25 hours). Presentation of theoretical contents by a faculty or by external experts to all students enrolled in the course. Although it is not a mandatory activity, regular attendance is highly recommended.
- A02 Problem and case solving (13 hours). Solve practical problems and exercises with all the students. Although it is not a mandatory activity, regular attendance is highly recommended.
- A03 Laboratory sessions (12 hours). Students will work actively in groups to solve practical exercises.
- A06 Guided assignments (20 hours). Students will complete assignments, problems and exercises related to concepts seen in laboratory sessions and lectures.

- A07 Autonomous work (50 hours). Students are expected to spend about 50 hours to study theory, solve problems and prepare lab sessions.
- A08 Assessment (5 hours).

The indicated hours are for guidance and will be adjusted depending on the academic calendar.

At the beginning of the course, lecturers will communicate the schedule of practice sessions, which will be set according to the syllabus and the availability of laboratories and computer rooms.

The professors will monitor the development of the **assignment** in tutorial time (3.5 hours).

### 4.3. Syllabus

The course will address the following topics:

- Topic 1. Thermoelectric generation in conventional power stations
- Topic 2. Thermoelectric generation in combined-cycle power stations
- Topic 3. Thermoelectric generation in advanced power stations
- Topic 4. Control of emissions in power stations: primary and secondary techniques
- Topic 5. Global warming: international agreements
- Topic 6. CO<sub>2</sub> capture technologies
  - 6.1. Oxy-fuel combustion
  - 6.2. Post-combustion
  - 6.3. Pre-combustion
- Topic 7. CO<sub>2</sub> storage and uses

### 4.4. Course planning and calendar

#### Provisional course planning

- February - Start of the course
- March - First Case-Study
- April - Second and Third Case-Study
- May - Fourth Case-Study
- June 2019 - Final Exam, first call
- September 2019 - Final Exam, second call

Further information concerning the timetable, classroom, assessment dates and other details regarding this course will be provided on the first day of class.