

Academic Year: ( 2021 / 2022 )

Review date: 12-01-2022

Department assigned to the subject: Thermal and Fluids Engineering Department

Coordinating teacher: SORIA VERDUGO, ANTONIO

Type: Compulsory ECTS Credits : 4.0

Year : 1 Semester : 2

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

- Thermodynamics
- Heat Transfer

**OBJECTIVES**

Competences acquired by the students:

- Capability of analyzing the different processes occurring in a power station based on renewable energy.
- Capability of designing a power station based on renewable energy.
- Capability of evaluating the performance of a power station based on renewable energy.

Learning results acquired by the students:

The student should be capable of designing and evaluating the performance of different types of power stations based on renewable energies.

**DESCRIPTION OF CONTENTS: PROGRAMME**

- Advanced fundamentals of thermodynamics.
- Brayton cycle.
- Rankine cycle.
- Combined cycle.
- Exergy and thermoeconomics.
- Biomass.
- Solar thermal energy for electricity generation.
- Geothermal energy.

**LEARNING ACTIVITIES AND METHODOLOGY**

- Lectures, where the concepts to be acquired by the student will be presented. The student will receive the notes of the lecture prior to the class. (1.5 ECTS)
- Problems solving by the students (0.75 ECTS)
- Problems lessons, where the problem solutions will be discussed. (0.75 ECTS)
- Presentations. (1 ECTS)

**ASSESSMENT SYSTEM**

The evaluation of the course is carried out in continuous evaluation, leaving the final exam as a recovery for those who, could not take the partial exam and / or did not pass it.

Partial thermodynamics 50%: part of thermodynamics on advanced thermodynamic cycles, which corresponds to the first part of the course where it is reviewed and deepened in the analysis of advanced thermodynamic cycles that can be used in thermal power plants of renewable energies.

Individual or pair work 50%: This work consists of the students' search in the literature of a novel article related to the course and its presentation to the rest of the class. Both the theme of the scientific article and the interaction of the other students will be taken into account.

<b>% end-of-term-examination:</b>	0
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	100

**BASIC BIBLIOGRAPHY**

- José Antonio Carta González, Roque Calero Pérez, Antonio Colmenar Santos, Manuel-Alonso Castro Gil Centrales de energías renovables : generación eléctrica con energías renovables, Pearson, 2009
- M.J. Moran, H.N.Saphiro Fundamentals of Engineering Thermodynamics, John Wiley & Sons, 2006
- P. K. Nag Power plant engineering, Tata McGraw-Hill Education,, 2002