Renewable energy systems

Academic Year: (2022 / 2023) **Review date: 23/05/2022 12:18:37**

Department assigned to the subject: Thermal and Fluids Engineering Department

Coordinating teacher: SORIA VERDUGO, ANTONIO

Type: Electives ECTS Credits : 3.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Thermal Engineering (2nd course)
Thermal Power Plants (3rth course)

OBJECTIVES

By the end of this subject, students will be able to have:

1. a systematic understanding of the key aspects and concepts of thermal engineering.
2. coherent knowledge of thermal engineering including some at the forefront of the branch in mechanical engineering;
3. the ability to apply their knowledge and understanding to identify, formulate and solve problems of thermal engineering using established methods;
4. the ability to select and apply relevant analytic and modelling methods in thermal engineering.
5. the ability to apply their knowledge and understanding to develop and realise designs of thermal systems to meet defined and specified requirements;
6. an understanding of design methodologies in thermal engineering, and an ability to use them.
7. the ability to design and conduct appropriate experiments in thermal engineering, interpret the data and draw conclusions;
8. the ability to select and use appropriate equipment, tools and methods to solve problems of thermal engineering;
9. the ability to combine theory and practice to solve problems of thermal engineering;
10. an understanding of applicable techniques and methods in thermal engineering, and of their limitations;

DESCRIPTION OF CONTENTS: PROGRAMME

1.- Introduction
2.- Solar thermal energy (low temperature)
3.- Solar photovoltaic energy
4.- Solar thermoelectric energy
5.- Wing energy
6.- Biomass energy
7.- Geothermal energy
8.- Seawater and wave energy

LEARNING ACTIVITIES AND METHODOLOGY

LEARNING ACTIVITIES

THEORETICAL-PRACTICAL CLASSES.
Essential knowledge and concepts students must acquire. Student receive course notes and will have basic reference texts to facilitate following the classes and carrying out follow up work. Students partake in exercises to resolve practical problems and an evaluation tests, all geared towards acquiring the necessary capabilities.

STUDENT INDIVIDUAL WORK.

Individual project about the design of a low temperature solar facility.

LABORATORY SESSIONS.
Two lab sessiones related with renewable energy facilities.
Lab 1: Sizing of a solar instalation to produce hot water.
Lab 2: Sizing of a solar photovoltaic installation.

FINAL EXAM

METHODOLOGY

THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject`s main concepts are developed, while providing material and bibliography to complement student learning

PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group.

LABORATORY PRACTICAL SESSIONS. Applied/experimental learning/teaching in workshops and laboratories under the tutor's supervision.

TUTORING SESSIONS.
Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with teacher as tutor.

ASSESSMENT SYSTEM

% end-of-term-examination/test:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

CONTINUOUS ASSESMENT:
- Group project: 40%
- Lab sessions: 10%

FINAL EXAM: 50%

BASIC BIBLIOGRAPHY

- J.A. Duffie & W.A. Beckman Solar Engineering of Thermal Processes, John Wiley & Sons. Inc., 2013

- Javier Cañada Manual de energía solar térmica. Diseño y cálculo de instalaciones, Universidad politécnica de Valencia, 2008