

28813 - Thermal Engineering and Energy Technology

Syllabus Information

Academic Year: 2019/20

Subject: 28813 - Thermal Engineering and Energy Technology

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia

Degree: 424 - Bachelor's Degree in Mechatronic Engineering

ECTS: 6.0

Year: 2

Semester: Second semester

Subject Type: Compulsory

Module: ---

1.General information

1.1.Aims of the course

The aim of the course is to provide students with a solid basis of the major concepts of THERMODYNAMICS and to prepare them to use the TECHNICAL THERMODYNAMICS in their professional practice, as well as the concepts of solar thermal energy.

1.2.Context and importance of this course in the degree

The course on Thermal Engineering and Energy Technology is part of the Degree in Mechatronic Engineering offered by EUPLA, belonging to the group of subjects that make up the module called Compulsory. It is a compulsory second-year course (OB), with a teaching load of 6 ECTS credits.

This course helps in the acquisition of the competences of the degree, as well as providing additional useful training in the performance of the Mechatronic Engineer's functions related to the field of thermodynamics.

1.3.Recommendations to take this course

This course does not have any normative prerequisite, although for its adequate progress, knowledge and strategies from the chapters on Thermodynamics of the subject of Physics I of the first year are an asset.

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The subject Thermal engineering and energy technology is conceived as a stand-alone combination of contents, yet organized into three fundamental and complementary forms, which are: the theoretical concepts of each teaching unit, the solving of problems or resolution of questions and laboratory work, at the same time supported by other activities.

It involves the active participation of the student, in a way that the results achieved in the learning process are developed, not taking away from those already set out.

4.2.Learning tasks

The course includes the following learning tasks:

- Face-to-face generic activities:
 - Lectures.
 - Practice Sessions.
 - Laboratory Workshop.
 - Seminars.
- Generic non-class activities:
 - Study and understanding of the theory taught in the lectures.
 - Understanding and assimilation of the problems and practical cases solved in the practical classes.
 - Preparation of seminars, solutions to proposed problems, etc.
 - Preparation of laboratory workshops, preparation of summaries and reports.
 - Preparation of the written tests for continuous assessment and final exams.

4.3.Syllabus

The course will address the following topics:

THEORETICAL CONTENTS

- 1 Introductory concepts and definitions.
- 2 Energy and the first law of Thermodynamics.
- 3 Properties of a pure, simple compressible substance.
- 4 Control volume energy analysis.
- 5 The second law of Thermodynamics and Entropy.
- 6 Vapour power systems.
- 7 Refrigeration and heat pump systems.

PRACTICE SESSIONS

Some topics discussed in the previous section have associated laboratory practices in this regard. As the topics are developed, these Practices will be presented, both in the classroom and through the Moodle platform.

Following are those practices to be developed in the laboratory that will be carried out by the students in sessions of 2 hours duration.

- Practice 1: Heat pump.
- Practice 2: Thermal insulation.
- Practice 3: Thermohygrography.

CONTENTS SEMINARS

Thermal solar energy. Introduction. Solar Collectors. Elements of an installation. Applications. Calculation of facilities.

4.4.Course planning and calendar

The dates of the final exams will be those that are officially published at <https://eupla.unizar.es/asuntos-academicos/examenes>.

The written assessment tests will be related to the following topics:

- Test 1: Topics 1, 2, 3 and 4.
- Test 2: Topics 5, 6 and 7.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28813&year=2019