

## 30119 - Applied thermodynamics and heat transfer basics

### Información del Plan Docente

Academic Year	2016/17
Academic center	175 - Escuela Universitaria Politécnica de La Almunia
Degree	425 - Bachelor's Degree in Industrial Organisational Engineering
ECTS	6.0
Course	2
Period	Second semester
Subject Type	Compulsory
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

**The learning process designed for this subject is based on the following:**

Strong interaction between the teacher/student. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

The current subject Applied thermodynamics and heat transfer basics 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.

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The organization of teaching will be carried out using the following steps:

– **Theory Classes** : Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamental, structuring them in topics and or sections, interrelating them.

– **Practical Classes** : The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.

– **Laboratory Workshop** : The lecture group is divided up into various groups, according to the number of registered students, but never with more than 20 students, in order to make up smaller sized groups.

– **Individual Tutorials** : Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

### 5.2.Learning activities

**The programme offered to the student to help them achieve their target results is made up of the following activities...**

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, the activities are the following:

– **Face-to-face generic activities:**

– **Theory Classes** : The theoretical concepts of the subject are explained and illustrative examples are developed as support to the theory when necessary.

– **Practical Classes** : Problems and practical cases are carried out, complementary to the theoretical concepts studied.

– **Laboratory Workshop** : This work is tutored by a teacher, in groups of no more than 20 students.

– **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.

The subject has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class.

A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the subject file in the Accreditation Report of the degree, taking into account the level of experimentation considered for the said subject is moderate.

Activity	Weekly school hours
Lectures	3
Laboratory Workshop	1
Other Activities	6

### 5.3.Program

The program of the subject includes seven topics:

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Topic 1: Introductory concepts and definitions.

Topic 2: Energy and the first law of Thermodynamics.

Topic 3: Properties of a pure, simple compressible substance.

Topic 4: Control volume energy analysis.

Topic 5: The second law of Thermodynamics.

Topic 6: Entropy.

Topic 7: Vapor power systems.

Topic 8: Refrigeration and heat pump systems.

### 5.4.Planning and scheduling

#### Class hall sessions & work presentations timetable

The dates of the final exams will be those that are officially published at <http://www.eupla.es/secretaria/academica/examenes.html>.

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

– Test 1: Topics 1, 2, 3 & 4.

– Test 2: Topics 5, 6, 7 & 8.

### 5.5.Bibliography and recommended resources

- Moran, Michael J.. Fundamentos de termodinámica técnica / Michael J. Moran, Howard N. Shapiro . - 2ª ed. en español Barcelona [etc.] : Reverté, D.L. 2004
- Agüera Soriano, José. Termodinámica lógica y motores térmicos / José Agüera Soriano . - 6a. ed. mejorada Madrid : Ciencia 3, D.L. 1999
- Çengel, Yunus A.. Termodinámica / Yunus A. Çengel, Michael A. Boles ; traducción, Víctor Campos Olguín, María Teresa Colli Serrano ; revisión técnica, Luis G. Ríos Casas, Missael Flores Rojas . - 4ª ed. en español Mexico [etc.] : McGraw-Hill, cop. 2003
- Velasco Callau, María Carmen. Termodinámica técnica / Carmen Velasco Callau, Amaya Martínez Gracia y Tomás Gómez Martín . - 1ª ed. Zaragoza : Prensas Universitarias de Zaragoza, 2010
- Segura Clavell, José. Termodinámica técnica / Jose Segura Clavell Barcelona [etc.] : Reverté, D. L.1999
- Mills, Anthony F.. Transferencia de calor / Anthony F. Mills ; versión en español de Sergio de Régules Ruiz-Funes ; con la colaboración técnica de Eduardo Muñoz Tomás y Víctor Hugo del Valle Muñoz Barcelona [etc.] : Irwin, D.L. 1995

Material	Format
Topic theory notes	Paper/repository
Topic problem	

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Topic theory notes	
Topic presentations Topic problems Related links	Digital/Moodle E-Mail
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