DIM-SAP-336 Engineering Thermodynamics

SEMESTER:   Fall / Spring
CREDITS:    6 ECTS (4 hrs. per week)
LANGUAGE:   English
DEGREES:    SAPIENS program

Course overview

Engineering Thermodynamics is concerned with energy transformation and utilization. The key of the subject is the analysis of any energy process, determining the variation of the thermophysical properties of the fluids involved and applying energy and entropy balances. Special attention is paid to heat to mechanical/electric power conversion. Real-life examples and general overview of devices designed following Thermodynamic principles (power cycles, combustion engines, compressors, cooling systems, etc.) are shown. Understanding psychrometry is another goal, as the basis to air conditioning and climate control systems.

Prerequisites

Having passed a first year of Bachelor degree in Engineering

Course contents

1. Introduction: Basic definitions, Systems, Properties, Specific volume, Pressure, Temperature.
4. Control volumes analysis using energy.
Engines (Otto, Diesel, Dual cycles), Gas turbine power plants, Brayton cycle, Combined-cycle power plants.


10. Ideal gas mixtures and psychometry: Composition and properties of an ideal gas mixture, First and Second Law to ideal gas mixtures, Psychrometric properties, Psychrometric processes.

**Textbook**

The contents of the course will be provided to the alumni in the form of weekly lectures (4h/week), supported by lecturer’s slides and notes.


**Grading**

The evaluation will be determined by the combination of the results of different activities:

- Two midterm exams.
- Biweekly homework tasks.
- Final exam

The alumni grade will be defined by the maximum value to be chosen from two quantities, $\max(A,B)$:

1. $A = 0.50 \times \text{Average grade of two midterms} + 0.10 \times \text{Average grade of the homework} + 0.40 \times \text{Grade of the final exam}$.

2. $B = 0.25 \times \text{Average grade of two midterms} + 0.10 \times \text{Average grade of the homework} + 0.65 \times \text{Grade of the final exam}$.

The exams are all closed notebook and closed textbook. The grade will be given in the Spanish convention (0.0-10.0) with a 5.0 determining the boundary between Fail/Pass. The course will not be graded on a curve, i.e., there is no bound on the numbers of As, Bs, Cs, etc.

In case of failing, a retake exam will be offered. In this case, the final grade will be determined by the homework (10%), the midterm’s average (20%) and the retake exam grade (70%).