

## 25866 - Physics I

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 25866 - Physics I

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 558 - Bachelor's Degree in Industrial Design and Product Development Engineering

**ECTS:** 6.0

**Year:** 1

**Semester:** 107-First semester

558-First semester o Second semester

**Subject type:** Basic Education

**Module:**

### 1. General information

Physics I focuses on the fundamentals of mechanics and its more applied aspects such as mechanical oscillations, elasticity and fluid mechanics. It also provides the basic concepts and principles of thermodynamics. As this is a basic training subject, this knowledge is focused as a starting point for other subjects of the industrial branch and specific to the degree.

The assessable contents of Physics I, by themselves, do not provide the student with any of the skills that contribute to the achievement of the 2030 Agenda. However, the contents of Physics I are essential for the foundation of the subsequent knowledge of the rest of the degree, which are more directly related to the SDGs of the 2030 Agenda.

### 2. Learning results

- Know the fundamental concepts and laws of mechanics and thermodynamics and their application to basic engineering problems.
- Analyse problems that integrate different aspects of Physics I, recognizing the various physical fundamentals underlying a technical application, device or real system.
- Know the units, orders of magnitude of defined physical quantities and solves basic engineering problems, expressing the numerical result in the appropriate physical units.
- Correctly use basic methods of experimental measurement or simulation and treat, present and interpret the data obtained, relating them to appropriate physical magnitudes and laws.
- Use bibliography, by any of the means currently available, and use clear and precise language in their explanations of physics questions
- Correctly apply the fundamental equations of mechanics to various fields of physics and engineering: kinematics, rigid solid dynamics, oscillations and fluids
- Understand the meaning, usefulness and relationships between magnitudes, moduli and fundamental elastic coefficients used in solids and fluids.
- Perform mass and energy balances correctly in fluid motions in the presence of basic devices.
- Correctly use the concepts of temperature and heat. Apply them to calorimetric, expansion and heat transfer problems.
- Apply the first and second principles of thermodynamics to processes, basic cycles and thermal machines.

### 3. Syllabus

- Unit 1: Kinematics.
- Unit 2: Dynamics of the particle.
- Unit 3: Dynamics of the rigid solid.
- Unit 4: Static.
- Unit 5: Mechanical oscillations.
- Unit 6: Elasticity.
- Unit 7: Fluid mechanics.
- Unit 8: Heat and temperature. Heat transfer.
- Unit 9: Thermodynamic processes. First principle.
- Unit 10: Thermal machines. Second principle.

### 4. Academic activities

The planned learning activities are as follows:

- Classroom and laboratory activities: Lectures (30 hours), problems and cases (15 hours), laboratory practices (8

hours).

- Activities outside the classroom and laboratory: Personal study and work (91 hours), evaluation tests (6 hours).

## 5. Assessment system

The subject will be evaluated in the global assessment modality, but a midterm test will be scheduled during the school period in order to facilitate the gradual passing of the subject.

Assessment throughout the semester.

- Midterm written test on topics 1 to 6 (37.5% grade). If the grade is at least 4.5 out of 10, this type of assessment may be continued.
- At the end of the semester, a written test will be given on topics 7 to 10 (37.5% grade).
- Exam on laboratory practices, (20% grade), by means of a written exam if the practical sessions have been attended .
- Throughout the semester, group or individual work will be done (5% of the final grade).

Global assessment

- Examination of topics 1 to 10 (75% grade).
- Exam on laboratory practices, (20% grade), by means of a written exam if the practical sessions have been attended . Students who have not completed the practical sessions will be additionally evaluated by means of a practical exam in the laboratory.
- Presentation of a group or individual work (5% of the final grade)