

## 29701 - Physics I

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 29701 - Physics I

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

**Degree:** 434 - Bachelor's Degree in Mechanical Engineering

**ECTS:** 6.0

**Year:** 1

**Semester:** 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, in isolation, 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 foundation 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 fields, waves and electromagnetism and their application to basic engineering problems.
- Analyze problems that integrate different aspects of physics, 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 treats, presents and interprets the data obtained, relating them to the magnitudes and physical laws involved .
- 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 uses the concepts of temperature and heat. They apply them to calorimetric problems, of expansion and heat transfer.
- 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 (35 hours), problems and cases (15 hours), laboratorypractices (10

hours).

- Activities outside the classroom and laboratory: Personal study and work (84 hours), assessment tests (6 hours).

## 5. Assessment system

The subject will be evaluated in the global assessment modality, but an intermediate test will be scheduled during the school period in order to facilitate the gradual overcoming of the subject.

Assessment throughout the semester.

- Written test of topics 1 to 6 at mid-semester (40% grade). If the grade is at least of 4.5 out of 10, this type of evaluation may be continued.
- At the end of the semester, there will be a written test on the date scheduled for the first exam of topics 7 to 10 (40% grade).
- Examination on the laboratory practices, (20% grade), by means of a written test on the date scheduled for the first call, if the student has attended the practical sessions.

Global assessment

- Examination of topics 1 to 10 (80% 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.