

Academic Year/course: 2022/23

## 25866 - Physics I

### Syllabus Information

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**Academic Year:** 2022/23

**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

## 2. Learning goals

### 2.1. Competences

#### BASIC COMPETENCES

CB01. Students have demonstrated knowledge and understanding in a field of study that is part of the general secondary education curricular, and is typically at a level which, although it is supported by advanced textbooks, includes some aspects that involve knowledge of the forefront of their field of study.

CB02. Students can apply their knowledge to their work or vocation in a professional manner and have competences typically demonstrated through devising and defending arguments and solving problems within their field of study.

CB03. Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include an important reflection on social, scientific or ethical issues.

CB04. Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

CB05. Students have developed those skills needed to undertake further studies with a high degree of autonomy.

#### GENERAL COMPETENCES

GC04. Ability to organize time effectively and coordinate activities to acquire new knowledge quickly and perform under pressure.

GC05. Capacity to collect, manage, analyze and synthesize information from various sources for the development of design projects and product development. Capacity to use this documentation to obtain conclusions aimed at solving problems and making decisions with initiative, creativity and critical thinking, in order to generate new product concepts, new ideas and solutions.

GC06. Ability to generate the necessary documentation for the proper transmission of ideas through graphics, reports and technical documents, models and prototypes, oral presentations in Spanish and other languages.

GC07. Ability to use and master techniques, skills, tools and techniques and communication and others specific of design engineering needed for design practice.

GC08. Ability to learn continuously, to develop autonomous learning strategies and to work in multidisciplinary groups with motivation and determination to achieve goals.

#### SPECIFIC COMPETENCES

SC02. Understanding and mastery of basic concepts of the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and its application for solving problems of Engineering in Industrial Design and Product Development.

## 3. Assessment (1st and 2nd call)

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

Subject's learning process to pass the subject is based on the following aspects:

1. Lectures, where the lecturer will explain the main theoretical concepts as well as, will illustrate the application of the theoretical material via exercises and practical cases. Active students' participation is intended in this activity. In parallel, the students should spend self-study time in order to take advantage of the lectures.
2. Laboratory sessions will be scheduled during the semester. Lab sessions' assessment will contribute to the single overall mark.
3. Supervised projects where students will work on problem-solving tasks or a practical question proposed by the professor and related to the concepts learned in the subject.
4. Self-study time, learning the subject as well as performing problem-solving tasks. This activity is essential for the student's learning process as well as to have success to pass the subject.

### 4.2. Learning tasks

The planned subject's learning activities are listed as follows:

#### 1: Lectures (43 hours)

This activity is intended to present the basics of the discipline illustrated with practical examples in order to facilitate the understanding and assimilation of the concepts. Problem solving tasks and illustrative examples will take place in the practical sessions with the cooperation of students. Students will be encouraged to solve prior to the lectures some problems proposed by the professor.

#### 2: Laboratory sessions (8 hours)

Laboratory sessions' scripts will be available for the students in the ADD. Scripts consist of a theoretical introduction and the steps to perform during the lab activity. Reading the script prior to attend to the laboratory session is a must for the student. Writing a full report including the main result is recommended after completing the lab sessions.

#### 3: Supervised projects (8 hours)

The professor will propose topics for individual or team works about different subject's parts. Students will be tutored during these tasks.

#### 4: Study (86 hours)

It is of importance for the student to devote constant efforts, during the semester, for personal study, problem-solving tasks and writing lab sessions' reports.

#### 5: Assessment task (5 hours)

The overall assessment is planned at the end of the semester, but the continuous assessment will be a learning tool for formative and summative assessment during the semester. In this way, students can check their learning during the progress of the course.

#### 6: Tutorials

The professor's tutoring timetable will be available for the student to ask questions about the subject.

### 4.3. Syllabus

The course will address the following topics:

#### MECHANICS

- Principles of mechanics
  - 1. Kinematics.
  - 2. Dynamics.
  - 3. Rigid body dynamics.
  - 4. Statics.
- Applied mechanics
  - 5. Oscillatory movement.
  - 6. Elasticity.
  - 7. Fluid dynamics.
- THERMODYNAMICS
  - 8. Heat and temperature. Heat transfer.
  - 9. Thermodynamics processes. First principle.
  - 10. Thermal machines. Second principle.

#### **4.4. Course planning and calendar**

Schedule for on-site sessions and reports? deadline.

The schedule for the lectures, problem-solving sessions, and laboratory sessions will be planned by the university center and will be published on the Center?s website. The remainder activities will be planned depending on the number of students and the schedule will be provided in advance.

The professor will inform about the tutoring timetable.

#### **4.5. Bibliography and recommended resources**

<https://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=25866>