

## Physics

Academic Year: ( 2024 / 2025 )

Review date: 20-01-2025

Department assigned to the subject: Physics Department

Coordinating teacher: BRIZ PACHECO, SUSANA

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Engineering and Architecture

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Physics and Mathematics at high school level.

Physics: fundamentals of kinematics, dynamics, electric and magnetic field

Mathematics: algebraic operations with vectors, derivatives and integrals

## LEARNING OUTCOMES

CB1: Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study

CG3: Knowledge of basic and technological subject areas which enable acquisition of new methods and technologies, as well as endowing the technical engineer with the versatility necessary to adapt to any new situation.

CG12: Understanding and command of the basic concepts of the general laws of mechanics, thermodynamics, electromagnetic fields and waves, and their application to resolve problems characteristic of engineering.

RA1: Knowledge and Understanding. Knowledge and understanding of the general fundamentals of engineering, scientific and mathematical principles, as well as those of their branch or specialty, including some knowledge at the forefront of their field.

## OBJECTIVES

Acquire the knowledge of basic physical phenomena related with engineering.

Understanding the mathematical models involved in general physics.

Understanding and using the scientific method, and scientific language.

Development of reasoning strategies and techniques for analysing and solving problems.

Analysis and interpretation of experimental data.

Dealing with laboratory instruments.

## DESCRIPTION OF CONTENTS: PROGRAMME

Topics covered:

Particle kinematics. Particle dynamics. Coulomb's law. Electric field. Gauss law. Electric potential. Conductors.

Capacitors, dielectrics and field energy. Magnetic forces and magnetic field. Sources of the magnetic field. Magnetic materials. Faraday's induction law. Wave propagation. Acoustic and electromagnetic waves.

## LEARNING ACTIVITIES AND METHODOLOGY

- Theoretical master classes in synchronous online format
- Discussions in the classroom
- Practical demonstrations in the virtual or face-to-face classroom
- Personal work of the student oriented to the acquisition of theoretical knowledge
- Classes in small groups in face-to-face format, with direct and active interaction between

students and teacher. In these classes, the theoretical concepts will be applied to problem solving to check if the concepts have been understood correctly.

- Weekly individual tutoring or in groups
- Occasional online tutoring
- Personal work of the student oriented to the acquisition of practical skills related to the program of the subject
- Participation in forums in Aula Global
- Continuous assessment tests for the student to check if they have understood the subject
- Practical laboratory sessions consisting of conducting experiments and analyzing the results.

Two practices will be in online format and two others will be face-to-face. All of them are compulsory to pass the subject.

## ASSESSMENT SYSTEM

|                                                                             |    |
|-----------------------------------------------------------------------------|----|
| <b>% end-of-term-examination:</b>                                           | 60 |
| <b>% of continuous assessment (assignments, laboratory, practicals...):</b> | 40 |

The evaluation of the course will have three contributions: continuous assessment, laboratory work and final exam.

A regular evaluative process is conducted in the theoretical and practical classes through short exams, and exercises proposed during the class or for homework. This continuous assessment accounts for 25% of the final mark.

In the laboratory, a report of each experiment should be submitted by the student. These reports account for 15% of the final mark. Attendance to all the laboratory sessions (4) and submission of reports by the due date is compulsory to pass the course.

A final exam will be carried out accounting for 60 % of the final mark. In order to apply these percentages, the minimum grade of the final exam will be equal to or greater than 3.

## BASIC BIBLIOGRAPHY

- Paul A. Tipler Physics for Scientists and engineers, Ed. W.A. Freeman and Company.
- Wolfgang Bauer, Gary D. Wesfall University Physics with Modern Physics, Ed. Mc Graw Hill.