Universidad Zaragoza

Academic Year: 2024/25

26900 - Fundamentals of Physics I

Teaching Guide Information

Academic year: 2024/25
Subject: 26900 - Fundamentals of Physics I
Faculty / School: 100 - Facultad de Ciencias
Degree: 447 - Degree in Physics
ECTS: 6.0
Year: 1
Semester: First semester
Subject type: Basic Education
Module:

1. General information

The objective of the Fundamentals of Physics subjects is to provide the student with both a basic and homogeneous training in general aspects of Physics, which will enable them to take more specific subjects in further years, and a global and unified vision of Physics. . In particular, the subject Fundamentals of Physics I focuses on the basic tools for the understanding of Classical Mechanics and the principles of Thermodynamics.

These approaches and objectives are aligned with the following Sustainable Development Goals of the 2030 Agenda of the United Nations 2030 Agenda:

- Goal 4: Quality Education.

- Goal 8: Decent Work and Economic Growth

It is recommended to have taken Physics and Mathematics in the 2nd year of Baccalaureate.

2. Learning results

Upon completion of the subject the student will be able to:

- Use the basic notation and language used in Physics.

- Know the fundamental laws of physics and apply them in appropriate situations.

- Distinguish between measurable physical quantities and derived physical quantities.

- Calculate the trajectory of a particle knowing the forces responsible and the initial conditions of motion.

- Describe the behaviour of a mechanical system based on both force and energy analysis.

- Distinguish between conservative and dissipative interactions.

- Apply particle system dynamics to rigid solids and be able to solve the two-body problem and analyse collisions using conservation theorems

- Analyse the behaviour of a fluid, identifying the different regimes of its dynamics.

- Derive some macroscopic properties of gaseous systems from microscopic behaviour.

- Correctly apply the principles of thermodynamics in simple systems, being able to calculate the performance of a thermal machine.

3. Syllabus

Mechanics:

  Block I. Kinematics.

  Block II. Dynamics of a particle: Newton's Laws.

  Block III. Work and energy

  Block IV. Dynamics of particle systems.

  Block V: Dynamics of the rigid solid.

  Block VI: Mechanics of deformable solids and fluids.

Thermodynamics:

  Block VII. Temperature and heat. Thermal properties.

Block VIII. First and second principles of thermodynamics.

4. Academic activities

- Master Sessions: Each block has several lectures, in which the student is introduced to the general contents of each block.
- Practical sessions (problems): problems of application of the contents of the block are solved in class (which have been previously given to the students) both by the teacher and the students who voluntarily raise doubts or queries.
- Study and personal work.
- The laboratory practices corresponding to the contents of the subject are included in the subject-"Physics Laboratory".

5. Assessment system

If continuous evaluation is chosen, there will be three phases:

1.   Pass the Digital Skills Course offered by the Library

2.
         A written exercise covering the material taught in the first three blocks of the program. It will consist of both theory and problem will constitute 30% of the total result and will eliminate topics of the syllabus for students who obtain a grade equal to or higher have to sit for the global test.

3.   A final exam (theory questions and problems) on the material taught in blocks 4-8 of the syllabus, which will count for 70% of th

The final grade will be the weighted average (30%-70%) of the two exercises, which must be equal to or higher than 5 to pass.

If a single global test is chosen: The evaluation will be obtained directly from an examination test, with two differentiated parts : one on the first 3 blocks (30% of the overall grade) of the program and another on blocks 4-8 (remaining 70%). In both parts there will be both theory questions and problem solving. In order to pass, it will be necessary to obtain 5 points in the weighted average of both parts.