

29706 - Physics II

Syllabus Information

Academic year: 2024/25

Subject: 29706 - Physics II

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 II provides the basic concepts and laws related to electromagnetic fields, their meaning and experimental basis, as well as a detailed analysis of Maxwell's equations in the form integral. It also shows the wave concepts from a general point of view while the detailed analysis of the peculiarities of those wave phenomena of interest in engineering: waves in solids and fluids (acoustics), electromagnetic waves and optics.

The assessable contents of Physics II, 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 II 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
- Know and uses the concepts related to capacitance, electric current, self-induction and mutual induction, as well as basic electrical and magnetic properties of materials .
- Know the wave equation, the characteristic parameters of its basic solutions and the energetic aspects of them. Analyse the propagation of mechanical waves in fluids and solids and knows the fundamentals of acoustics.
- Recognize the properties of electromagnetic waves, the basic phenomena of propagation and superposition, the electromagnetic spectrum, the basic aspects of light-matter interaction and the applications of these phenomena in technology

3. Syllabus

- Unit 1: Static electric fields.
- Unit 2: Electric current.
- Unit 3: Static magnetic fields.
- Unit 4: Electromagnetic induction. Maxwell's equations.
- Unit 5: Waves in solids and fluids. Acoustics.
- Unit 6: Electromagnetic waves.
- Unit 7: Optics.

4. Academic activities

The planned learning activities are as follows:

- Classroom and laboratory activities: Lectures (33 hours), problems and cases (15 hours), laboratorypractices (12 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 on topics 1 to 4 at mid-semester (45% 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 on topics 5 to 7 will be given (35% grade).
- Exam on laboratory practices, (20% grade), by means of a written exam if the practical sessions have been attended .

Global assessment

- Examination of topics 1 to 7 (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.

6. Sustainable Development Goals

4 - Quality Education