

30301 - Basic Principles of Physics

Syllabus Information

Academic year: 2024/25

Subject: 30301 - Basic Principles of Physics

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 581 - Bachelor's Degree in Telecommunications Technology and Services Engineering

ECTS: 6.0

Year: 1

Semester: First semester

Subject type: Basic Education

Module:

1. General information

This subject aims to provide the student with the basic knowledge of the phenomena and physical laws important for engineering and the necessary tools to solve problems related to them. It is a subject with a high educational content since it provides the basis of scientific-technological knowledge and the application of the scientific method. In addition, the knowledge and tools acquired serve as a basis for following subjects.

2. Learning results

To know the fundamental concepts and laws of mechanics and electromagnetism and know how to apply them correctly to basic engineering problems.

To know the main properties of electric and magnetic fields, the classical laws of electromagnetism that describe and relate them, their meaning and their experimental basis.

To know and use the concepts related to capacitance, electric current, and mutual self-induction and induction.

To analyze problems and cases that integrate different aspects of Physics, using a global vision and knowledge of it, being able to discern the various physical fundamentals underlying a technical application, device or real system.

To solve in a complete and reasoned way, using a rigorous, clear and precise language, physics exercises and problems, reaching correct numerical results expressed in the appropriate units.

To use correctly basic methods of measurement, treatment, presentation and interpretation of experimental data, relating these with the appropriate physical magnitudes and laws and identifying the degree of approximation used. Use bibliography, search for information by any of the means currently available and be able to study with books and articles in English and to write a report or technical paper in Spanish or English.

3. Syllabus

PART I. MECHANICS AND THERMODYNAMICS

1. Kinematics and Dynamics of a particle
2. Thermodynamics

PART II. ELECTRICITY and MAGNETISM

3. Electrostatic field.
4. Electrostatic potential
5. Conductors
6. Electric current
7. Magnetic induction
8. Electromagnetic induction

Laboratory Practices

Practice 1: Introduction to experimental work.

Practice 2: Simple pendulum: harmonic and anharmonic oscillations.

Practice 3: Determination of equipotential lines

Practice 4: I/V curves in direct current circuits.

Practice 5: Magnetic field measurements by a Hall detector.

4. Academic activities

1. **Lectures**, in which the basic principles of the subject will be explained and selected problems will be solved(36 hours).
2. **Resolution of problems and cases**, problems will be proposed to the students before the classes, in which the solutions will be discussed with the teacher. (14 hours)
3. **Laboratory practices**, to be carried out in groups of two or three students, with a previously delivered manual and a questionnaire that collects the experimental data and their analysis. (10 hours)
4. **Study of the subject**, (67.5 hours)
5. **Teaching assignments and other activities**, problems and questions will be proposed that the student will be able to solve, on a voluntary basis, individually or in groups, , aimed at promoting continued study and self-assessment. (15 hours)
6. **Assessment tests**. 7.5 hours

5. Assessment system

The final assessment of the subject consists of a theory part and a laboratory practices part.

Assessment of laboratory practices

At the end of the four-month period, there will be an exam of laboratory practices that will consist of carrying out, individually, one of the practices programmed during the course. This test will constitute **20%** of the final score. It will be of an eliminatory nature, i.e., it must be passed in order to pass the subject.

Assessment of the theory

I. **Mixed system**, which is composed of the following assessment activities:

a) Evaluation of learning control activities developed during the course, which will be based on the qualification of minimum 2 and maximum 5 activities, consisting of the resolution of theoretical-practical questions and problems on the different topics. The partial scores obtained will be communicated to the student.

The score obtained in the assessment of the activities developed during the course is valid also for the second call, provided it has been obtained within the same enrollment call of the subject.

b) Final written test, which will consist of the resolution of theoretical questions and problems. A minimum score of 3.5 out of 10 in the problems exam must be obtained in order to pass the subject.

The average of grades a) and b) will constitute **80%** of the final grade.

II. Simple system

At the end of the four-month period, during the exams period, there will be a written exam consisting of short theoretical-practical questions and problems. A minimum grade of 3.5 points out of 10 must be obtained in the problems exam in order to pass the subject.

This test will constitute **80%** of the final grade.

6. Sustainable Development Goals

4 - Quality Education