COURSE DATA

DATA SUBJECT

Code: 34830
Name: Physics
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1407 - Degree in Multimedia Engineering	Escola Tècnica Superior d'Enginyeria	1	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1407 - Degree in Multimedia Engineering	Física	BASIC

COORDINATION

MORAIS DE LIMA MARQUES MAURICIO

SUMMARY

Physics is a fundamental subject that is present in all science and engineering degrees. Specifically Physics is taught in the second semester of the first course. It consists of a part of theory and problems and a laboratory practice.

The course provides the basis of Classical mechanics, wave phenomena and electromagnetic phenomena from the phenomenological point of view. It begins with the study of the kinematics and dynamics of the material point, then the oscillations and waves will be studied paying special attention to simple harmonic movement and sound. Next, the basic principles of electromagnetism are presented, studying the electrostatic and static magnetic fields in the vacuum and in the materials, and the course finishes studying the magnetic induction.

The contents of the subject are: Kinematics and dynamics of the point. Oscillations and waves. Electricity and magnetism. Which are structured in the thematic units that appear in section 6.

The fundamental objective of the subject is to provide with student the basic knowledge in relation to mechanics, oscillations, waves and electromagnetism that allow him to understand and explain the phenomena of engineering related to these areas.

On the other hand, the subject aims to provide the support of physical knowledge that can require other subjects of the degree.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

Knowledge of physics, chemistry and mathematics at high school or similar.

COMPETENCES / LEARNING OUTCOMES

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B2 - Understand and master the basic concepts of fields and waves and electromagnetism, theory of electrical circuits, electronic circuits, physical principles of semiconductors and logic families, electronic and photonic devices and their application to solve engineering problems.

G1 - Be able to relate and structure information from different sources and to integrate ideas and knowledge. (RD1393/2007)

G2 - Have the learning skills needed to undertake further studies or to gain further training with a certain degree of autonomy. (RD1393/2007)

G6 - Know the basic subject areas and technologies that serve as a basis to learn and develop new methods and technologies and those that provide versatility to adapt to new situations.

MM22 - Have knowledge and ability to understand essential facts, concepts, principles and theories related to multimedia and to the spectrum of reference disciplines.

DESCRIPTION OF CONTENTS

1. Kinematics of a material point

Kinematic magnitudes: position, velocity and acceleration vectors of a point particle. Examples and exercises in two dimensions (rectilinear and uniform circular motion).

2. Dynamics of a material point

Forces and Newton laws. Types of Force. Examples and exercises with constant forces (for example, constant gravitational force: inclined plane).

3. Work and kinetic energy

Potential energy (work) and kinetic energy. Conservation of Mechanical Energy.

4. Wave motion. Oscillations and waves

Simple harmonic movement. Wave phenomena. Wave equation. Propagation speed. Harmonic solution. Energy and intensity of a wave. Superposition of waves. Attenuation and absorption. Doppler effect. Examples of waves: electromagnetic waves and pressure waves (sound waves). Perception of sound by the human ear.

5. Electrostatic field in vacuum

Electrical force between punctual charges (Coulomb's Law). Electric field. Potential energy. Work and potential and electrical. Examples and exercises of point-loading systems in two dimensions applying the superposition principle.

6. Static magnetic field in vacuum

Electric current as source of magnetic field. Magnetic field of an undefined rectilinear current (Biot and Savart Law). Magnetic fields of a loop, solenoid and toroid. Force of a magnetic field on a current. Lorentz force on a moving charge. The mass spectrometer.

7. Electric and magnetic fields in materials

Electric field in materials. Dielectric and electrical permeability. Capacitors. Magnetic field in the materials. Magnetic permeability. Magnetic properties of matter: diamagnetic, paramagnetic and ferromagnetic.

8. Magnetic (electromagnetic) induction

Magnetic flow. Faraday-Lenz law of induction. Inductive devices (Generator and Transformer). Examples and exercises.

9. Physics Laboratory

Speed and attenuation of electromagnetic waves. Interference of electromagnetic waves. Magnetic fields. Electromagnetic induction.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	25,00
Laboratory	10,00
Classroom practices	25,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	4,00
Independent study and work	17,00
Preparation of lessons	26,00
Preparation for assessment activities	10,00
Resolution of case studies	33,00
Total hours	**90,00**

TEACHING METHODOLOGY

• Class work: Theory classes, problem classes and laboratory classes.
• student's class work: preparation of classes, problem solving, job preparation and presentation of results.
• Individual and group tutorials.

EVALUATION

To assess student learning, the following procedure will be applied:

A) Evaluation of the theory concepts and problems studied during the course (80 points). This evaluation will be carried out through written exams and continuous evaluation throughout the course. The written exams will consist of a midterm and a final exam. Students who pass the midterm exam may take the final exam only on the subject not included in the midterm exam. The rest of the students will be examined in all the matter of the subject. The continuous evaluation will consist of the presentation of activities, problems or questionnaires proposed to the student, and their qualification will represent at least 15 of the 80 points of this block.

B) Work carried out in the laboratory (20 points). The laboratory work will be evaluated based on the reports made by the students for each of the practices planned during the course. These reports must contain the data measured in the laboratory and the resolution of the questions indicated in the script for each practice. Attendance at the laboratory will be mandatory and not recoverable. The laboratory qualification is valid for the two calls of the course in which it has been carried out.

To pass the course it is necessary that the qualification of the written exam and that of the laboratory have both been higher than 40%. In that case, the final grade will be obtained as the sum of the grades from sections A and B.

The final grade necessary to pass the course will be 50 points.

In any case, the evaluation of this subject will be done in compliance with the University Regulations in this regard, approved by the Governing Council on 30th May 2017 (ACGUV 108/2017)

Copying or plagiarism of any activity that is part of the evaluation will result in the impossibility of passing the course, and the student will then be subject to the appropriate disciplinary procedures indicated in the ACTION PROTOCOL FOR FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA (ACGUV 123/2020).

REFERENCES

- Física para la Ciencia y la Tecnología (Vol. 1 y 2). Autores: Gene Mosca y Paul A. Tipler. Editorial: Reverté.
- Física para ciencias e ingeniería. Autores: P.M. Fishbane, S. Gasiorowicz, S. T. Thornton, Vol 1 y 2. Editorial: PrenticeHall, 1993.
- Physics for scientists and engineer. Autores: R.A. Serway. Editorial: Sunders Golden Burst Series.
- Física para ingeniería y ciències. Autores: Wolfgang Bauer, Michigan State University, Gary D. Westfall. Editorial: McGraw-Hill, 2014.