COURSE DATA

DATA SUBJECT

Code: 34652
Name: Physics
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1400 - Degree in Computer Engineering	Escola Tècnica Superior d'Enginyeria	1	Second quarter
1936 - Double Degree Program in Mathematics-Telematics Engineering	Facultat de Ciències Matemàtiques	1	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1400 - Degree in Computer Engineering	Physics	BASIC
1936 - Double Degree Program in Mathematics-Telematics Engineering	Primer curso	COMPULSORY

COORDINATION

ANDRES BOU MIGUEL VICENTE

SUMMARY

Physics is a fundamental subject that is present in all degrees of Science and Engineering. Specifically Physics is coursed in the second semester of the first academic year. It consists of a part of theory and exercises and another of practical work in laboratory. The course establishes the basis of wave phenomena and Electromagnetism. It begins with the study of mechanical waves, with special attention to sound, and electromagnetic waves. Next the basic principles of electromagnetism are presented, studying the electrostatic and magnetostatic fields in vacuum and in material media, and the phenomenon of magnetic induction.

The contents of the course are: mechanical, acoustic waves and electromagnetic waves. Electricity, Magnetism and magnetic induction, which are divided into thematic units listed in Section 6.

The main objective of the course is to provide students with basic knowledge regarding with mechanical and electromagnetic waves, in addition to Electromagnetism, that will allow the student to understand and explain themselves the phenomena involved in Engineering based in those areas of knowledge. Moreover, the course intends to provide physical knowledge that can be required for other course 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 is recommended.

COMPETENCES / LEARNING OUTCOMES

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B2 - Understanding and mastery of basic concepts of fields and waves and electromagnetism, electrical circuit theory, electronic circuits, physical principles of semiconductors and logic families, electronic and photonic devices and their application for solving problems in engineering.

G8 - Knowledge of basic subject areas and technologies that serve as a basis for learning and developing new methods and technologies, and of those which provide versatility to adapt to new situations.

G9 - Ability to solve problems with initiative, decision making, autonomy and creativity. Ability to communicate and transmit the knowledge, skills and abilities of a computer engineer.

DESCRIPTION OF CONTENTS

1. Wave motion.

Wave phenomena. Wave equation. Periodic harmonic waves. Wavelength, frequency and speed. Superposition of waves: standing waves. Energy and intensity of a wave. Absorption and attenuation.

2. Sound and Light

Acoustics. Intensity level and loudness. Electromagnetic waves: speed of light. Plane waves. Electromagnetic spectrum. Poynting vector. Intensity and radiation pressure. Doppler effect.

3. Electrostatic field in vacuum

Coulomb's law. Electric field. Gauss theorem. Potential. Work.

4. Electrostatic field in matter

Loaded conductors in electrostatic equilibrium balance. Capacitors with different geometry and capacity. Charging and energy storage. Polarization and dielectric permittivity materials.

5. Static magnetic field in vacuum

Magnetic field and Lorentz Force. Electric current. Action of a magnetic field on a current. Biot-Savart Law. Ampère's theorem.

6. Magnetostatic fiels in matter

Media magnetic materials. Relative magnetic permeability. Magnetic properties of matter.

7. Electromagnetic induction

Faraday's law of induction. Inductive devices. Displacement current.

8. Laboratory sessions

-Speed and attenuation of electromagnetic waves. Electromagnetic wave interference. Measurement of magnetic fields. Electromagnetic induction and transformers.

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.
Home work: preparation of classes, problem solving, job preparation and presentation of results.
Individual and group **tutorials**.

EVALUATION

The theoretical and practical concepts studied during the course will be evaluated by a written exam. The exam will represent the 80% of the total mark. The teacher can define, based on the characteristics of the group, complementary ways of evaluating the work done by the students throughout the course by means of partial exams.

The attendance to the laboratory classes and the realization of the experiments is obligatory and non recoverable. The evaluation will be carried by means of the presentation in writing of the results obtained in the laboratory throughout the different sessions and will represent the 20% of the total mark, being compulsory to obtain at least 8 points out of 20.

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).

In any case, the evaluation system will be governed by the provisions of the Evaluation and Qualification Regulations of the Universitat de València for Degrees and Masters: (http://links.uv.es/7S40pjF).

REFERENCES

- Referencia b1: Física, P.A. Tipler, G. Mosca, Edt. Reverte.
- Referencia c1: Física para ciencias e ingeniería, P.M. Fishbane, S. Gasiorowicz, S. T. Thornton, Vol 1 y 2, Prentice Hall, 1993.
- Referencia c2: Physics for scientists and engineers, R.A. Serway, Edt Sunders Golden Burst Series.