COURSE DATA

DATA SUBJECT

Code: 34916
Name: Physics II
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1404 - Degree in Industrial Electronic Engineering	Escola Tècnica Superior d'Enginyeria	2	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1404 - Degree in Industrial Electronic Engineering	Physics	BASIC

COORDINATION

ANDRES BOU MIGUEL VICENTE

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SUMMARY

Physics is a fundamental subject that is present in all science and engineering degrees. Specifically Physics II 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 wave mechanics and electromagnetic phenomena from the phenomenological point of view. It begins with the study of mechanical waves with special attention to sound. Here are the basic principles of electromagnetism, studying electrostatic and magnetostatic fields in vacuum and matter, then studies the behavior of time-varying fields, and the course finishes studying the basic characteristics of electromagnetic waves .

The course contents are: mechanical and acoustic waves. Electricity and magnetism. Electromagnetic fields and electromagnetic waves, which are divided into thematic units listed in paragraph 6.

The main objective of this course is to provide students with basic knowledge regarding the mechanical waves and electromagnetism (including specifically the study of electromagnetic waves) that help you

understand and explain the phenomena of engineering related to these areas. Moreover, the course aims to provide support for physical knowledge in other subjects that may require 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

1404 - Degree in Industrial Electronic Engineering

CG13 - Understanding and mastery of the basic concepts of the general laws of mechanics, thermodynamics, electromagnetics fields and waves, and of their application to solve engineering problems.

CG3 - Knowledge of basic and technological subjects that allows students to learn new methods and theories and provides them with versatility to adapt to new situations.

CG4 - Ability to solve problems with initiative, decision-making skills, creativity and critical reasoning and to communicate and transmit knowledge, abilities and skills in the field of industrial engineering (with specific industrial electronics technology).

DESCRIPTION OF CONTENTS

1. Wave motion.

Wave phenomena. Wave Equation. Propagation speed. Harmonic solution. Energy and intensity of a wave.

2. Acoustics

Pressure waves. The human ear. Attenuation and absorption.

3. Electrostatic field in vacuum

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

4. Electrostatic field in matter

Electric dipoles. Polarization of the materials. Permittivity. Driver charged in equilibrium. Electricity, resistivity.

5. Static magnetic field in vacuum

Ampère's law. Magnetic Field. Biot-Savart Law. Ampère's theorem.

6. Magnetostatic fiels in matter

Magnetic dipoles. Magnetization of materials. Relative magnetic permeability. Magnetic properties of matter.

7. Fields that depend on time

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

8. Electromagnetic waves

Wave equation. Harmonious solution. Electromagnetic spectrum. Boundary conditions of the electromagnetic field.

9. Laboratory experiments, Physics II

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

- **Classroom work:** classes of theory, problems and laboratory (G3, G4, B2).
- **Home work**: preparation of theory classes, problem solving, job preparation and presentation of results. (G3, G4, B2).
- **Individual or group tutorial classes**. (G3, G4, B2)

EVALUATION

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

A) Evaluation of the concepts of theory and problems studied during the course (80 points). This evaluation will be carried out through written exams and continuous evaluation during the course. The written exams will consist of partial and final exams. Students who pass any partial exam may be examined in the final exam only of the subject not included in that partial exam. The rest of the students will be examined on all the contents 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 done 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 of each practice. Attendance at the laboratory will be compulsory and non-recoverable.

To pass the subject 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 of sections A and B.

The final grade required to pass the subject will be 50 points. In any case, the evaluation procedure will be governed by the Evaluation and Qualification Regulations of the University of Valencia for Bachelor's and Master's degrees. (http://links.uv.es/7S40pjF).

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