COURSE DATA

Data Subject	
Code	34874
Name	Physics II
Cycle	Grade
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
1403 - Degree in Telematics Engineering	School of Engineering	1	Second term
1935 - PDG Matemàtiques-Telemàtica	Faculty of Mathematics	1	Second term

Subject-matter

Degree	Subject-matter	Character
1403 - Degree in Telematics Engineering	2 - Physics	Basic Training
1935 - PDG Matemàtiques-Telemàtica	1 - Primer curso	Basic Training

Coordination

Name	Department
ANDRES BOU, MIGUEL VICENTE	175 - Applied Physics and Electromagnetism

SUMMARY

The course lays the foundations of wave mechanics and electromagnetic phenomena from the phenomenological point of view. It begins with the study of mechanical waves with particular attention to the sound. The basic principles of electromagnetism are presented studying electro and magnetostatics in vacuum and in material media fields, then the behavior of the field variables over time, components and basics of circuit theory, and finally, the course examines finished studying the basic characteristics of electromagnetic waves.

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 High School level or similar.

OUTCOMES

1403 - Degree in Telematics Engineering

- G3 - Acquisition of the knowledge of the basic and technological subjects that allows students to learn new methods and theories and endows them with the versatility to adapt to new situations.
- G4 - Ability to solve problems with initiative, decision-making and creativity, and to communicate and transmit knowledge, abilities and skills, understanding the ethical and professional responsibility of the activity of a telecommunications technical engineer.
- B3 - Understand and master the basic concepts of the general laws of mechanics, thermodynamics, fields and waves and electromagnetism their application to solve engineering problems.

LEARNING OUTCOMES

General Learning Outcomes: (G3, G4, B3)

This subject should endorse the student with the following learning abilities:

- To know and understand the basic concepts of Physics, as well as the required mathematical tools, and the main applications for industry or common life.
- Ability of estimating the orders of magnitude of physical quantities and the relative importance of the different causes yielding a physical process.
- To resolve problems, being able of identifying the essential points and to make the appropriate approximations.
- To get a deeper insight into different branches of Physics starting from the basic notions obtained in this subject, including mathematical formalism and more elaborate concepts.

Other learning outcomes: (G3, G4, B3)

Understanding the basic knowledge studied during the previous years and the first semester of Physics for its use in problems of engineering.

Ability to address new problems in relation to the knowledge acquired during the course.

Ability to transmit the knowledge acquired during the course.

DESCRIPTION OF CONTENTS

1. Waves

Wave phenomena. Wave equation. Velocity of propagation. Harmonic solution. Energy and intensity of a wave.

2. Acoustics

Pressure waves. Response of a human ear. Doppler Effect. Sound Intensity.

3. Electromagnetic field in vacuum

Coulomb Law. Electric field. Gauss law. Electrostatic potential. Work produced by the electric field.

4. Electric field in matter

Electric dipoles. Polarization in matter. Dielectric permittivity. Capacitors. Electrostatic Energy. Electric current, resistivity.

5. The magnetic field

Ampères Law. Magnetic field. Biot-Savart law. Ampères theorem.

6. Magnetic field in matter

Magnetic dipoles. Magnetic polarization in matter. Magnetic permeability. Magnetic properties in matter.

7. Electromagnetic fields

Faraday's law of induction. Electromotive force. Lenz's law. Displacement current. Self-inductance and mutual inductance. Magnetic energy. LC and RLC circuits.

8. Electromagnetic waves

Maxwell equations. Harmonic solutions. Wave equation in one dimension. The electromagnetic spectrum. Energy propagation of an electromagnetic wave. Power and current.

9. Laboratory

Velocity and attenuation of electromagnetic waves. Interferences of electromagnetic waves. Magnetic fields. Electromagnetic induction.

WORKLOAD

ACTIVITY	Hours	% To be attended
Classroom practices	25,00	100
Theory classes	25,00	100
Laboratory practices	10,00	100
Study and independent work	10,00	0
Readings supplementary material	8,00	0
Preparation of evaluation activities	12,00	0
Preparing lectures	15,00	0
Preparation of practical classes and problem	15,00	0
Resolution of case studies	30,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

(G3, G4, B3)

Class work: theoretical and practical classes. (G3, G4, B3)

Class work: preparation of the lessons, problem solution, individual work preparation and presentation of results. (G3, G4, B3)

Individual or group tutorials.(G3, G4, B3)

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.

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:https://webges.uv.es/uvTaeWeb/MuestraInformacionEdictoPublicoFrontAction.do?idEdictoSeleccionado=5639

REFERENCES

Basic

- Física, R. A. Serway y J. W. Jewett Jr., Thomson, 2003.
- Física Universitaria, F. W. Sears, M. W. Zemansky, H. D. Young y R A. Freedman, Pearson Educación, 2004.
- Física, P. A. Tipler y G. Mosca, Reverté, 2005.

Additional

- Fundamentals of Physics, D. Halliday, R. Resnick y J. Walker, John Wiley & Sons Inc., 2005.
- Introducción a los Fundamentos Físicos de la Informática, A. M. Criado Pérez y F. Frutos Rayego, Paraninfo, 1999.