COURSE DATA

DATA SUBJECT

Code: 34747
Name: Physics II
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1401 - Degree in Chemical Engineering	Escola Tècnica Superior d'Enginyeria	2	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1401 - Degree in Chemical Engineering	Physics	BASIC

COORDINATION

AGOURAM OUHTIT SAID

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.

Observations: The theory classes will be taught in Spanish and practical classes as stated in the course sheet available on the website 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

COMPETENCES / LEARNING OUTCOMES

1401 - Degree in Chemical Engineering

Acquire knowledge of basic and technological subjects to facilitate the learning of new methods and theories, and develop the versatility to adapt to new situations.

Act autonomously in learning, make informed decisions in different contexts, issue judgements based on experimentation and analysis and transfer knowledge to new situations.

Collaborate effectively in work teams, assume responsibilities and leadership roles, and contribute to collective improvement and development.

Saber comunicarse de manera efectiva, tanto de forma oral como escrita, adaptándose a las características de la situación y de la audiencia

Solve problems with initiative, make decisions, think creatively and critically, and communicate and convey knowledge, skills and competences in the field of industrial engineering.

Understand and master the basic concepts of the general laws of mechanics, thermodynamics, fields and waves, and electromagnetism, and apply them to solving engineering problems.

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.

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. Harmonic solution. Electromagnetic spectrum. Poynting.

9. Physics II. 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

Classroom work: classes of theory, problems and laboratory .

Home work: preparation of theory classes, problem solving, job preparation and presentation of results.

Individual or group tutorial classes.

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 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).

Anyhow, the evaluation system will be based on the guides stated in the Reglament d'Avaluació i Qualificació de la Universitat de València per a Graus i Màsters (ACGUV 108/2017).

REFERENCES

- Física, P.A. Tipler, G. Mosca, Edt. Reverte.

- 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.