COURSE DATA

Data Subject	
Code	34873
Name	Physics I
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	First term
1935 - PDG Matemàtiques-Telemàtica	Faculty of Mathematics	1	First 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
BORDES VILLAGRASA, JOSE MANUEL	185 - Theoretical Physics
OTEO ARACO, J. ANGEL	185 - Theoretical Physics

SUMMARY

(From the document: Memoria de verificación del MECD. Item 5.5.1.3)

Fisica I is a first course subject on basic physics corresponding to the first four-month term of the Degree on Telematics Engineering. The main part of the subject is lectured to the complete group of students at the class-room, complemented with practical sessions given at the Laboratory of General Physics for subgroups of 16 students. The main goals of the subject are

- To master different approaches to solve different problems of Physics, including the necessary mathematical tools. Special care will be put on the interpretation of the results and criticism by the student.
- To offer good physical grounds to the students in order that she or he could face other subjects of the same or higher courses.
- To introduce the experimental work in Physics to the student, including experimental setups, data taking and their mathematical treatment, as well as the correct interpretation in terms of physical laws and presentation of a scientific memorandum.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

It is highly recommended to have already followed subjects on Physics and Mathematics at high-school.

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

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 (Outcome B3).
- Ability of estimating the orders of magnitude of physical quantities and the relative importance of the different causes yielding a physical process(Outcome G3) .
- To resolve problems, being able of identifying the essential points and to make the appropriate approximations (Outcomes G3, G4 and B3).
- Ability of conveying information, ideas, questions and solutions through argument and reasoning (Outcome B3)

Getting a deeper understanding of the different branches of physical sciences from the basic concepts acquired in this subject, using mathematical formalisms and more advanced concepts (Outcome B3).

DESCRIPTION OF CONTENTS

0. ELEMENTS OF MATHEMATICS

Vectors. Operations with vectors. Cartesian components. Derivatives and integrals.

1. UNITS AND MAGNITUDES

Dimensional analysis. Orders of magnitude.

2. Particle Kinematics

Linear motion in two and three dimensions. Reference frames. Circular and harmonic motion.

3. PARTICLE DYNAMICS

Newtons laws. Friction. Applications.

4. ENERGY AND MOMENTUM

Work and kinetic energy. Conservative forces and potential energy. Linear momentum. Conservation laws.

5. GRAVITATIONAL FIELD

Newton law. Gravitational potential energy. Intensity of the gravitational field and equipotential surfaces. Angular moment and Kepler Laws.

6. FLUID MECHANICS

Pressure. Pascal and Archimedes principles. Laminar and turbulent regime. Viscosity.

7. TERMODYNAMICS

Temperature. Theorem of conservation of energy. Entropy. Second principle of termodynamics.

8. LABORATORY

General introduction to the laboratory and two demostrations ("Hookes law and elastic oscillations" and "Density and Viscosity").

WORKLOAD

ACTIVITY	Hours	% To be attended
Classroom practices	25,00	100
Theory classes	25,00	100
Laboratory practices	10,00	100
Development of group work	8,00	0
Study and independent work	10,00	0
Preparation of evaluation activities	12,00	0
Preparing lectures	30,00	0
Preparation of practical classes and problem	30,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

(From the document: Memoria de verificación del MECD. Item 5.3)

The subject is split into two parts, with a distinct methodology in each case:

• Theory and exercises (lectures on blackboard)

• Laboratory

Theory and exercises (Outcome G3 and B3).:

Four hours per week are foreseen on average, equally distributed as theory and exercise lectures. Theory lectures will be generally of the masterclass type, providing the contents of the subject, but special emphasis will be made on the applications and resolution of questions and exercises, thereby stimulating students' participation. In the practical lectures, questions and problems related to each topic will be resolved in the classroom. Previously, the professor should have provided the student with a collection of problems; some of them will be resolved during the class time. More problems will be assigned individually to each student, which should be returned by the student once the topic is over.

Laboratory. Compulsory attendance activity (Outcome G3, G4 and B3).:

4 sessions of laboratory are foreseen for subgroups of 16 students each, with a professor. The first session is devoted to the treatment of experimental data (errors, graphics, fits). Subsequent sessions are dedicated to demonstrations, where students in pairs, carry out the experimental setup and data taking. Every pair of students has to provide a memo, with the data, results, graphics and fits, as well as the main conclusions. Special emphasis will be put in the use of the software required in the treatment of data (calculus sheet) which can be done using the Laboratory computers during the sessions.

EVALUATION

The evaluation of the subject will be done independently for the two parts:

a) Laboratory and b) Theory and problems.

a) Laboratory evaluation (Competences G3, G4 and B3):

Attendance to the laboratory and qualification of the individual performance. In order to pass the subject it is compulsory that the laboratory grade is greater than or equal to 5/10.

In the first call there is no possibility of recovering this part of the evaluation by other means. Therefore, with the laboratory failed, you cannot aim to pass the subject in this call.

b) Assessment of theory and problems (Competences G3 and B3)

Modality: continuous evaluation.

Evaluation through partial exams of the lessons of the subject.Requirements to pass the subject: weighted average mark of the exams greater than or equal to 5.

Modality: single evaluation.

Failure to pass the subject through continuous evaluation the student will have to attend for a final exam on the date set by the Center. The exam will consist of a theory part (50% of the exam grade) and a problem part (50% of the exam grade).

In order to carry out the average between the two and aim to pass the course, a minimum grade of 3/10 is required in each of them.

FINAL EVALUATION (first call)
The final evaluation of the subject (out of 10 points) will be done with the following criteria:

Modality: continuous evaluation.

A) 2 points: qualification of the work done in the laboratory.

B) 8 points: grading of the partial exams.

Final grade: A + B

Modality: single evaluation.

A) 2 points: qualification of the work done in the laboratory.

B) 8 points: grading of the final exam.

Final grade: A + B

Pass grade: 5 points.

FINAL EVALUATION (second call)

For the qualification of the second call, a laboratory exam will be carried out for those students who have not passed it in the first call. It will be necessary to pass this exam to be able to take the theory exams. The evaluation method will be the same as in the single evaluation modality of the first call.

"In any case, the evaluation system will be governed by the provisions of the Evaluation and Qualification Regulations of the Universitat de València for Grades and Masters (https://webges.uv.es/uvTaeWeb/MuestraInformacionEdictoPublicoFrontAction.do?accion=inicio&idEdictoSelecctado = 5639) ”

REFERENCES

Basic

- A. Rex, R. Wolfson. Fundamentos de Física. Ed. Pearson Education, Madrid 2011.
- Tipler, Mosca, Física para la Ciencia y la tecnología, Volumen I, Reverté 2010.

Additional

- Fishbane, Gasiorowicz, Física para ciencias e ingeniería, Prentice Hall 1993
- Alonso, Finn, Física, Pearson Ecuación 2000
- Alcaraz Sendra, Física. Problemas y ejercicios resueltos. Pearson 2006