30002 - Physics I

Información del Plan Docente

Academic Year	2018/19
Subject	30002 - Physics I
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	436 - Bachelor's Degree in Industrial Engineering Technology
ECTS	6.0
Year	1
Semester	Half-yearly
Subject Type	Basic Education
Module	

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he/she has achieved the expected learning outcomes through the following assessment activities
Throughout the semester there will be **two written tests**, based on short questions or test type. It is intended to promote the continued work of the student. The aim is that this will favor the student's follow up and better use of the contents, using the tools from the previously learned ones. The qualification obtained in these intermediate tests (PI1 and PI2) will represent **40%** of the final grade.
The learning outcomes 1.1 and 1.3 will be evaluated.
At the end of the semester a test will be carried out in the **laboratory (LAB)**, related both to the experimental methods and to the analysis of the obtained data. The content of this test will be elaborated from the activities carried out in the laboratory sessions. This test will constitute **20% of the final grade**. It will be of an eliminatory nature, that is, it must be passed in order to pass the subject.
The learning outcomes 1.3 and 1.4 will be evaluated.
A **tutorial work** of a practical nature will be proposed that will allow the evaluation of learning outcomes 1.1, 1.2, 1.3 (occasionally 1.4 and 1.5). This part constitutes **10% of the final grade** of the subject.
At the end of the semester, according to the center's exam calendar, there will be a **global written test** of the subject. It

will consist of two parts: a repetition of PI1 and PI2 for students who wish to improve their qualification and another consisting of problems of numerical resolution, which will have a value of **30% of the final grade**.
The learning outcomes 1.1, 1.2 and 1.3 will be evaluated.
To pass the subject, it will be necessary to obtain a minimum score of four points out of ten in the problem part, and five points out of ten in the LAB test, as well as in the final score, taking into account the scores of all the tests.

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, laboratory sessions, private/personal study, and tutorials.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class.

4.2.Learning tasks

The course includes 6.0 ECTS organized according to:

- Lectures (1.44 ECTS): 36 hours.

- Problem-solving sessions (0.56 ECTS): 14 hours.

- Laboratory sessions (0.4 ECTS): 10 hours.

- Guided assignments (0.6 ECTS): 15 hours.

- Private/personal study (3 ECTS): 75 hours.

Notes:

Lectures: the professor will explain the theoretical contents of the course and solve illustrative applied examples. Lectures run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

Problem-solving sessions: guided, tutor-led problem-solving in a small group.A full set of problems and exercises will be provided at the beginning of the semester.

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Laboratory sessions: sessions will take place every 2 weeks (4+1 sessions) and last 2 hours each. Students will work together in groups actively doing tasks such as practical demonstrations, measurements, calculations, and the use of graphical and analytical methods.

Guided assignments: students will complete assignments, problems and exercises related to concepts seen in laboratory sessions and lectures.

Private/personal study: students are expected to spend about 75 hours to study theory, solve problems, prepare lab sessions, and take exams.

Tutorial: a meeting involving one-to-one or small group supervision, feedback or detailed discussion on a particular topic. The professor's office hours will be posted on Moodle.

4.3.Syllabus

The course will address the following topics:

Theory sessions

Topic 1. Motion in one, two and three dimensions (4 hours)

Topic 2. Newton's laws of motion: single particle (4.5 hours)

Topic 3. Newton's laws of motion: several particles (5.5 hours)

Topic 4. Rotation of rigid bodies (8 hours)

Topic 5. Periodic motion (4.5 hours)

Topic 6. Elasticity (1 hours)

Topic 7. Fluid mechanics (3.5 hours)

Topic 8. Temperature and heat (1 hour)

Topic 9. The first law of thermodynamics (3 hours)

Topic 10. The second law of thermodynamics (1 hour)

Laboratory sessions

Session 1. Newton's 2nd law of motion

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Session 2. Archimedes' principle and Stokes' law

Session 3. Periodic motion: Pohl's pendulum

Session 4. Determination of the ratio of heat capacities for an ideal gas: Flammersfeld's oscillator

Examination session.

4.4.Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course, please refer to the Escuela de Ingeniería y Arquitectura de la Universidad de Zaragoza (EINA), website, https://eina.unizar.es/ .

4.5.Bibliography and recommended resources