

30101 - Physics I

Syllabus Information

Academic year: 2023/24

Subject: 30101 - Physics I

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia
179 - Centro Universitario de la Defensa - Zaragoza

Degree: 425 - Bachelor's Degree in Industrial Organisational Engineering
563 - Bachelor's Degree in Industrial Organisational Engineering

ECTS: 6.0

Year: 1

Semester: First semester

Subject type: Basic Education

Module:

1. General information

The subject and its expected results respond to the following approach: Analyze and solve autonomously problems that integrate different aspects of physics, recognizing the various physical and technical fundamentals underlying the problem.

The above approach is aligned with the following Sustainable Development Goals (SDGs):

Goal 7: Affordable and Clean Energy

Goal 8: Sustainable Cities and Communities

The development of the subject of Physics requires knowledge of:

- Physics: understanding the fundamental equations and laws of mechanics and thermodynamics.
- Mathematics: mastery of the basic notions of calculus.

A level of second year of baccalaureate in both mathematics and physics is recommended to take the subject. As well as simultaneously take the subject Mathematics I of the degree.

2. Learning results

1. Know the fundamental concepts and laws of fields, waves and electromagnetism and their application to basic engineering problems basic engineering problems.
2. Analyze problems that integrate different aspects of physics, recognizing the various physical fundamentals underlying a technical application, device, or real system.
3. Know the units, orders of magnitude of defined physical quantities and solves basic engineering problems, expressing the numerical result in the appropriate physical units.
4. Correctly use basic methods of experimental measurement or simulation and treat, present and interpret the data obtained, relating them to appropriate physical magnitudes and laws.
5. Use bibliography, by any of the means currently available, and use clear and precise language in their explanations of physics questions.
6. Correctly apply the fundamental equations of mechanics to various fields of physics and engineering: kinematics, rigid solid dynamics, oscillations and fluids
7. Understand the meaning, usefulness and relationships between magnitudes, moduli and fundamental elastic coefficients used in solids and fluids.
8. Perform mass and energy balances correctly in fluid motions in the presence of basic devices.
9. Correctly uses the concepts of temperature and heat. Apply them to calorimetric, expansion and heat transfer problems
10. Apply the first and second principles of thermodynamics to processes, basic cycles and thermal machines.

3. Syllabus

COMPANY PROFILE

Know the fundamental concepts and laws of fields, waves and electromagnetism and their application to basic engineering problems basic engineering problems.

Analyze problems that integrate different aspects of physics, recognizing the various physical fundamentals underlying a technical application, device, or real system.

Know the units, orders of magnitude of defined physical quantities and solves basic engineering problems, expressing the numerical result in the appropriate physical units.

Correctly use basic methods of experimental measurement or simulation and treat, present and interpret the data obtained,

relating them to appropriate physical magnitudes and laws.

Use bibliography, by any of the means currently available, and use clear and precise language in their explanations of physics questions.

Correctly apply the fundamental equations of mechanics to various fields of physics and engineering: kinematics, rigid solid dynamics, oscillations and fluids

Understand the meaning, usefulness and relationships between magnitudes, moduli and fundamental elastic coefficients used in solids and fluids.

Perform mass and energy balances correctly in fluid motions in the presence of basic devices.

Correctly uses the concepts of temperature and heat. Apply them to calorimetric, expansion and heat transfer problems.

The program of the subject comprises 6 topics:

- I. Kinematics.
- II. Single and multi-particle dynamics. Static.
- III. Dynamics of the rigid solid.
- IV. Oscillatory motion.
- V. Elasticity and fluids.
- VI. Thermodynamics

DEFENSE PROFILE

The program consists of the following topics:

Topic 1: Kinematics.

Topic 2: Dynamics of a particle.

Topic 3: Mechanics of particle systems.

Topic 4: Mechanics of rigid solids.

Topic 5: Oscillations.

Topic 6: Fluid Mechanics.

Topic 7: Thermodynamics.

4. Academic activities

COMPANY PROFILE

The subject consists of 6 ECTS credits, which represents 150 hours of student work in the subject during the semester. 40% of this work (60 h.) will be done in the classroom, and the rest will be autonomous.

The program offered to the student includes the following activities:

- Theoretical classes: Theoretical activities taught in a fundamentally expository manner by the teacher.
- Practical classes: Practical discussion activities and exercises carried out in the classroom that require a high level of student participation. The practical classes may also involve the realization of experimental practices including the use of different instruments and appropriate software.
- Group and individual tutoring. They will be scheduled according to the needs of the subject.

DEFENSE PROFILE

The subject consists of 6 ECTS credits, which represents 150 hours of student work. Of these, 60 hours are classroom work, including laboratory practices and evaluation tests; the other 90 hours are autonomous work.

The academic activities are as follows:

- Lectures: where the contents of the subject are developed.
- Practical classes: where some of the proposed problems are carried out with the active participation of the student.
- Laboratory sessions: where scientific instrumentation is used for the analysis of experimental data and the presentation of the data obtained.
- Study and personal work: which consists of studying the theory, completing the proposed problems, completing the theoretical questionnaires and the self-evaluation tests, the previous reading of the practical scripts and the presentation of the report of the same.
- Tutoring: A schedule will be published for the students, for the realization of individual tutorials as well as group tutorials.

5. Assessment system

COMPANY PROFILE

The student must demonstrate that they have achieved the expected learning results by means of the following assessment activities. There is the possibility of passing the subject by two different ways:

Continuous Assessment:

To be eligible for the Continuous Assessment system, at least 80% of the classes must be attended. It will consist of two written

tests. To pass this part, a grade of 4.0 or higher on each written test is required.

The final grade for the subject will be the average of both tests.

In order to pass the subject, the student must obtain an average grade of 5.0 or higher.

Global Assessment:

The Global Assessment will consist of a final written test whose grade must be greater than or equal to 5.0 to pass the subject.

The final grade for the subject will be the grade obtained in the final written test.

The same assessment procedure will be followed in the two global assessment calls.

Note: in case the student does not pass the subject through Continuous Assessment, they will be able to do it through Global Assessment . In addition, in case the student has passed the subject through Continuous Assessment and wants to improve their grade, they can take the 1st call of the Global Assessment without the risk of lowering their grade.

DEFENSE PROFILE

FIRST CALL

Continuous assessment

The student will be able to pass the total of the course by the continuous assessment procedure.

- Written test 1 (35% final grade): Evaluation of the understanding and mastery of the theoretical content in a reasoned manner, as well as its application to theoretical and practical issues and problem solving.
- Written test 2 (45% final grade): Evaluation of the understanding and mastery of the theoretical content in a reasoned manner, as well as its application to theoretical and practical issues and problem solving.
- Laboratory practices (20% final grade): Assessment of understanding and mastery of the theoretical content of the basic methods of experimental measurements and treatment.

To pass the subject, the student must obtain a final grade greater than or equal to 5.

Global test:

Students who do not opt for continuous assessment, do not pass the subject according to this system or would like to improve their grade are entitled to take a global test. In any case the best of the grades obtained will prevail. This global test will be equivalent to the continuous assessment tests described above and will have a 100% weight in the final grade.

To pass the subject, the student must obtain a final grade greater than or equal to 5.

SECOND CALL

Global test:

Students who do not pass the subject in the first call may sit for a global test set in the academic calendar for the second call.

To pass the subject, the student must obtain a final grade greater than or equal to 5.

Assessment instruments:	Weighting	RA-1	RA-2	RA-3	RA-4	RA-5	RA-6	RA-7	RA-8	RA-9	RA-10
Theoretical and practical exams	80%	X	X	X		X	X	X	X	X	X
Laboratory laboratory	20%			X	X	X	X	X	X	X	