

## 30107 - Physics II

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 30107 - Physics II

**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:** Second semester

**Subject type:** Basic Education

**Module:**

### 1. General information

#### COMPANY PROFILE

The subject and its expected results respond to the following approach: Analyze and autonomously solve 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 11: Sustainable Cities and Communities

The development of this subject requires knowledge of:

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

In summary, we recommend a level of second year of Bachillerato in both mathematics and physics to take the course. As well as having studied and passed Mathematics I and being enrolled or having passed Mathematics II.

#### DEFENSE PROFILE

The main objective of the subject is to expose the universal character of physical laws, their inexorable nature and the enormous benefits obtained from their knowledge in the field of engineering.

These goals are aligned with Sustainable Development Goals SDG-7 "Affordable and Clean Energy" and SDG-9 "Industry, Innovation and Infrastructure" of the United Nations 2030 Agenda ( <https://www.un.org/sustainabledevelopment/es/>), such that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement.

### 2. Learning results

1. Know the fundamental concepts and laws of mechanics, thermodynamics, fields, waves and electromagnetism and their application to 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 electromagnetism and waves to various fields of physics and engineering.
7. Know the main properties of electric and magnetic fields, the classical laws of electromagnetism that describe and relate them, their meaning and their experimental basis
8. Know and uses the concepts related to capacitance, electric current, self-induction and mutual induction, as well as basic electrical and magnetic properties of materials
9. Know the wave equation, the characteristic parameters of its basic solutions and the energetic aspects of them. Analyze the propagation of mechanical waves in fluids and solids and knows the fundamentals of acoustics
10. Recognize the properties of electromagnetic waves, the basic phenomena of propagation and superposition, the electromagnetic spectrum, the basic aspects of light-matter interaction and the applications of these phenomena in technology

### 3. Syllabus

#### COMPANY PROFILE

The program of the subject comprises 6 topics:

- I Electrostatics
- II Dielectric capacity and electric current
- III Magnetism
- IV Electromagnetic field
- V Wave motion
- VI Optics

#### DEFENSE PROFILE

Topic 1: Wave motion

Topic 2: Electrostatics

Topic 3: Direct Current

Topic 4: Magnetostatics

Topic 5: Magnetic induction

Topic 6: Electromagnetic waves

Topic 7: Geometric optics

### 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 way 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

- **Lectures:** sessions of development of the content of the subject in the classroom.
- **Problem solving sessions or cases:** problem solving sessions in the classroom.
- **Laboratory practices:** practical activities carried out in the laboratory.
- **Evaluation tests:** completion of the theoretical and practical exams of the subject.

Total = 60 hours

- **Personal study and work; tutoring.**

### 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

- 1.-First **theoretical-practical exam** (40% final grade): Written test corresponding to topics 1 and 2.
- 2.-Second **theoretical-practical exam** (40% final grade): Written test corresponding to the rest of the syllabus.
- 3.-**Laboratory** practicals (20% final grade): Carrying out of practices and preparation of the corresponding reports.

Global test:

Students who do not pass the subject by CA or who would like to improve their grade, will have the right to sit for the global test, prevailing, in any case, the best of the grades obtained. It will consist of three written tests, corresponding to each of the parts of continuous assessment.

### SECOND CALL

Global test:

Students who do not pass the course in the first exam may sit for this global exam. It will consist of a written test that will cover the entire syllabus of the subject, including the content seen in laboratory practices.

### ASSESSMENT CRITERIA:

Continuous assessment: The final grade must be greater than or equal to 5 and the following conditions must also be met: the grade in each of the midterm exams must be greater than or equal to 4 (compensable) and the average grade of both must be greater than or equal to 5. No minimum grade will be required in the assessment of the practice, although attendance and submission of reports are mandatory . In the case of the practice report, students will be provided with assessment rubrics. If the above conditions are not met, the final grade will be the lower of the two midterm exams.

First call: The criteria applied in the continuous assessment are maintained.

Second call: A grade greater than or equal to 5 must be obtained in the overall test.

### INSTRUMENTS vs. LEARNING RESULTS (RA)

Assessment instruments:	Weighting	RA-1	RA-2	RA-3	RA-4	RA-5	RA-6	RA-7	RA-8	RA-9	RA-10
First partial exam	40 %	X	X	X		X	X	X	X	X	
Second partial exam	40 %	X	X	X		X	X	X	X		X
Laboratory practices	20 %		X	X	X	X		X	X		