

28906 - Physics II

Syllabus Information

Academic year: 2023/24

Subject: 28906 - Physics II

Faculty / School: 201 - Escuela Politécnica Superior

Degree: 583 - Degree in Rural and Agri-Food Engineering

ECTS: 6.0

Year: 1

Semester: Second semester

Subject type: Basic Education

Module:

1. General information

The aim of this subject is to provide scientific explanations to the physical phenomena directly related to agri-food and rural engineering.

We will be interested in answering questions such as:

what are the main heat transfer mechanisms and how do they occur?

how does a heat engine, a refrigerator and a heat pump work?

how is the power dissipated in an electrical resistance calculated?

The subject of Physics II is indirectly related to the following SDGs:

Goal 7: Ensure access to affordable, secure, sustainable and modern energy.

Goal 12: Ensure Sustainable Consumption and Production Patterns.

Goal 13: Take Urgent Action to Combat Climate Change and its Impacts.

This course establishes the necessary basis to be able to take subjects in later subjects, such as Engines and Machines or Electrical Engineering and Rural Electrification.

2. Learning results

To pass the subject, the student must demonstrate that they have acquired the following learning results:

-Enunciate, synthesize, analyze, relate and apply the basic principles and fundamentals of Thermodynamics, Electromagnetism and Waves.

-To relate dimensionally the different physical magnitudes and to use correctly the coherent systems of units, especially the International System, within the scope of the subject.

-To interpret quantitatively and qualitatively the results obtained in the satisfactory resolution of certain cases based on physical phenomena and processes, both general and related to the agri-food and rural environment.

-Express adequately in oral and written form, both in substance and form, clarity and organization in the methods, processes, results obtained and their analysis in the cases entrusted for study.

-Relate certain practical cases, within the scope of the subject, to environmental sustainability and contextualize them appropriately in the framework of the SDGs of the 2030 Agenda.

-To elaborate laboratory works and reports making an adequate use of ICT (word processor, spreadsheet, bibliographic searches on the Internet) in relation to the phenomena described above.

-Execute the laboratory work assigned in which they demonstrate that they are able to make an adequate use of the basic instrumentation in Physics.

3. Syllabus

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BLOCK I.- THERMODYNAMICS

Topic I.1. Temperature and Heat. Heat transfers.

Topic I.2. The first law of thermodynamics.

Topic I.3. The second law of thermodynamics.

BLOCK II.- ELECTROMAGNETISM

Topic II.1. Electrostatics

Topic II.2. Direct current circuits

Topic II.3. Magnetostatics

Topic II.4. Electromagnetic field

BLOCK III.- WAVES

Topic III.1 Waves in solids and fluids

Topic III.2 Electromagnetic waves

LABORATORY PRACTICE PROGRAM

1. Thermal expansion and aggregation states

2. Heat energy

3. Multimeter and oscilloscope

4. Ohm's Law and resistor association

5. Charging and discharging of a capacitor

4. Academic activities

Lectures: 46 hours

Theoretical-practical sessions in which the contents of the subject will be explained and problems will be solved.

Laboratory practices: 10 hours

Practical sessions in the laboratory.

Preparation and presentation of problems to the teacher: 3 hours

Estimated time that the student will dedicate to solve a problem proposed by the teacher and its subsequent presentation.

Assessment tests. 6 hours

Personal study: 85 hours

Estimated time that the student should dedicate to the study and preparation of the subject (including the attendance to the tutorials with the teacher).

5. Assessment system

Assessment activity 1 Written classroom exam (75% of the overall grade)

It will consist of two tests, corresponding to the thematic blocks detailed below:

- Test 1a. Block I. Thermodynamics (37.5% of the overall grade)
- Test 1b. Block II. Electromagnetism and Block III. Waves (37.5% of the overall grade)

It will be favorably evaluated:

- Understanding of physical laws, theories and concepts.
- Dexterity and skill in the use of mathematical tools.
- The correct use of units in physical quantities.
- Clarity in diagrams, figures and graphic representations.
- The correctness of the results, as well as the order, presentation and physical interpretation of the results.

If the student obtains in Test 1a a grade higher or equal to 4, they will not have to take this part in the final exam (unless they wish to improve the grade obtained, in which case the highest grade obtained will be taken into account).

On the other hand, if the grade in any of the Tests (1a or 1b) is lower than 4, the subject will not be considered passed, regardless of the grades obtained in the rest of the activities that are evaluated.

Assessment activity 2 Individual resolution and oral defense of a case study (10% of the overall grade) Throughout the semester and at the student's request, an individual assignment will be carried out consisting of the resolution of a practical case, outside the classroom, and the oral presentation of the methodology, the process, the results and their physical interpretation in a previously arranged tutorial session.