

39821 - Physics and electronics

Syllabus Information

Academic year: 2023/24

Subject: 39821 - Physics and electronics

Faculty / School: 326 - Escuela Universitaria Politécnica de Teruel

Degree: 634 - Joint Programme in Computer Engineering - Business Administration

ECTS: 6.0

Year: 2

Semester: Second semester

Subject type: Basic Education

Module:

1. General information

The main objective of this subject is that the student understands the fundamental physical magnitudes and laws that govern the operation of computer systems at the physical level. It is expected that students will obtain at the end of this subject the sufficient basis for the understanding of hardware and its continuous training, so necessary in such a dynamic field as information technologies.

In order to know and understand these physical phenomena, knowledge of mathematics such as basic operations with vectors and the calculation of derivatives and integrals is necessary, as well as basic knowledge of high school physics.

There is no relationship between these approaches and objectives and any of the Sustainable Development Goals (SDGs) of the 2030 Agenda.

2. Learning results

In order to pass this subject, the students shall demonstrate they has acquired the following results:

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 .

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 .

Understand oscillating phenomena, know their differential equation, as well as their solutions.

Know the wave equation, the characteristic parameters of its basic solutions and the energetic aspects of them. Use and understand the properties of electromagnetic waves and their spectrum, the basic phenomena of propagation and the basic aspects of light-matter interaction.

Describe the concept of signal and the different electrical forms with which information can be represented.

Solve simple electrical circuits in direct current and permanent regime and identifies adequately the most relevant time response parameters of first order circuits in the presence of input steps.

Describe the principle of operation of basic semiconductor devices (diode and transistor) and solves simple problems based on them.

Describe the concept of logical family.

Identify the structure and fundamental characteristics of the most widely used digital technology.

Describe the implementation strategy of the main logic gates and solves basic technological problems.

3. Syllabus

Electric field

Electrical properties of matter. Resistors and capacitors

Magnetic field

Magnetic properties of matter. Coils

Electromagnetic waves. Signals and information transmission

Electrical circuits: Fundamentals. Voltage and current laws
Techniques for the analysis of resistive circuits
Basic circuits with capacitors and coils
Resistive circuits with sinusoidal sources
Fundamentals of electrical installations
Fundamentals of electronics: Diode and transistor
Logical families: TTL and CMOS

4. Academic activities

The subject is divided into 3 blocks, which are distributed as follows:

5 weeks dedicated to electric field and oscillations

5 weeks dedicated to electrical circuits

5 weeks dedicated to electronic devices

On a weekly basis, the teaching organization of the course is as follows:

Theoretical classes (3 hours per week). These class hours will alternate lectures, analysis and resolution of problems.

Practical classes (6 sessions of 2 hours every 2 weeks)

The schedule of exams, as well as the dates for handing in papers and practice scripts will be announced well in advance.

5. Assessment system

The subject will be assessed by the continuous assessment system by means of the following activities:

Evaluation of practices (10%).

Other evaluable activities (10%).

Final exam of the whole syllabus (80%).

A minimum score of 4 out of 10 is required for the final exam. If the student does not pass the minimum grade of the final exam (4 out of 10), the final grade will be the minimum between 4 and the weighted grade. In case of having missed one or more laboratory practices, the assessment of such activity will be made through a practical exam in the laboratory on the date of the call, which will be worth 20% of the overall grade, corresponding to the written exam of theory and problems of the whole subject the remaining 80%.

In the first call, students may opt for the evaluation by means of a global test consisting of a written exam of theory and problems of the whole subject, which will be worth 80%, and a practical exam in the laboratory, which will be worth 20%.

In the second call, the assessment will be by means of a global test, consisting of a written exam of theory and problems of the whole subject, which will represent 80%, and a practical exam which will be worth 20%.