

## 30022 - Basic principles of electronics

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 30022 - Basic principles of electronics

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 436 - Bachelor's Degree in Industrial Engineering Technology

**ECTS:** 6.0

**Year:** 3

**Semester:** First semester

**Subject type:** Compulsory

**Module:**

### 1. General information

The subject provides students with basic knowledge about electronics, both analog and digital, and presents the usual terminology, enabling them to analyze and design simple electronic circuits, so that they can reach the expected learning results.

For this purpose, the most common electronic devices are presented, studying first their inner workings. The most representative stages of each device are presented and, finally, the methodology that allows the analysis of electronic stages based on these devices is introduced.

These approaches and goals are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/en/>), such that the acquisition of the learning results will contribute to some extent to the achievement of targets 1.3, 7.1 and 7.3 of Goal 7; 8.2 and 8.4 of Goal 8; 9.4 of Goal 9 and 10.2 and 13.3 of Goal 13.

### 2. Learning results

- Identify the applications and functions of electronics in engineering.
- Recognize the basic electronic components and devices used for different electronic functions.
- To know how to use the basic techniques for the analysis of analog electronic circuits.
- Sizing and selecting the components of a linear power supply.
- Handle, with the appropriate safety measures, the instruments of a basic electronics laboratory and use electronic simulation tools.
- Understand the social, environmental, economic and industrial advantages of electronics.

### 3. Syllabus

Unit 1. Previous knowledge

Unit 2. Semiconductors. Diodes

Unit 3. Bipolar transistors

Unit 4. Single-pole transistors

Unit 5. Transistor stages

Unit 6. Transistor switching

Unit 7. Fundamentals of Digital Electronics

Unit 8. Operational amplifier

Unit 9. Non-linear stages with operational amplifiers

Unit 10. Amplifiers

Unit 11. Linear stages with operational amplifiers

Unit 12. The real operational amplifier

Unit 13. Frequency response

### 4. Academic activities

Lectures: 30 hours.

Types of problems: 15 hours.

In parallel, and in synchronized sequence with the classroom teaching, six laboratory sessions of two and a half hours are foreseen in which different stages and basic blocks presented in the lectures will be implemented and characterized.

Laboratory practices: 15 hours.

- Introduction to the electronics laboratory and the LTSpice simulator.
- Diodes. Linear power supply.
- Electronic speed control of a DC motor.
- Digital PWM generator for electronic speed control of a DC motor.
- Analog PWM generator for electronic speed control of a DC motor.
- Audio amplifier

## 5. Assessment system

### 1. Laboratory Practices (CL)

They will be graded by observation of the students' work in the laboratory (handling of laboratory instruments, assembly capacity, circuits start-up, circuit reasoning and simulator handling) and by evaluation of the previous preparatory work.

It will account for **30% of the overall grade**.

### 2. Review of questions and exercises (CT)

1-Theoretical-practical questions (**40%**). **Minimum grade of 2.5 points**.

2-Exercises(**60%**).

It will account for **70% of the overall grade**.

**Minimum grade of 4 points in the entire written exam.**

### GLOBAL TEST (OFFICIAL CALLS)

#### First call

This subject has an exceptional seal of continuous assessment in its practical part (according to Art. 9.4 of the Evaluation Regulation). Therefore, the grade in this activity is transferred to the global test of the first call

without the possibility of recovery.

Tests:

- Review of issues and exercises

#### Second call for applications

Tests:

- Review of issues and exercises

- Laboratory examination: The exam will consist of the implementation and/or simulation of the following of circuits similar to those developed during the term in the laboratory practice sessions.

Due to logistical needs, in order to attend the class, the student will have to make a previous request within the period that will be communicated in class.

**Once the minimum grades for each part have been passed**, the final grade for the subject will be: **0.3xCL + 0.7xCT**

If the **minimum grades are not exceeded**, the final grade will be: **CT**

The subject is passed with a total grade of 5 points out of 10.

## 6. Sustainable Development Goals

3 - Good Health & Well-Being

9 - Industry, Innovation and Infrastructure