

## 30121 - Basic principles of electronics

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 30121 - Basic principles of electronics

**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:** 3

**Semester:** First semester

**Subject type:** Compulsory

**Module:**

### 1. General information

The main objective is to provide students with the basic fundamentals of electronics technology. Therefore, it is intended that students learn about the main analog and digital components, their functionality, their behavior within circuits and their main applications. In addition, methodological aspects are studied for the analysis and synthesis of simple electronic circuits with the help of simulation tools and laboratory instrumentation.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 ( ) 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), so that the acquisition of the learning results of the subject provides training and knowledge, skills and competencies to contribute to some extent to the achievement of target 7.3 of Goal 7.

### 2. Learning results

1. Identify the applications and functions of electronics in engineering.
2. Recognise the basic electronic components and devices used for the different electronic functions.
3. Know how to use the basic techniques for the analysis of analog and digital electronic circuits.
4. Have the ability to design analog and digital electronic circuits at the block level.
5. Handle the instruments of a basic electronics laboratory and uses electronic simulation tools.

### 3. Syllabus

#### Company profile

- Unit 1. Introduction
- Unit 2. The transistor
- Unit 3. The operational amplifier
- Unit 4. Combinational systems
- Unit 5. Sequential systems

#### Defense profile

- Unit 1. Introduction to electronics, semiconductors.
- Unit 2. Diode
- Unit 3. Transistors
- Unit 4. Operational amplifier
- Unit 5. Fundamentals of digital electronics
- Unit 6. Combinational digital systems
- Unit 7. Sequential digital systems

### 4. Academic activities

#### Company profile

- Lectures / Theoretical: 14 hours

The theoretical concepts of the subject will be explained and illustrative practical examples will be developed to support the theory when necessary.

- **Practical Class / Problem solving: 18 hours**

Problems and practical cases will be solved as a complement to the theoretical concepts studied.

- **Practices and tutored work. 24 hours**

These practices are highly recommended for a better understanding of the subject because they show in real operation elements whose calculation is done on the lectures.

- **Study and personal work: 50 hours**
- **Group work: 40 hours**

Preparation of group practices, preparation of the corresponding scripts and reports.

- **Assessment tests. 4 hours**

### **Defense profile**

There will be up to 25 double sessions (equivalent to two hours with breaks) of lectures combining theory and problems.

Three practical sessions will be carried out in the laboratory or with simulation equipment.

Two double sessions will be dedicated to the continuous assessment.

Students will have available material for voluntary self-assessment activities in the Moodle platform.

## **5. Assessment system**

### **Company profile**

The subject will be evaluated in the continuous assessment mode through the following activities: - **Practical work** ( 10% of the grade, minimum 5 out of 10).

The topics on which the works will be developed will be proposed in the first week, being carried out its virtual delivery in weeks 9 and 15, the dates will be specified during the subject.

The following aspects will be evaluated:

- Pre-practice study, handed in before starting the assignment
- Quality of the analysis of the results, assessed by means of a final report.

- **Theoretical-practical written tests** (90% of the grade, minimum 5 out of 10 in each one).

Questions and/or problems from the engineering field of similar complexity to the one used will be posed during the term. The tests will be related to the following topics:

- Test 1. Topic 1, 2 and 3.
- Test 2. Topic 4 and 5.

The following will be evaluated:

- The quality and clarity of the resolution strategy.
- The concepts used to solve the problems.
- The absence of errors in the development and solutions.
- Correct use of terminology and notation.

If the student has not successfully passed any of these assessments during the semester, they will have the opportunity to pass the

subject by means of a global test in the two official exams.

### **Defense profile**

#### **FIRST CALL**

Continuous assessment:

The student will be able to pass the total of the subject by the continuous assessment procedure demonstrating that has achieved the expected learning results by means of 2 types of tests:

1. theoretical-practical written tests consisting of multiple-choice questions and problem solving.

Topics 1-4. Its weight in the final grade is 45%.

Topics 5-7. Its weight in the final grade is 25%.

2.- Practical laboratory/simulation tests. It will be evaluated with 30% of the grade.

#### **Global test:**

Students who do not pass the subject by continuous assessment or who would like to improve their grade, will have the right to take the global test set in the academic calendar, prevailing, in any case, the best of the grades obtained.

The written test will have a maximum duration of 3 hours and will include all the theoretical and practical content of the subject.

Practical laboratory/simulation tests must be retaken until the passing grade is achieved on the date established for this purpose.

**SECOND CALL**

Same criteria as the global test first call.

<b>Assessment instrument</b>	<b>Weighting</b>	<b>RA1</b>	<b>RA2</b>	<b>RA3</b>	<b>RA4</b>	<b>RA5</b>
<b>Theoretical written test practice 1</b>	45%	X	X	X	X	
<b>Theoretical written test practice 2</b>	25%	X	X	X	X	
<b>Practical tests of laboratory/ simulation</b>	30 %	X	X	X	X	X