

## 29818 - Analogue Electronics

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 29818 - Analogue Electronics

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

326 - Escuela Universitaria Politécnica de Teruel

**Degree:** 440 - Bachelor's Degree in Electronic and Automatic Engineering

444 - Bachelor's Degree in Electronic and Automatic Engineering

**ECTS:** 6.0

**Year:** 2

**Semester:** Second semester

**Subject type:** Compulsory

**Module:**

### 1. General information

In the real world, physical quantities vary continuously over time and can take an indefinite number of values. After transduction, these quantities are represented by an electrical signal, voltage or current, of a continuous nature. Analog Electronics, as a branch of the more general discipline of Electronics, is responsible for the study of the systems that process these types of signals.

The objective of the subject is to train the student in the fundamentals of analog electronics and its main applications.

Knowledge of Fundamentals of Electrical Engineering and Fundamentals of Electronics is required, subjects, previously taught.

### 2. Learning results

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

- Identify the applications and functions of analog electronics in engineering.
- To know the technological fundamentals and models of integrated operational amplifiers.
- Analyze and design linear and nonlinear analog electronic stages with operational amplifiers and transistors.
- To know the blocks and circuits of linear power supplies and to design their elements.
- Have the ability to design analog electronic systems.
- Handle with ease the equipment and instruments of an analog electronics laboratory.
- To know how to use computer simulation tools applied to analog electronic circuits.

### 3. Syllabus

- Unit 0. Introduction to Analog Electronics.
- Unit 1. BJT and MOSFET: Dynamic Equivalent Circuits.
- Unit 2. Amplification and Feedback.
- Unit 3. Operational Amplifier: Linear stages and limitations.
- Unit 4. Linear voltage regulators.
- Unit 5. Operational Amplifier: Non-linear stages and oscillators,

### 4. Academic activities

- Expository sessions of theoretical and practical contents (30 hours). The concepts and fundamentals of the subject will be presented and illustrated with real examples. Student participation will be encouraged through questions and brief discussions.
- Problem solving and case studies (15 hours). Exercises related to the theoretical contents will be developed.
- Laboratory practices (15 hours). It will consist of the assembly or simulation of power electronic circuits.
- Personal study and work (86 hours).
- Assessment tests (4 hours)

At EUPT, the course is taught in two different modalities: classroom and blended learning. For the classroom modality all of the above applies. For the blended learning modality, all face-to-face activities will be replaced by adapted materials through the online training platform and virtual tutorials. The assessment tests will be in person.

### 5. Assessment system

Río Ebro Campus (Zaragoza).

Assessment throughout the semester.

- Laboratory practices (30%). It will account for 30% of the student's overall grade. To pass the subject a minimum grade of 5 out of 10 must be obtained in this section.
- Final exam (70%). It will account for 70% of the student's overall grade. To pass the subject a minimum grade of 5 out of 10 must be obtained in this section.

Global assessment (official calls; 100%):

- The student's global evaluation will be carried out in the two official calls. To pass the subject it will be necessary to have done it separately in the laboratory practices and in the final exam. In that case, the final grade will correspond to the sum of the grade in the laboratory practicals (C1) and the final exam (C2). Otherwise, the overall grade will be the minimum between  $0.3 \cdot C1 + 0.7 \cdot C2$  and 4. The student who has passed the laboratory practicals prior to will only have to take the final exam. Otherwise, may do so by responding in writing or orally to a specific set of related questions. However, the faculty responsible for the subject may alternatively establish a specific exam in the laboratory for those who have not passed the practice program.

The subject is passed with an overall grade higher or equal to 5 points out of 10.

#### **Teruel Campus.**

A continuous assessment mode is proposed, which the student may choose voluntarily. Likewise, every student will have the right to a global test in which they will be examined for the entire course:

- Laboratory practices (20%): Evaluated on an ongoing basis.
- Written test (80%-100%): Composed of theoretical questions and problems. Laboratory practices are also subject of examination. It will weight 80% if the student wants to consider their practice grade. It will weight 100% otherwise.

A minimum grade of 5 out of 10 is required to pass the subject.

## **6. Sustainable Development Goals**

9 - Industry, Innovation and Infrastructure  
12 - Responsible Production and Consumption