Universidad Zaragoza

**Academic Year/course: 2023/24**

# 67238 - Advanced Analog Systems

## Syllabus Information

**Academic year:** 2023/24
**Subject:** 67238 - Advanced Analog Systems
**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura
**Degree:** 622 - Master's in Electronic Engineering
**ECTS:** 6.0
**Year:** 1
**Semester:** First semester
**Subject type:** Compulsory
**Module:**

## 1. General information

The purpose of this subject is for the student to acquire the necessary knowledge to understand the fundamentals and applications of modern analogue electronics. The analysis, simulation and design tools necessary for the creation of advanced analogue circuits and their application to instrumentation systems will be used. In addition, the design flow for the microelectronic implementation of integrated circuits will be presented in order to provide the student with an overview of submicron fabrication technologies.

These approaches and objectives are aligned with the Sustainable Development Goals*(SDGs*) of the United Nations Agenda 2030(https://www.un.org/sustainabledevelopment/es/) and certain specific targets, so that the acquisition of the learning results of the subject will contribute to some extent to the achievement of targets 8.2 and 8.4 of Goal 8, and target 9.4 of Goal 9.

## 2. Learning results

- To design advanced analogue circuits, such as conditioning circuits, active filters, analogue processing systems, actuators and sensor blocks.
- To know and apply the advanced techniques of analogue design targeted to the development of instrumentation blocks.
- To apply low noise and precision techniques to analogue circuit design.
- To analyse interference situations and be able to apply interference mitigation techniques in electronic circuits.
- To be familiar with the design flow and the technologies available for the fabrication of an integrated circuit.
- Teamwork.

## 3. Syllabus

- BLOCK 1: Introduction and basic concepts
- BLOCK 2: Fabrication of integrated circuits*(ICs*)
- BLOCK 3: Amplification and feedback
- BLOCK 4: Active filters
- BLOCK 5: Precision and Low Noise Design
- BLOCK 6: Analog-digital interface

## 4. Academic activities

- **Participatory master class:** 20 hours

The contents of the subject will be presented, with a practical orientation towards the design of electronic systems.

- **Problem solving and case studies**: 10 hours

Practical design problems will be solved.

- **Laboratory practices:** 20 hours

Simulation tools and instrumentation will be used to approach the design and experimental verification of analogue electronic systems.

- **Teaching assignments:** 34 hours

Both the evaluable teaching assignments and the preparation of laboratory practice reports are included.

- **Study and personal work:** 60 hours
- **Assessment tests** (6 hours)**.**

## 5. Assessment system

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

- **Intermediate tests** (30% of the grade, minimum 4 out of 10).

They will consist of evaluable teaching assignments and individual theoretical and practical written tests.

- **Laboratory practice** (30% of the grade, minimum 4 out of 10).

There will be several laboratory practices distributed throughout the semester. The following aspects will be evaluated:

- Previous preparation of the practice.
- Management of the required design tools and solutions provided to the problems encountered.
- Deepening in practice.
- Report made at the end of each practice.
- Student autonomy and participation.

- **Project** (40% of the grade, minimum 4 out of 10).

A team work will be proposed to be developed throughout the course. The evaluation will consider the autonomy, the quality and originality of the solution, the analytical and critical capacity of the student and, especially, the ability to work in a team and to communicate the results.

If the student has not passed any of these activities during the semester, they will have the opportunity to pass the subject by means of a global test in the two official exams.