Universidad Zaragoza

Year : 2020/21

29818 - Analogue Electronics

Syllabus Information

Academic Year: 2020/21
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

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as:

- Lectures: they will provide a theoretical background on the fundamentals of analogue electronic systems.
- Practice Sessions: Case studies and real applications will be worked out in the classroom.
- Laboratory work: The students will do laboratory work in small groups, building and analyzing analogue electronic circuits.
- Assignments: Individual and group assignments will be proposed.
- Seminars.
- Student participation is considered very important in order to acquire the learning outcomes and skills needed.

4.2.Learning tasks

The course includes the following learning tasks:

Classroom activities 2.4 ECTS (60 hours)

1) Course lectures (T1) (30 hours)

The fundamentals of analogue electronics including essential background concepts are presented and illustrated with real examples.

2) Case studies (T2) (15 hours)

Different case studies will be worked out in the classroom. Students are encouraged to prepare them in advance. Assignments could also be worked out in this part

3) Laboratory work (T3) (15 hours)

Six laboratory sessions will be carried out. Each session will be evaluated in the laboratory. Students have to prepare sessions in advance.

Autonomous work: 3.6 ECTS (90 hours)

4) Assignments (T6) (4 hours)

Individual and group assignments will be proposed.

5) Personal study (T7) (82 hours)

Continuous study will be promoted among students. They can also attend tutorials to solve the specific problems they can face in the course.

6) Evaluation activities (T8) (4 hours)

Assessment will be based on coursework (laboratory work and assignments) and final examination.

4.3.Syllabus

The course will address the following topics:

Topic 0. Introduction to Analog Electronics

1) Definition

2) Context

3) Functions and Applications

Topic 1. BJT and MOSFET: Dynamic Equivalent Circuits

1) Biasing. Operating Point
2) Signal Coupling
3) Small Signal Analysis
4) Frequency Limitations

Topic 2. Amplification and Feedback

1) Frequency Response
2) Fundamental Amplifier Configurations
3) Coupling between Stages
4) Differential Amplifier
5) Feedback: Characterization and Stability
6) Effects of Negative Feedback

Topic 3. Operational Amplifier (I)

1) Basic Structure. Equivalent Circuit
2) Basic Amplifier Configurations
3) Non-Linear Limitations
4) Current and Voltage Regulation
5) Basic Linear Configurations
6) Non-Ideal Effects
7) Linear Single Supply Configurations
8) Stability Analysis of Voltage Feedback Operational Amplifiers
9) Types of Operational Amplifiers

Topic 4. Voltage Regulators

1) Linear Voltage Regulator

2) Limitations and Parameters
3) Fixed Output Linear Regulator
4) Adjustable Output Linear Regulator
5) Specific Linear Regulators

Topic 5. Operational Amplifier (II)

1) Non-Linear Operation
2) Voltage Comparators
3) Astable, Monostable and Bistable
4) Wave Generation. Voltage to Frequency Conversion
5) Sinusoidal Oscillators
6) Non-Linear Single Supply Configurations

4.4.Course planning and calendar

Timetables for classroom and laboratory sessions will be published prior to the beginning of the course at the web of the EINA https://eina.unizar.es/ and EUPT https://eupt.unizar.es/

4.5.Bibliography and recommended resources