Analog Electronics I

Academic Year: (2023 / 2024) **Review date: 18-04-2023**

Department assigned to the subject: Electronic Technology Department

Coordinating teacher: PLEITE GUERRA, JORGE

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Electrical Power Engineering Fundamentals (2nd year 1st term)
- Fundamentals on Electronics Engineering (2nd year 2nd term)

OBJECTIVES

By the end of this subject, students will be able to have:

1. a systematic understanding of the key aspects and concepts of their branch of engineering in analogue electronics;
2. the ability to apply their knowledge and understanding of analogue electronics to identify, formulate and solve engineering problems using established methods;
3. the ability of choosing and applying relevant analytical and modelling methods.
4. the ability to apply their knowledge and understanding to develop and realise designs to meet defined and specified requirements;
5. an understanding of design methodologies, and an ability to use them.
6. The ability of designing and performing experiments, data interpretation and conclusions discussion.
7. workshop and laboratory skills.
8. the ability to select and use appropriate equipment, tools and methods;
9. the ability to combine theory and practice to solve problems of analogue electronics;
10. an understanding of applicable techniques and methods in analogue electronics, and of their limitations.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Semiconductor electronic components: Diodes and Transistors.
1.1. Overview of Diodes.
1.2. FEt Transistors.
1.3 BJT Transistors.
1.4. Basic Applications of electronic circuits.

2. Electronic Circuits in Small Signal mode.
2.1. The Small Signal concept.
2.2. Small Signal Models for Diodes and Transistors.
2.3. Amplifiers analysis.

3. Frequency Response of Amplifiers.
3.1. Basic Concepts.
3.2. Frequency Response Analysis of Amplifiers based on the time constant method.

4. Feedback in amplifiers.
4.1. Basic concepts.
4.2. Analysis of Ideal feedback amplifiers.
4.3. Analysis of Real feedback amplifiers.

5. Operational Amplifiers.
5.1. Overview of the OpAmp.
5.2. Integration and Derivation configurations. Time Domain vs. Frequency domain.
5.3. Differential amplifiers.
5.4 OpAmp as a multistage system. Analysis of 741 OpAmp.

6. Linear power supplies.
6.1 Stabilized supplies.
6.2. Regulated supplies.

LEARNING ACTIVITIES AND METHODOLOGY

This Subject is under extintion process, with no teaching activity. Tutoring may be requested to the teacher

ASSESSMENT SYSTEM

This Subject is under extintion process, with no teaching activity. Consequently, the student will be entitled to an exam or final test with the value of 100% of the total grade on the exam dates established in the academic calendar for the 2022-2023 academic year.

Each Final exam will be composed of 4 Circuit Analysis and Design Problems. Each problem corresponds, respectively, to the 3 sections into which the subject is divided:

Section 1: Topics 1 and 2
Section 2: Topic 3
Section 3. Topic 4
Section 4: Topics 5 and 6

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

BASIC BIBLIOGRAPHY

- Departamento de Tecnología Electrónica Recopilaciones de problemas de exámenes, UC3M.
- MALVINO Principios de Electrónica , McGraw-Hill.
- MILLMAN, J. y GRABEL, A. Microelectrónica , Hispano Europea S.A..
- Pleite J., Vergaz R., Ruiz J.M. Electrónica Analógica para Ingenieros, MC Graw-Hill.
- Sedra, K. C. Smith Circuitos Microelectrónicos, Oxford University Press.
- Thomas L. Floyd. Dispositivos Electrónicos, Pearson Prentice Hall..

ADDITIONAL BIBLIOGRAPHY

- MALVINO Principios de Electrónica, McGraw-Hill.
- MILLMAN, J. y GRABEL, A. Microelectrónica, Hispano Europea S.A..