Electronics engineering fundamentals

Academic Year: (2022 / 2023) **Review date: 16/05/2022 10:35:08**

Department assigned to the subject:

Coordinating teacher: VERGAZ BENITO, RICARDO

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Electrical Power Engineering Fundamentals (2nd Course, 1st Semester).
It is STRONGLY recommended to have it passed.

OBJECTIVES

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

1. knowledge and understanding of the theoretical fundamentals of electronics engineering and their practical applications;
2. the ability to apply their knowledge and understanding to identify, formulate and solve problems about electronics engineering and their main industrial applications by using both theoretical and practical established methods as well as basic electronic design rules for their real implementation.
3. the ability to apply their knowledge and understanding to develop and design electronic systems that comply with defined and specified technical requirements;
4. the ability to design and conduct appropriate experiments about electronics engineering to characterize and implement basic electronic systems, to properly analyse and interpret the results/data obtained from an engineering point of view, and to draw conclusions about the electronic system performance;
5. the ability to properly apply the technical skills acquired for the experimental evaluation of an electronic system in an electronics engineering lab facility;
6. the ability to combine theory and practice to solve problems about electronics engineering.

DESCRIPTION OF CONTENTS: PROGRAMME

THEORY:

TOPIC 1. Electronic signals and systems
- Block diagram of real electronic systems and subsystems.
- Designing and building-up an electronic system. Main requirements.
- Electronic signal types and their parameters that describe them.
- Review of electric circuit analysis and basic circuit theory.

TOPIC 2. Electronic instrumentation. Sensors and transducers
- Lab instrumentation and measurement of electronic signals.
- Electronic sensors. Classification.
- Transducers. Classification.

TOPIC 3. Amplifiers and analog electronic subsystems
- Description and modeling.
- Concept of transfer function. Classification.
- Operational amplifiers. Negative feedback (stable) topologies. Electronic applications.
- Software for analog circuit simulation.

TOPIC 4. Electronic components and integrated circuits
- Transistors: description, operation and applications.

- Diodes: description, operation and applications.
- Moore¿s Law and integrated electronic circuits manufacturing.

TOPIC 5. Digital electronic subsystems and analog-to-digital (A/D) and digital-to-analog (D/A) conversion
- Fundamentals of digital electronics. Numbering and coding in digital systems.
- Boolean algebra. Basic logic gates. Boolean logic functions and representation.
- Combinational and sequential digital circuits. Memories
- Software for digital circuit simulation.
- A/D and D/A converters. Characteristics.

LEARNING ACTIVITIES AND METHODOLOGY

Tutorial sessions, both individual and group.
Materials uploaded to Aula Global (videos, documents, solved problem collections, etc)

ASSESSMENT SYSTEM

% end-of-term-examination/test:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

This subject is disappearing, currently being under an extinction process. Students will have the right to do a final exam with a value of 100% in the final mark. The other percentages of end-of-term-examination and continuous assessment that can be found in the application appear by default, as they correspond to any normal subject out of any extinction process.

Therefore, the student will have right to a final exam with a 100% value of the final mark in the exams dates interval established in 2022-2023 season.

Continuous assessment does not apply.
Ordinary or extraordinary exams both have a 100% of the final mark.
It is mandatory to get more than (or equal to) 4 points out of 10 in each part of the subject (part 1: analog electronics, part 2: digital electronics).

BASIC BIBLIOGRAPHY

- Thomas L. Floyd. Digital fundamentals, Pearson Prentice Hall..

- Thomas L. Floyd. Principles of Electric Circuits, Pearson Prentice Hall..

- Thomas L. Floyd. Electronic Devices, Pearson Prentice Hall..