Electronics engineering fundamentals

Academic Year: (2022 / 2023) **Review date: 27-05-2022**

Department assigned to the subject: Electronic Technology Department

Coordinating teacher: ROMERO PERALES, ELENA

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Programming, Linear Algebra, Calculus II, Physics II

OBJECTIVES

- Knowing the purpose and operation of analog and digital electronic systems
- Managing basic electronic instrumentation equipment and performing measurements with them
- How to analyze, build and apply basic electronic functions.
- Using CAD tools to calculate and design circuits, as well as to recognize the elements of an electronic circuit and its function within a scheme.
- Analysis of a computer-based digital electronic system, describing both the basic components that make up the system and the programming techniques required to comply with functional specifications.
- Managing integrated development environments for programming of computer-based digital systems

DESCRIPTION OF CONTENTS: PROGRAMME

Introduction to the course

Block I: Fundamentals of analog electronics
- Theorems of electrical circuits.
- Sources of tension and currents
- Passive components: R, C, L
- Laboratory instrumentation and electronic signal measurements.
- Frequency response
- Electronic components
- Sensors and actuators

Block II: Fundamentals of digital electronics and microcontrollers
- Digital representation of information
- Basic components of digital electronics
- Digital systems based on microcontrollers
- Fundamentals of programming in C
- Peripherals of a microcontroller
  - o I / O Ports
  - o Interrupt management
  - o Timing
  - o Analog / digital conversion
  - o Serial interfaces

LEARNING ACTIVITIES AND METHODOLOGY

In each week one lecture session (master class) and one exercise-based session (in reduced groups) will be taught. The first is geared to the acquisition of theoretical knowledge, and the second to the acquisition of practical skills related to theoretical concepts. In addition to these sessions, 4 practical sessions will be held, all of them in the laboratory.

Several exercises will be proposed during de course to be solved individually by the students.

Students will have the possibility of individual tutorials.

ASSESSMENT SYSTEM

P1 = Midterm exam Part I (20%)
LAB = Laboratory sessions (30%)
EJ = Individual exercises (10%)
EF= Final exam (40%). 20% for Part II and 20% for Part I.

Minimum mark of 3.5/10 in each part in the final exam is required to pass the course

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

BASIC BIBLIOGRAPHY

- Anant Agarwal Foundations of Analog and Digital Electronic Circuits, Morgan-Kauffman, 2005
- Microcontroller manufacturer of the course Datasheet for the course microcontroller, Microcontroller manufacturer.
- Thomas L. Floyd Digital fundamentals , Pearson Prentice Hall,, 2009

ADDITIONAL BIBLIOGRAPHY

- John Wakerly Digital Design, Prentice Hall, 2000
- P. Horowitz, W. Hill The Art of Electcronics, Cambridge University Press, 1989