

Academic Year: ( 2017 / 2018 )

Review date: 24-04-2017

Department assigned to the subject: Electronic Technology Department

Coordinating teacher: ACEDO GALLARDO, PABLO

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 1

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Electronic Technology in Biomedicine

## OBJECTIVES

Ability to analyze and conceptually design electronic devices that permit to solve problems in biology and medicine. Moreover, the student has to be able to select electronic devices to implement an electronic function. It will be especially emphasized that the student understands the possibilities offered by actual electronic technology, and the associated problematic in the development of new electronic technologies of interest in biology and medicine.

## DESCRIPTION OF CONTENTS: PROGRAMME

Bloque 1: Analog electronics for biomedical engineering

- Basic feedback amplifiers
- Instrumentation amplifiers, isolation amplifiers
- Filter design
- Introduction to ASICS

Bloque 2: Sensors and signal conditioning

- Transducers and sensors
- Analog signal conditioning
- EMI compatibility, noise and interferences

Bloque 3: Data acquisition

- Signal multiplexing
- Analog to digital converters
- Digital to analog converters
- Data acquisition and signal processing

Bloque 4: Signal processing

- Microprocessors
- Introduction to DSP and FPGA (o su correspondiente actualización)
- Introduction to mixed analog-digital integrated circuit design

## LEARNING ACTIVITIES AND METHODOLOGY

- Theory classes (large group), problem resolutions classes (small groups), individual tutorials and student personal homework; oriented to theoretical knowledge acquisition.
- Laboratory practices and problems resolution classes in small groups, individual tutorials and student personal homework; oriented to practical knowledge related with the fields of the course.
- Computer sessions in small groups using CAD tools for electronics circuits; simulations. The goal of these sessions is to encourage the use of the CAD tools to complement the theoretical-practical learning during the course.

## ASSESSMENT SYSTEM

The tests of first and second blocks in the continuing assesment are valued 40% of total mark. Lab exercises also are valued 20%. The final examination has a value of the remaining 40%. The last course block is evaluated together with the final examination. For the students not following continuing

evaluation, the general rules of the university apply.

**% end-of-term-examination:** 40

**% of continuous assessment (assignments, laboratory, practicals...):** 60

#### BASIC BIBLIOGRAPHY

- Thomas L. Floyd Digital Fundamentals, Pearson Prentice Hall , 2009
- Thomas L. Floyd Principles of Electric Circuits, Pearson Prentice Hall , 2007
- Thomas L. Floyd Electronic Devices, Pearson Prentice Hall , 2008

#### ADDITIONAL BIBLIOGRAPHY

- null <https://www.arduino.cc/>, Arduino LLC.