

Academic Year: ( 2023 / 2024 )

Review date: 11-04-2023

Department assigned to the subject: Electronic Technology Department

Coordinating teacher: PATON ALVAREZ, SUSANA

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 1

## OBJECTIVES

- Knowing in detail the basic architecture of a reference CPU for embedded systems
- Knowing the different levels of abstraction in the definition of functions and specifications of an embedded system
- Knowing the interrupts subsystem, the timing subsystem, and the input/output subsystems of a reference microcontroller.
- Being able to program libraries for the use of specific peripherals, sensors and actuators, according to a technical user manual
- Being able to analyze the hardware-software set of a simple embedded system
- Being able to allocate resources and conceive at system level the hardware-software set of a simple embedded system
- Being able to implement signal processing functions and sequencers in embedded systems
- Knowing the principles of real-time operation of an embedded system

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to digital systems. Basic concepts. CPU, GPU, FPGA.
2. Fundamentals of computer architecture. Processing unit. Control unit
3. Microprocessors. Memory organization. Addressing modes. Instruction set.
4. Input/output subsystems. Structure, control and addressing.
5. Microcontrollers. Development environment and applications.
6. Timers. Generation and capture of timed signals.
7. General Purpose Input/Output (GPIO)
8. Serial Input/Output. Main protocols
9. Analog Input/Output. Use of A/D and D/A converters

## LEARNING ACTIVITIES AND METHODOLOGY

### THEORETICAL PRACTICAL CLASSES.

Knowledge and concepts students must acquire. Receive course notes and will have basic reference texts. Students partake in exercises to resolve practical problems.

### TUTORING SESSIONS.

Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher. Subjects with 6 credits have 4 hours of tutoring/ 100% on- site attendance.

### STUDENT INDIVIDUAL WORK OR GROUP WORK.

Subjects with 6 credits have 98 hours/0% on-site.

### WORKSHOPS AND LABORATORY SESSIONS.

Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.