

Academic Year: (2022 / 2023)

Review date: 16-05-2022

Department assigned to the subject: Department of Electronic Technology

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.