

DEA-GITI-431 Microprocessors

SEMESTER: Fall

CREDITS: 9 ECTS (6 hrs. per week. 3h Theory + 3h Lab)

LANGUAGE: Spanish

DEGREES: GITI

Course overview

The main objective of the course is to be able to develop a digital electronic system based on a microprocessor, where sensors, actuators and communications with industrial systems are involved. There is a final project where the student has to integrate all the concepts of the subject and to demonstrate his learning. Examples of systems are: domotic systems, smart energy boxes, interactive games, robot systems, systems for cars, and so on.

Prerequisites

Knowledge about C programming and digital electronics.

Course contents

Theory:

1. Description of a Microcontroller.
2. Parallel Ports.
3. C Programming for Microcontrollers.
4. Timers.
5. Interruptions.
6. Microprocessor Architecture.
7. Memory Map.
8. C++ programming for industrial systems.
9. STL: Standard Template Library
10. Inheritance and polymorphism in C++.
11. Integration between industrial systems and digital systems. Serial Communications.
12. Drivers.
13. A/D converter.
14. Design of a Digital System based on a Microcontroller.
15. Real Applications of Digital Electronic Systems.

Laboratory:

Each unit described previously has at least one associated lab practice (2 hours/week)

- P1.** Developments tools
- P2.** Input and output
- P3.** Timers
- P4.** Assembly programming
- P5.** Objects and classes
- P6.** Inheritance and polymorphism
- P7.** Communications between industrial and digital systems.
- P8.** Driver and A/D converter.
- P9.** Exam
- P10.** Digital system design
- P11.** Final project

Textbook

- Microprocesadores. Álvaro Sánchez Miralles. Year 2013.

Grading

- Final exam accounts for 35% of the final grade.
- Mid-term exam accounts for 15%.
- Laboratory exam accounts for 15%.
- The final project accounts for 15%.
- Lab reports must be handed in every week and they are graded and returned the following week. They account for 20% of the grade.