

## DEA-GITT-224 Digital Systems II

**SEMESTER:** Spring

**CREDITS:** 6 ECTS (4 hrs. per week: 2 Theory + 2 Lab)

**LANGUAGE:** Spanish

**DEGREES:** GITT

### Course overview

This is an advanced course on digital systems. Complex digital systems and testbed design are introduced. The course focuses on microprocessor design, advanced arithmetic blocks, test methodology, memory architectures, pipeline design to digital complex systems. Besides, typical applications will be analyzed and experimented in the lab to illustrate solutions to real problems.

### Prerequisites

Digital system I, fundamentals on programming.

### Course contents

#### Theory:

1. Introduction to Advanced Digital Design.
2. Combinational and Sequential Subsystems.
3. Introduction to Memory Subsystems.
4. Advanced Digital Design with VHDL.
5. Designing with Microprocessors.
6. Introduction to Pipeline Design.

#### Laboratory:

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

- P1.** Introduction to programmable logic and VHDL.
- P2.** Combinational subsystems with VHDL: ALU
- P3.** Serial communications design: RS232 (1)
- P4.** Serial communications design: RS232 (2)
- P5.** Introduction to microprocessor design: ICAI-RISC (1)
- P6.** Introduction to microprocessor design: ICAI-RISC (2)
- P7.** Introduction to microprocessor design: ICAI-RISC (3)

- P8.** Introduction to microprocessor design: ICAI-RISC (4)
- P9.** Introduction to microprocessor design: ICAI-RISC (5)
- P10.** Introduction to microprocessor design: ICAI-RISC (6)

## Textbook

- Sistemas digitales avanzados. Sadot Alexandres (2014)
- Introducción a los sistemas digitales. Un enfoque usando lenguajes de descripción de hardware. José Daniel Muñoz Frías (2011)
- Jan M. Rabaey. Digital Integrated Circuits. A design perspective. Prentice Hall.
- Hennesy and Patterson. Computer Architecture. A Quantitative Approach. Prentice-Hall.

## Grading

The following conditions must be accomplished to pass the course:

- A minimum overall grade, in the final and the lab, of at least 5 over 10

The overall grade is obtained as follows:

- Final exam accounts for 40% of the final grade
- Mid-term exam accounts for 10%.
- Several small exams during the course account for 10% in total.
- Lab must be handed in every week and they are graded and returned the report following week. They account for 40% of the grade.