

Design of Integrated Circuits

5º Ing. Informática. Universidad de Extremadura, 2011-2012

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General Objectives

The main purpose of the course is to gain knowledge of the fundamentals of the design of digital integrated circuits (ICs) and to know the technologies in the reconfigurable computing field.

Specific Objectives

- Know in depth the MOSFET transistors characteristics.
- Study the logic of the different CMOS devices which are used in the design of the digital ICs.
- Study the synchronization strategies in the CMOS circuits.
- Know the design styles for the actual ICs.
- Design a simple IC in the mask level.
- Know the FPGA programmable logic devices.
- Prototype digital systems with HDL languages and synthesis tools.

Rules

- The student must supply their personal data in the specified sheet at the beginning of the course.
- The Center establishes the exam date, and the professor sets up the time to begin.

Evaluation approaches

The course is divided in two parts: theory and laboratory practices.

- **THEORY:**
 - It will be carried out a final exam (in February).
- **LABORATORY:**
 - It will be carried out several laboratory activities along the course.
 - The student must pass an exam related with the laboratory activities.
 - The theory exam and the lab exam will contribute in 70% and 30% respectively in the final score. Both exams must be approved to approve the course.

Theory contents

- **Lesson 1. The MOS transistor.**
- **Lesson 2. CMOS logics.**
- **Lesson 3. Synchronization strategies.**
- **Lesson 4. CI design styles.**
- **Lesson 5. FPGAs and Reconfigurable Computing**

Lab contents

- Labs about the design of CIs.
- **Lab with FPGAs to prototype a digital system.**

References

- [RAB 03] Rabaey. "Digital integrated circuits: a design perspective"2/E. Prentice Hall, 2003.
- [JAC 05]Jacob. "Circuit Design, Layout and Simulation" IEEE Press, 2006
- [WES 96] Weste-Eshraghian. "CMOS VLSI Design". Addison Wesley, 2ª edición, 1996.
- Several teaching materials from the professors of the course, at: <http://arco.unex.es/dci>