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Politecnico di Torino

Academic Year 2009/10 (first time established in A.Y.2007/08)

01GQSJA

Microelectronics

1st degree and Bachelor-level of the Bologna process in Electronic And Computer Engineering - Vercelli (III FACOLTA' DI INGEGNERIA)

Teacher	Status	SSD	Les	Ex	Lab	Years Stability

SSD	CFU	Activities	Area context
ING-INF/01	5	D - A scelta dello studente	A scelta dello studente

NOTA: Il programma non e stato modificato rispetto a quello dell'anno accademico 2008/09

Objectives of the course

The course provides the basic knowledge required for both analysis and design of modern digital integrated circuits, implemented as VLSI devices or Systems-on-Chip. The whole design flow is covered in the course, including laboratory activities that imply the use of CAD tools.

Expected skills

At the end of the course, the student will be able to understand the main issues related to the design and analysis of digital integrated circuits in current and next generations of semiconductor technology. The student will be also able to use some CAD tools.

Prerequisites

Fundamental requisite of the course is basic knowledge of semiconductor technology and design methods for digital circuits (combinational and sequential).

Syllabus

PART1: Review of MOSFET behavior and CMOS process. CMS circuits: design and optimization; static inverter, combinational CMOS circuits, memory elements (latches and flip-flops), sequential circuits (static sequential circuits, dynamic circuits, NORA and TSPC logic), performance and power consumption optimization.
PART2: Design of circuits and sub-systems, design methods and styles, arithmetic blocks, timing (single and multiple phase systems, clock skew, self-timed circuits, clock generation and distribution), on-chip interconnects, IO pads, memory architectures, programmable logic devices.

Laboratories and/or exercises

Exercises will be assigned in the laboratory to learn the use of CAD tools for design, simulation and verification of digital circuits.

Bibliography

o Slides will be made available on both CD-ROM and course web-site
o Jan M. Rabaey, Anantha Chandrakasan, Borivoje Nokolic, 'Digital Integrated Circuits', II edition, Prentice Hall, 2003
o Neil H. E. Weste, Kamran Eshraghian, 'Principles of CMOS VLSI design', II Edition, Addison-Wesley, 1992
o Additional readings, such as scientific papers

Revisions / Exam

Written exam with numerical problems and questions covering the whole course content.

Programma definitivo per l'A.A.2008/09

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m@il