The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 5334 – VLSI Design

Syllabus

Catalog Description:

Design and fabrication of digital integrated circuits. CAD tools for the design, layout, and verification of VLSI circuits; fabrication of CMOS integrated circuits; computer modeling of submicron transistors; static and dynamic CMOS logic design; design of low voltage and low power circuits; microprocessor datapath circuits and sub-system design issues; testing and verification of integrated circuits; fault tolerant design. Three hours of lecture each week. Course project(s) required.

Prerequisites: EENG 3302 and EENG 3306 or consent of instructor.

Credits: (3 hours lecture, 0 hours laboratory per week)

Text(s): N. H. E. Weste and D. Harris. *CMOS VLSI Design.* 3rd edition. Pearson–Addison-Wesley, 2005. ISBN 978-0321149015

Additional Material:
J. M. Rabaey, *Low Power Design Essentials*, Springer, 2009. ISBN 978-0-387-71712-8
P. K. Lala, *Self-Checking and Fault-Tolerant Digital D*esign, Morgan Kaufmann, 2000. ISBN 978-0124343702
Class Notes; Journal Articles

Course Coordinator: David Hoe, Assistant Professor, Electrical Engineering

Topics Covered: (paragraph of topics separated by semicolons)

VLSI CAD tools; Fabrication of integrated circuits; Modelling submicron transistors; Static and dynamic logic gate design; Low-voltage, low-power circuits; Datapath design; Subsystem design; Clock Distribution, I/O design; Testing and Verification Issues; Fault-tolerant systems.

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project

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Course Objectives[1]: By the end of this course students will be able to:

1. Describe the process flow involved in implementing VLSI designs [1,2,4]
2. Use CAD tools to design, simulate, and implement VLSI designs [1,2,4,5]
3. Select and design with the appropriate CMOS logic circuits for a given application [1,2,4]

4. Summarize the issues involved in scaling to short channel devices [1,2,4]
5. Design circuits for low-power and low-voltage applications [1,2,4]
6. Design circuits used in a microprocessor datapath [1,3,4,5]
7. Explain subsystem design issues [1,2,4,5]
8. Identify issues involved with testing and verifying VLSI designs [1,2,4]
9. Design integrated circuits for fault tolerant applications [2,3,5]
10. Appraise the latest VLSI research presented in journals [1,3,5,7]

[1]*Numbers in brackets refer to method(s) used to evaluate the course objective.*

Relationship to Program Outcomes (only items in dark print apply)[2]: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. Possess a breadth and depth of knowledge in electrical and computer engineering. [2,3,5,6,10]
2. Possess and demonstrate oral and written communication skills.[1,4,6,7,8,9,10]
3. Demonstrate the capability to perform independent learning and investigation. [4,5,7,9,10]

[2]*Numbers in brackets refer to course objective(s) that address the Program Outcome.*

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	0	hours
Engineering Sciences and Design:	3	hours
General Education Component:	0	hours

Prepared By:	David Hoe	Date:	28 Oct 2009
Modified By:		Date:	