

The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 5335 – FPGA Design

Syllabus

Catalog Description:

Digital systems design with Field Programmable Gate Arrays (FPGAs); Design and synthesis of reconfigurable logic with high-level descriptor languages; Logic design using FPGAs; Architectural and systems design issues; Fine-grained versus coarse-grained fabrics. Reconfigurable computing with FPGAs. Course project(s) required. Three hours of lecture each week.

Prerequisites:

EENG 3307 Microprocessors and EENG 4309 Electronic Circuits II or consent of instructor

Credits:

(3 hours lecture, 0 hours laboratory per week)

Text(s):

Peter J. Ashenden, *The Student's Guide to VHDL*. 2nd edition. Morgan Kaufmann, 2008. ISBN 978-1-55860-865-8.
(Recommended) W. Wolf. *FPGA-Based System Design*. Prentice Hall, 2004.

Additional Material:

Vassiliadis, *Fine- and Course-Grain Reconfigurable Computing*, Springer, 2007.
S. Hauck, ed., *Reconfigurable Computing: The Theory and Practice of FPGA-Based Computation*, Morgan Kaufmann, 2007.
Class Notes; Journal Articles

Course Coordinator:

David Hoe, Assistant Professor, Electrical Engineering

Topics Covered: (paragraph of topics separated by semicolons)

Digital systems design with FPGAs; Using CAD tools; FPGA design and synthesis with VHDL; Combinational and sequential logic design using FPGAs; Architectural issues; Fine-grained versus coarse-grained fabrics; Reconfigurable computing design issues.

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

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Objectives¹: By the end of this course students will be able to:

1. Explain how FPGAs are used in digital systems design [1,2,4]
2. Use VHDL to specify and implement FPGA designs
3. Use CAD tools in the design, simulation, and implementation of FPGA designs

- [1,2,4,5]
4. Explain how reconfigurable logic is implemented in a VLSI process [1,2]
 5. Design and implement sequential and combinational logic circuits with FPGAs [1,2,3,4,5]
 6. Identify the issues at the architectural level associated with reconfigurable logic design [1,2,3,5]
 7. Describe the tradeoffs involved in coarse-grain versus fine-grained reconfigurable systems [1,2]
 8. Design reconfigurable computer systems using FPGAs [2,3,5]
 9. Appraise the latest research into reconfigurable systems design presented in journals [1,3,5]

¹Numbers 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. [1,2,3,4,5,7]
2. Possess and demonstrate oral and written communication skills. [1,4,6,7,9]
3. Demonstrate the capability to perform independent learning and investigation. [6,7,8,9]

²Numbers 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

Modified By:

Date:

17 Jan 2011

Date: