**The University of Texas at Tyler**
**Department of Electrical Engineering**

## Course: EENG 4332 – 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; Three hours of lecture each week.

Prerequisites: EENG 3307 Microprocessors and EENG 4309 Electronic Circuits II

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: 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; Combinational and sequential logic design using FPGAs; Architectural issues; Fine-grained versus coarse-grained fabrics; Systems 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 Objectives[1]: 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 [1,4,5]
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]

[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. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering;
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering;[2,3,5]
3. have the ability to analyze electrical circuits, devices, and systems;[1,4,5,6]
4. have the ability to design electrical circuits, devices, and systems to meet application requirements;[3,5,6]
5. have the ability to design and conduct experiments, and analyze and interpret experimental results;
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods;
7. have effective written, visual, and oral communication skills;
8. possess an educational background to understand the global context in which engineering is practiced, including:
   a. knowledge of contemporary issues related to science and engineering;
   b. the impact of engineering on society;
   c. the role of ethics in the practice of engineering;
9. have the ability to contribute effectively as members of multi-disciplinary engineering teams;
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers; [1,4,6]

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

Contribution to Meeting Professional Component: (in semester hours)

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

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| Prepared By: | David Hoe | Date: | 17 Jan 2011 |
| Modified By: | | Date: | |