

ECE 440 Digital Systems Engineering

Credits and Contact Hours: 3 credits, 3 lecture hours

Course Instructor or Coordinator: James F. Frenzel, PhD

Textbook: "Logic Design and Verification Using SystemVerilog", Donald Thomas., ISBN-13: 978-1500385781.

Supplemental Materials: The Zynq Book and Tutorials (www.zynqbook.com)

Course Catalog Description:

Design of digital systems using a hardware description language and field-programmable gate arrays; projects emphasize a top-down design process using software tools; topics include datapath optimization, pipelining, static and dynamic memory, technology issues, intra-system communication, and design for testability.

Prerequisites: ECE 240, 241, or permission

Course Type: Selected Elective

Course Goals:

- Learn fundamental concepts of digital system engineering
- Learn the advantages and use of hardware description languages
- Learn different design principles for the implementation of digital logic circuits
- Learn the principles and basic functionality of field-programmable logic devices

Student Outcomes:

Data collected in this course are used to assess achievement of Student Outcomes (e) and (l) for the Electrical Engineering Program: (e) An ability to identify, formulate and solve engineering problems; (l) A broad knowledge in at least three, and introductory knowledge in all of the following areas of electrical engineering: electronics, power, electromagnetics, digital systems, signals and systems.

Course Topics:

- Introduction to digital systems engineering
- Review of fundamental digital logic topics
- Principle of a design process with HDL
- Basic HDL: Operands and operators
- Hierarchical design with HDL
- Implementation of finite-state-machines
- Functional, data-path and control-path description
- Timing Analysis
- Testability of digital designs

Prepared by: James F. Frenzel, PhD

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