New Jersey Institute of Technology
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NEWARK COLLEGE OF ENGINEERING

SYLLABUS AND COURSE INFORMATION

Course Name: Digital Logic and Circuit Design

Course Number: ECET 365

Course Structure: 3-0-3 (lecture hr/wk – lab hr/wk – course credits)

Course Description: Develops the mathematics and minimization techniques together with the circuit implementation for the design of combinational and sequential digital solid-state logic circuits. Studies decoders, mulitplexers, counters, registers, and PLDs. Computer and communications circuits are used as examples. Projects employ computer simulation of digital circuits.

Prerequisites: ECET 215 or ECE 251

Corequisites: None

Required, Elective, or Selected Elective: Required

Required Materials: **Text:** Name: Fundamentals of Digital Logic with VHDL Design
Author: Stephen Brown and Zvonko Vranesic
Year: 2008
ISBN: 978-0-07-722143-0

Course Outcomes: By the end of the course students are able to:

1. Analyze and design basic combinational SOP and POS logic systems.
2. Apply various simplification techniques to combinational logic.
3. Apply decoders to memory systems and combinational logic
4. Apply multiplexers to time division multiplexing systems and combinational logic.
5. Distinguish between the various programmable logic devices and draw logic using the short hand logic commonly used in PLDs.
6. Analyze and design basic sequential logic systems including counters.
7. Determine waveforms and state diagrams, with SR, D, JK and T flip-flops.
8. Design finite state machines in an efficient manner.
9. Use the schematic capture and the VHDL language to design, simulate and troubleshoot both combinational and sequential logic using the CAD software.
10. Present the results in a well-documented report with all logic and timing diagrams computer generated.
11. Through attending professional society meetings, appreciate the usefulness of, and role of professional societies in, lifelong learning.

New Jersey's Science & Technology University

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12. Through journal articles recognize technology's impact on society.

Class Topics:

Boolean Algebra	Gates
Combinational Logic	Sequential Logic
Hardware Implementations	Finite State Machines
VHDL Design	Timing Analysis

Student Outcomes: The Course Learning Outcomes support achievement of the following Student Outcomes from the ETAC of ABET Criterion 3 requirements.

Student Outcome d: An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives.
Related Course Learning Outcomes: 6

Student Outcome j: A knowledge of the impact of engineering technology solutions in a societal and global context.
Related Course Learning Outcomes: 11 & 12

Student Outcome l: The application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers, and engineering standards to the building, testing, operation, and maintenance of electrical/electronic(s) systems.
Related Course Learning Outcomes: 9

Academic Integrity: NJIT has a zero-tolerance policy regarding cheating of any kind and student behavior that is disruptive to a learning environment. Any incidents will be immediately reported to the Dean of Students. Please visit the Dean of Students website at http://www.njit.edu/doss for a list of student policies relating to academic integrity and student conduct.

Modification to Course: The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course Outline.

Prepared By: Daniel Brateris

Course Coordinator: Daniel Brateris