Rutgers University, Department of Electrical and Computer Engineering
ABET COURSE SYLLABUS
COURSE: 14:332:233

Course Catalog Description: 14:332:233 - Digital Logic Design Laboratory (1)
Hands-on experiments with digital circuits of increasing complexity from simple gates to state machines.

Pre-Requisite Course: none
Co-Requisite Course: 14:332:231
Pre-Requisite by Topic: 1. Boolean algebra.
2. Electrical concepts from physics.
3. Basic skills in using multimeters, power supplies, oscilloscopes.
4. General computer skills.

Textbook & Materials: Laboratory manual supplied by the instructor.
References: The OneKey access from Prentice Hall can be helpful to prepare the laboratory.
Overall Educational Objective: To provide practical experience with the implementation of digital circuits. Gives a good basis for studying computer engineering.

Course Learning Outcomes: A student who successfully fulfills the course requirements will have demonstrated:

1. An ability to operate laboratory equipment.
2. An ability to construct, analyze, and troubleshoot simple combinational and sequential circuits.
3. An ability to design and troubleshoot a simple state machine.
4. An ability to measure and record the experimental data, analyze the results, and prepare a formal laboratory report.

How Course Outcomes are Assessed: Pre-laboratory simulations(40%)
Experimental work in the laboratory (40%)
Final report of a laboratory (20%)

N = none **S = Supportive** **H = highly related**

Outcome	Level	Proficiency assessed by
(a) an ability to apply knowledge of mathematics, science, and engineering	H	Laboratory work and report
(b) an ability to design and conduct experiments and interpret data	H	Laboratory work and report
(c) an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	H	Setting up experiments, performing experiments, and circuit simulations
(d) an ability to function as part of a multi-disciplinary team	H	Each experiment done by a team
(e) an ability to identify, formulate, and solve ECE problems	H	Performing laboratory experiments
(f) an understanding of professional and ethical responsibility	S	Conducting the experiments and reporting the results
(g) an ability to communicate in written and oral form	H	Laboratory reports
(h) the broad education necessary to understand the impact of electrical and computer engineering solutions in a global, economic, environmental, and societal context	N	
(i) a recognition of the need for, and an ability to engage in life-long learning	S	Report written at home
(j) a knowledge of contemporary issues	N	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for electrical and computer engineering practice	H	Laboratory work and reports

Basic disciplines in Electrical Engineering	S	Laboratory instruction
Depth in Electrical Engineering	S	Laboratory instruction
Basic disciplines in Computer Engineering	H	Laboratory work and reports
Depth in Computer Engineering	H	Laboratory work and reports
Laboratory equipment and software tools	H	Laboratory work
Variety of instruction formats	S	Laboratory instruction, office hour discussions

Topics Covered Week by Week:

Week 1: General introduction to the laboratory.
Week 2 and 3: Introduction to hardware.
Week 4 and 5: Combinational SSI circuits.
Week 6 and 7: Combinational MSI circuits.
Week 8 and 9: Four bit arithmetic circuit.
Week 10 and 11: Sequential Circuits. State machine analysis.
Week 12 and 13: State machine synthesis.
Week 14: Review.

Computer Usage: At present time the students are not using a computer. If a *simple* digital logic design program will become available, the laboratory will be redesigned accordingly.

Design Experiences: Moderate design experience in arriving at circuits on which experiments are conducted.

Independent Learning Experiences: Conducting the circuit simulation and writing the laboratory reports.

Contribution to the Professional Component:

(a) College-level mathematics and basic sciences: 0.25 credit hours
(b) Engineering Topics (Science and/or Design): 0.75 credit hours
(c) General Education: 0 credit hours

Total credits: 1

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