

ELEC 2200 – DIGITAL LOGIC CIRCUITS

(Required for ECPE, Required for ELEC)

2004 Catalog Data: ELEC 2200. DIGITAL LOGIC CIRCUITS (3) LEC. 3. Pr., COMP 1200. Electronic devices and digital circuits; binary numbers; Boolean algebra and switching functions; gates and flip-flops; combinational and sequential logic circuits; hierarchical design of digital systems; computer-aided design tools for digital design, simulation, and testing.

Textbook: Digital Logic Circuit Analysis & Design, V.P. Nelson, H.T. Nagle, J.D. Irwin, and B.D. Carroll, Prentice-Hall, 1995

References: C. E. Stroud, *ASL: Auburn Simulation Language, AUSIM*, August, 2003.
C. E. Stroud, *AUSIM: Auburn University SIMulator – Version L2.2*, February, 2004.
Available at <http://www.eng.auburn.edu/~strouce/elec2200.html>

Coordinator: Victor P. Nelson, Professor of Electrical & Computer Engineering

Course Objectives:

1. To be able to analyze and design combinational logic circuits
2. To be able to analyze and design sequential logic circuits
3. To be able to develop and simulate gate-level models of digital logic circuits

Prerequisites by topic:

1. Introductory computer programming in a high level language

Topics:

1. Introduction to digital systems
2. Number systems and codes
3. Boolean algebra
4. Switching functions and canonical forms
5. Design and analysis of combinational circuits
6. Circuit minimization via Karnaugh maps
7. Schematic capture and simulation tools
8. Timing issues and common combinational logic circuits
9. Latches and flip flops
10. Counters and shift registers
11. Synchronous sequential circuit analysis
12. Synchronous sequential circuit design
13. Simulation and timing analysis of sequential circuits
14. Optimization of synchronous sequential circuits
15. Programmable logic devices
16. Exams and review

Class schedule (50 minute classes):

- (2 classes)
- (3 classes)
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Typical methods for evaluating student performance:

Hour exams (3)	60%
Final exam	20%
Homework/design projects	20%

Computer usage: Some problem assignments will require the use of the digital logic circuit simulation program (AUSIM), available on the class web page www.eng.auburn.edu/~strouce. Note that every student is expected to do his/her own work. Discussion of various aspects of the problems/design projects with fellow students is acceptable, provided that solutions/designs are not copied.

Class attendance: Students are expected to attend class regularly and on time. In case of absence, the student is responsible for all course business conducted in class.

Policy on unannounced quizzes: There will be no unannounced quizzes.

Special Accommodations: Any student requiring special accommodations should come by my office within the first two days of class, bringing your letter from the Office of Students with Disabilities.

Contribution of course to meeting the professional component

Engineering topics: 3 credits

33% engineering science (1 credit)

67% engineering design (2 credits)

Primary program outcomes related to this course:

Outcome 1. Ability to apply knowledge of math, science and engineering to solve problems.

Outcome 3. Ability to design an electrical component or system to meet desired needs.

Prepared by: C. E. Stroud

Date: February 4, 2004

Updated by: C. E. Stroud

Date: December 9, 2009