

Department of Electrical and Computer Engineering
520.142 Digital Systems Fundamentals
Spring 2008

2007-09 Catalog	Number systems and computer codes, switching functions, minimization of switching functions, Quine-McCluskey method, sequential logic, state tables, memory devices, analysis and synthesis of synchronous sequential devices. (3 credit hours/Required for CE, Elective for EE)
Prerequisite(s):	None
Textbook:	Nelson, Nagle, Carrol, Irwin, <i>Digital Logic Circuit Analysis and Design</i> , Prentice Hall.
Notes:	<i>Problems for Digital Systems Fundamentals, Version 15</i>
Course Objectives:	Development of the ability to analyze and synthesize combinational and synchronous sequential logic circuits
Topics Covered:	<ol style="list-style-type: none">1. Binary Systems2. Boolean Algebra and Logic Gates3. Analysis of Switching Networks, Canonical Forms4. Simplification of Boolean Functions: The Map Method5. Prime Implicants and The Quine-McCluskey Method6. Finite State Machines, State Tables, State Diagrams7. T Flip-Flops, D Flip-Flops, JK Flip-Flops, SR Flip-Flops8. Analysis of Synchronous Sequential Devices with Flip-Flops9. Sequential Logic Design Procedure: Excitation Tables for T, D, JK and SR Flip-Flops10. State Reduction: Partitioning Method11. Sequential Logic: Design of Sequence Recognizers12. Combinational Logic: Design of Adders13. Basic Flip-Flop Circuits14. Registers, Counters
Labs:	<ol style="list-style-type: none">1. Introduction to the Training Kit and Basic Gates.2. Combinatorial Logic Circuits3. Adders4. Two-bit Binary Counter
Class Schedule:	Three - one hour lectures/ week Two - laboratory sessions/ semester

Contribution of Course to Meeting the Professional Component (credit hours):

Engineering Science	Engineering Science and Design
	3

Relationship of Course to Program Educational Outcomes (✓ those that apply):

x	Apply mathematics, probability and statistics, basic science, and computer science
	Design and conduct experiments, analyze and interpret data
x	Identify, formulate and solve electrical engineering problems
x	Use technical skills and modern engineering tools to design to meet needs
	Communicate effectively and work on multidisciplinary teams
	Contemporary issues, ethical responsibilities, environmental, health, safety issues
x	Engage in life-long learning

Prepared November 1, 2007 by: Gerard G.L. Meyer