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| Course Number | EE 261 |
| Course | Introduction To Logic Circuits |
| University Catalog Description | Semesters offered: F, S 3 credit lecture An introductory course on logic circuits and digital systems. Course covers design and implementation of combinational logic circuits, synchronous sequential circuits and information storage circuits. Binary codes, binary arithmetic, typical computer operations on binary data. |
| Faculty Coordinator | Dr. Fredrick M. Cady |
| Prerequisites by Topic | None. |
| Textbook | Digital Design, Principles & Practices, Third Edition Updated, Prentice Hall 2001, John F. Wakerly |
| Course Objectives | Students will explore the fundamental concepts of classical digital design. This course covers design and implementation of combinational and synchronous sequential circuits, and information storage circuits. Basic concepts of programmable logic devices are also presented. The student will be adequately prepared to advance to upper level digital classes and labs. |
| Course Outcomes | At the end of the course the student should be able to: 1) Accomplish number system conversions between decimal, binary, octal and hexadecimal, etc. 2) Understand switching or Boolean algebra and Karnaugh Maps 3) Analyze and design small scale combinational logic circuits 4) Minimize and optimize combinational circuit designs 5) Incorporate medium scale integrated circuits, like decoders, encoders, multiplexers, etc., into circuit design 6) Analyze and design simple sequential circuits 7) Understand the use of combinational and sequential designs in more complex systems |
| Topics Covered | 1) Binary, octal and hexadecimal numbers and conversions 2) Two's-complement addition and subtraction 3) BCD and Gray codes and other codes 4) Logic gates and logic families, CMOS logic structure, dynamic and steady-state behavior, input and output structures 5) Boolean algebra 6) Combinational circuit analysis, minimization/optimization, and synthesis 7) Karnaugh maps, timing hazards, drawing standards 8) PLD's, decoders and encoders, multiplexers, comparators, adders, ALU's, multipliers 9) S-R, J-K, and T flip-flops, master-slave configuration, latches 10) State machine analysis, design and synthesis, state diagrams and state tables 11) Design practices with latches and flip-flops for controllers, counters, shift registers, etc. |
| Class/Laboratory Schedule | EE 261 meets three times a week for 50 minute periods. |
| Professional Component | Fundamental digital logic concepts are developed to allow the student to analyze and design basic combinational and sequential circuits. |
| ECE Program Outcomes | EE 261 supports the following Program Outcomes: a. An ability to apply knowledge of mathematics, science, and engineering. c. An ability to design a system, component, or process to meet desired needs. e. An ability to identify, formulate, and solve engineering problems. k. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice. o. An ability to design digital systems using modern design tools. |
| ECE Program Objectives | 3. Produce graduates who are able to apply theoretical and practical engineering practices in the workplace. |
| Prepared by | T. L. Sharpe |