Course Description
EE 2369-Digital System Design I

2000-02 Catalog: Design and synthesis of digital systems using both combinational and sequential circuits. Prerequisites: EE 1305 with a grade of "C" or better. Course fee required.

Prerequisite by Topic: 1. Basic concept of binary number systems


Course Outcomes: Students completing EE 2369 will be able to:
1. Apply Boolean algebra and K-Map to simplification of Boolean expressions, and analysis and synthesis of digital circuits (C).
2. Apply knowledge of combinational and sequential logic to digital circuit design (C).
3. Design combinational circuits, such as binary adders, code converters, etc., by using logic gates (C).
4. Design sequential circuits, such as counters, registers, etc., by using flip-flops and logic gates (C).
5. Design and test digital circuits using MSIs and EPROMs (I).

Topics Covered:
1. Review of binary number system and binary codes (3 hrs.)
2. Boolean algebra (4 hrs.)
3. Algebraic simplification, Karnaugh maps (5 hrs.)
4. Implementation of combinational circuits (3 hrs.)
5. MSI devices, ROMs, PLAs and PALs (5 hrs.)
6. Flip-Flops (5 hrs.)
7. Analysis of sequential circuits (5 hrs.)
8. Synthesis of sequential circuits (5 hrs.)
9. Iterative networks (3 hrs.)
10. Signed binary numbers, adders and substracters (4 hrs.)

Class Schedule: Three hours lecture per week.

Contribution to Professional Component:
EE 2369 is a required course for all ECE students. This course provides the fundamentals needed for students to take any other digital logic related courses in their curriculum.
Relationship to Program Outcomes:

1. Have an ability to apply knowledge of mathematics, science and engineering principles. Students use binary number theory, Boolean algebra, and principles of digital logic in the design of digital circuits. (Course Outcomes 1 and 2).

2. Have an ability to design and conduct experiments and interpret data. There are seven laboratory design projects, where students design and implement digital circuits using standard IC's (Course Outcomes 1, 2, 3, 4, and 5).

3. Have an ability to design a system, component, or process to meet desired needs. Students have homework problems and design projects that design both combinational and sequential circuits (Course Outcomes 1, 2, 3, 4, and 5).

5. Have an ability to identify, formulate, and solve engineering problems. Some assignments and laboratory projects are word problems where students must formulate Boolean expressions in order to solve the problems (Course Outcome 2).

7. Have an ability to communicate effectively. Students write laboratory reports for design projects.

11. Have an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. Students are given an introduction to programmable logic devices, a modern design approach for complex digital systems (Course Outcome 5).

Course outcomes do not relate to Program Outcomes 4, 6, 8-10, and 12. They do correlate strongly with Educational Objective 1 (40%) and Educational Objective 2 (60%).

**Computer Usage:** Students use PCs to program EPROMs.

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