Course Description
EE 3109-Computer-Aided Electronics Design

2000-02 Catalog: Design of electronic circuits using computer-based work station. Includes schematic capture, simulation, and PC board layout. Prerequisites: EE 2351 and EE 2369.

Prerequisite by Topic:
1. Digital circuit design
2. Implementation of digital circuits using standard ICs


Course Outcomes: Students completing EE 3109 will be able to:
1. Design combinational logic by using schematic capture tools and verify the circuit by simulation (C).
2. Design sequential logic by using schematic capture tools and verify the circuit by simulation (C).
3. Design complex digital circuits based on hierarchy approaches (I).
4. Model and verify combinational logic by using VHDL language (C).
5. Model and verify sequential logic by using VHDL language (C).
6. Demonstrate competence in written technical communication (I).

Topics Covered:
1. Basic capabilities and features of MAX+PLUS II (2 hrs.)
2. Design and simulation of combinational logic using MAX+PLUS II (3 hrs.)
3. Hierarchy design approach (1 hr.)
4. Design and simulation of sequential logic using MAX+PLUS II (3 hrs.)
5. Introduction to VHDL (2 hrs.)
6. Design and simulation of combinational logic using VHDL (1 hr.)
7. Design and simulation of sequential logic and state machine using VHDL (2 hrs.)

Class Schedule: One hour lecture per week.

Contribution to Professional Component:
EE 3109 is a required course for all ECE students. This course provides computer-aided design tools needed for students to take 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 apply principles of digital logic in the design of digital circuits using computer-aided design tools (Course Outcomes 1 and 2).

2. Have an ability to design and conduct experiments and interpret data.
   There are ten laboratory design projects, where students design and simulate digital circuits using Altera MAX+PLUS II design package (Course Outcomes 1 and 2).

3. Have an ability to design a system, component, or process to meet desired needs.
   Students have two projects that design large logic circuits based on hierarchy approaches (Course Outcomes 1, 2, and 3).

5. Have an ability to identify, formulate, and solve engineering problems.
   There are three projects, where students model and verify digital logic using VHDL programming language (Course Outcomes 3, 4, and 5).

7. Have an ability to communicate effectively.
   Each project requires a written report and a final written report is also required for Project 7 (Course Outcome 6).

11. Have an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
    Students use Altera CAD tools, which are commonly used in the industry, in their design projects (Course Outcomes 1, 2, 4, and 5).

Course outcomes do not relate to Program Outcomes 4, 6, 8-10, and 12. They do correlate strongly with Educational Objective 1 (30%) and Educational Objective 2 (70%).

Computer Usage: Students use unix workstations to do their design projects.

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