ECE 681 VLSI ASIC Design

Course and Lab Instructor               Office Hours: By Appt. & Monday 6:20pm-7:20 pm rm 128 STI
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Lecture/Lab               Monday 7:20 to 10:00 pm in room 128 in Science and Tech I
Prerequisites               ECE 545 and 586 or permission of instructor
Credit                  Course: 3

Grading
Project: 30%
Lab exercises: 15%
Class Participation: 5%
Midterm: 20%
Final exam: 30%

Course Description

This course introduces VLSI design of application-specific integrated circuits (ASICs) from conceptual design through design release to a foundry using HDL and modern design automation software. Tradeoffs and design perils will be discussed at various phases of this design process. Discussions will include design considerations and tradeoffs made by engineers throughout this process including ASIC performance, power, time to market, design for test, design for manufacturability, etc. Lecture will be accompanied with ample lab time for a hands-on project using the synopsys tool suite including, synthesis of digital circuits using standard cells, static timing analysis, design for test (test generation/fault simulation), floor planning - placement and routing, clock tree insertion and design rule checking.

Outline (Subject to Change) 14 classes including midterm – no class 9/1, class 10/14 instead of 10/13
Aug 25: Overview of modern VLSI Design Flow and Methodology
Sep. 8 Introduction to Synthesis – Libraries, HDL Coding and other considerations
Sep. 15 Static Timing analysis and Project Discussion
Sep. 22 Power analysis
Sept. 29 Design For Test
Oct. 6 Midterm
Oct 14 Synthesis Feedback and Timing Closure
Oct. 20 Floor Planning
Oct. 27 Placement
Nov. 3 Routing/Wiring
Nov. 10 Post Placement Analysis (timing and power)
Nov. 17 Design Checking (DRC/LVS/Timing)
Nov. 24 Project Workshop
Dec. 1 Deep Submicron issues and additional topics
Dec. 15 – Final Exam 7:20 – 10 pm

Required Text