ECE 681 VLSI Design for ASICs - Fall 2009

Course and Lab Instructor: Nancy Klimavicz; Adjunct Professor nklimavi@gmu.edu
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Lecture/Lab: Monday 4:30-7:10 pm in room 5358- The Engineering Building
Office Hours: By Appt. & Monday 3:30-4:30 pm ECE 3708 or 5358 if room is available

Prerequisites ECE 545 and 586 or permission of instructor

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

Course Description (3 Credits):

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) – no class 9/7, class 10/13 instead of 10/12 (Per George Mason Calendar)
- Aug 31 Overview of modern VLSI Design Flow and Methodology
- Sep. 14 Introduction to Synthesis – Libraries, HDL Coding and other considerations
- Sep. 21 Static Timing analysis and Project Discussion
- Sep. 28 Power Analysis and Formal Verification
- Oct. 5 Design For Test
- Oct. 13 Midterm (NOTE:School closed Monday – this is a Tuesday)
- Oct 19 Synthesis Feedback and Timing Closure
- Oct. 26 Floor Planning
- Nov. 2 Placement
- Nov. 9 Routing/Wiring
- Nov. 16 Post Placement Analysis (timing and power)
- Nov. 23 Design Checking (DRC/LVS/Timing)
- Nov. 30 Project Workshop
- Dec. 7 Deep Submicron issues and additional topics
- Dec. 14 – Final Exam - 4:30 pm – 7:15 pm

Required Text:

Helpful text: