CSE563 ADVANCED VLSI

Spring, 1997

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Office Hours:
Mon: 4:00pm - 5:30pm
Wed: 8:30am - 10:00am
(or by appointment)

Course Description:

This course, *Advanced VLSI*, aims to convey advanced concepts of circuit design and analysis for digital LSI and VLSI systems in CMOS technology. Emphasis is on analysis, design, layout, and optimization of handcrafted circuits. Special attention will be devoted to system design considerations including power supply level fluctuations, high-speed clocking strategies, estimating interconnection delays and design for testability.

Course Objectives:

1. Apply the knowledge of advanced concepts to design CMOS digital circuits using a computer-aided design tool.

2. Compare and evaluate various design approaches with respect to performance requirements, such as timing and power dissipation.

Prerequisites:

CSE 462 or similar introductory VLSI course is required. Also, some experience with the Mentor Graphics design tool suite is expected.

Reading Material:


- Course handouts and selected articles from journals.
Topics to be covered:

1. Review of device fabrication fundamentals
2. Review of MOS device theory and modeling
3. Static logic gates, structures and design
4. Dynamic logic gates, structures and design
5. Finite-state machine, PLA design
6. Pad driver and receivers
7. Power routing and power supply fluctuations
8. High-speed clocking strategies
9. Design for test
10. Floorplanning of large IC systems
11. Other advanced topics if time permitting

Course Policy:

- Class attendance and participation is expected.
- No late assignments will be accepted. If there is an emergency, contact me as soon as you can.
- No makeup exam will be given unless I have agreed to do so prior to the exam.
- Grading policy:

  Homework and class participation          10%
  Mid-term exam and quizzes                35%
  Two projects                            55%