Rice University
Elec 422, VLSI Design I
Course Information, Fall 1998

This is an introductory course on VLSI design. While the goals of the course are ambitious - covering the theory of VLSI design and successfully designing a chip; this could be the most fun you ever had in any engineering course. Welcome!

1 Organization

Day & Time: TTh 2:30-3:50pm
Location: Abercrombie Lab A126
Instructor: Joe Cavallaro, Duncan Hall 3042, cavallar@rice.edu
VLSI Lab: Abercrombie A121 (Owlnet) and Owlnet labs
Lab Assistants: Suman Das, DH 3038, suman@rice.edu; Vishwas Sundaramurthy, DH3039, vishwas@rice.edu;

2 Topics

Logic Design and Simulation.
CMOS fabrication technology (crystal growth, wafers, lithography, masks, doping, etc.).
Layout, design rules, "Stick" Diagrams.
Hierarchical Layout Methodology.
State Machine Design and Programmable Logic Arrays.
Clocking strategies, 2-phase non-overlapping clock, Karplus methodology.
Design verification tools (simulators, netlist comparators, DRC checkers, etc.).
Introduction to testing and testability.
Computer-Aided Design Tools: *irsim, magic, spice...*
MOSIS Scalable CMOS Design; 1.2μ nwell process.

3 Required Textbooks

1. Weste & Eshraghian "Principles of CMOS VLSI Design" Second Edition, Addison-Wesley, 1994.
2. VLSI Design I Packet (Available at Rice Campus Store)

4 Other Useful Resources

1. Course homepage `http://www.ece.rice.edu/Courses/422`
2. Webpages of previous classes and project groups (*links from course homepage*)

5 Course Requirements

- **Students are required to enroll in Elec 423 VLSI Design II during Spring 1999. This is due to contractual obligations with the MOSIS Fabrication Service to provide a report on the success of the fabricated chip.**
- Group Project (Groups of three) to be fabricated by MOSIS. Though this is a group effort, each individual needs to have distinct responsibilities within the group, to be reflected in the final project report.
- The project is composed of several short term goals which are specified in the "milestones" handout. Meeting these short term deadlines is mandatory.
- Homeworks designed to help assimilate VLSI theory and to prepare & help students in the project design process. (Independent work under the Honor System is expected).
- Midterm Exam (In-class, Honor System, closed book, late-October).
- Project Presentation & Design Review (Last week of class).
- Final Group Project Report (Last week of classes).
- There will be regular meetings of groups with the instructor and lab assistants.

6 Supplemental Reading

1. Mead and Conway, Introduction to VLSI systems, Addison Wesley
2. Peterson and Hill, introduction to switching theory and logical design, John Wiley
3. Streetman, solid state electronic devices
4. Standard text books on Logic Design, Computer Architecture & Organisation, and Arithmetic Methods will be useful for the project.