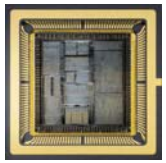
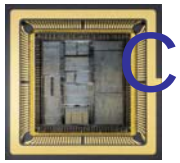


WELCOME TO

CSCI 5330
Digital CMOS VLSI Design

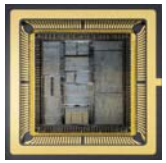
Instructor: Saraju P. Mohanty, Ph. D.



CSCI 5330 : Digital CMOS VLSI Design

Things to do:

- Instructor's introduction
- Student's introduction
- Student's attendance

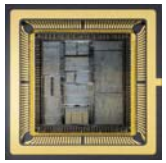


Class Time and Venue

- **Course Homepage:**
  http://www.cs.unt.edu/~smohanty/teaching/DigitalCMOSVLSIDesignSpring05/

- **Class Timing and Venue:**
  TuTh 4:00-5:20pm and NTRP B157

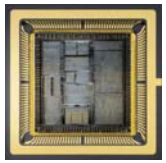
- **Instructor's Office:**
  Office Hours: MW 4:00-5:20pm (any other time possible by appointment through email)
  Room: NTRP F277
  Email: smohanty@cs.unt.edu
  Homepage URL: http://www.cs.unt.edu/~smohanty/



Course Syllabus and Description

Course objectives:

- To understand theory of MOS transistor.
- To learn design of digital systems at transistor level.
- Design, layout and simulate of digital VLSI circuits using various CAD tools.
- To acquire practical working knowledge of creating digital circuits using Computer-Aided-Design tools.



Course Syllabus and Description ….

- **Prerequisites:** Minimal knowledge of computer logic design, semiconductor physics, and maths.

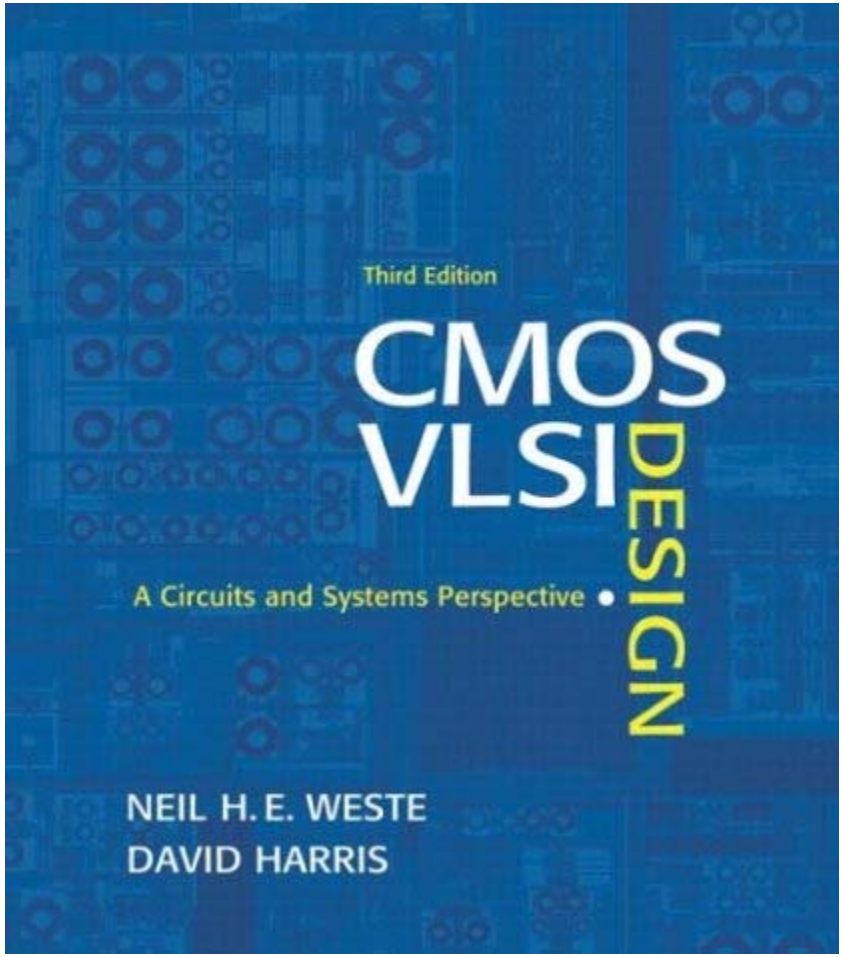
- **Level of the Course:** The course is designed for first year graduate students.

- **Course Software:** Students should have access to a computer to do the assignments and projects. A student can work on assignments and projects anytime, anywhere, using any useful software and computer. However, free lite version of the microwind and DSCH will preferably be used in this course. The software can be downloaded from http://www.microwind.org.

Course Syllabus and Description ….

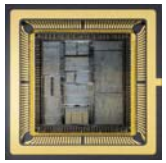
Text Book:

Principles of CMOS VLSI Design: A Systems Perspective by Neil H. E. Weste and David Harris, Addison Wesley Longman, 3rd Edition.



Links:

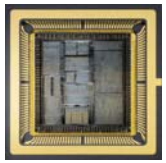
- http://www.cmosvlsi.com/
- http://www.aw-bc.com/weste/



Course Syllabus and Description ….

Selected Topics (Tentative):

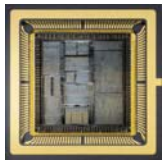
- Current-State-of-Art of VLSI technology: Discuss brief history of transistor, growth of VLSI technology
- MOS transistor theory: How a transistor works? What are its characteristics?
- CMOS processing technology: How are the transistors fabricated using chemical processes (broad view)?
- Circuit Characterization: Delay, Interconnect models



Course Syllabus and Description ….

Selected Topics (Tentative):

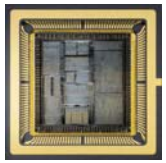
- Power Dissipation: Dynamic power consumption and Static power dissipation
- Reliability Issues: Heating, Electromigration, etc
- Circuit Simulation: Device Models, Device Characterization, and Circuit Characterization
- Combinational Circuit Design: Static and Dynamic CMOS, Silicon-on-Insulator



Course Syllabus and Description ….

Selected Topics (Tentative):

- Sequential Circuit Design: Sequencing static circuits, Latches, Flip-flops, Sequencing dynamic circuits
- Design methods and tools: Structures design, design methods, Design Flow, Interchange Formats, Design economics etc.
- CMOS testing: Test Programs, Logic Verification, Design for Testability
- Different Subsystems: Datapath, Array (RAM), Special Purpose

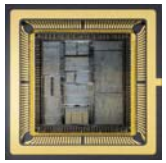


Course policy

- **Attendance for this course is mandatory** . In case of absence due to unavoidable reasons, substantial documented evidence needed.

- Several **assignments** including exercise problems and design works will be given. The written or typed solutions for exercise problems and reports for design works must be submitted in the class by 5:20pm of announced deadline.

- Several surprise **quizzes** will be given in the class. There will be no make up quiz for any student under any circumstances.



Course policy …..

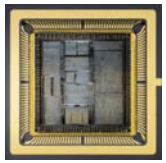
- **There will be three tests of equal weightage.** There will be no final test. The tests will be approximately evenly spaced throughout the semester.

- Any makeup test will not be given unless substantial documented evidence is provided for a reasonable excuse of absence. In the absence of the documented evidence, score for the test will be zero.

- Any questions regarding the test grades should be clarified **a week of returning the test**.

- All news will be announced in **news section** of course home page. **Students are expected to check this section from time to time.**

- **Dishonesty in this class will be handles as per the University of North Texas policy (http://www.unt.edu/csrr/).**

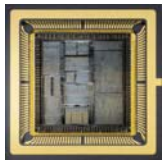


Tests Dates

Test No	Test Date	% of Final Grade
Test1	24th Feb (Thu)	10
Test2	29th Mar (Tue)	10
Test3	28th Apr (Thu)	10

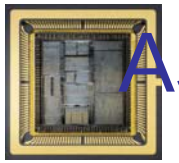
NOTE:

- Tests will be closed book and closed notes, but calculators are allowed.
- Test dates will not be changes under any circumstances.



Grading Procedure

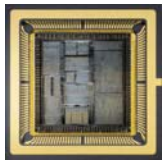
Items	% of Final Grade
Tests	30
Assignments (Exercise or Lab)	20
Quizzes and Attendance	10
Project	25
Term Paper	15



Assignments: Exercises and Laboratory

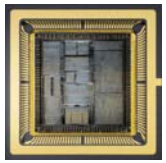
- Exercise problems from text books

- Laboratory works using microwind/DSCH tools
  - Report should be submitted
  - Demo from time to time (date will be announced in the class)
  - Report must contain
    - Design details
    - Simulation results
    - Time spent
    - Difficulties faced



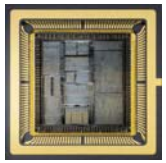
Projects

- All projects are individual projects. Students will have working experience in CAD tools.
- Any topic can be chosen by a student and can be assigned by instructor.
- Score Distribution:
  - Work-10
  - Abstract – 2
  - Midterm report – 2
  - Final report – 4
  - Presentation-4
  - Demo-3
- Important: Start from the first day of class ☺



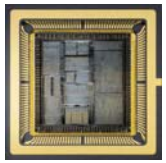
Term Paper

- Intended to make the student learn a particular area of current research.
- Needs to be done individually.
- Any topic can be chosen by a student and can be assigned by instructor.
- Score Distribution:
  - Abstract – 2
  - Midterm report – 2
  - Final report – 6
  - Presentation-5
- Important: Start from the first day of class ☺



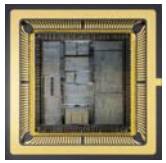
Schedule for the Project

- Abstract due: 22nd Feb (Tue)
- Midterm Report due: 22nd Mar (Tue)
- Final Report due: 21st Apr (Thu)
- Presentation:
  - 21st Apr (Thu): Alphabetically first half of the class 20 mins each
  - 26th Apr (Tue): Alphabetically second half of the class 20 mins each
- Demo:
  - 3rd May (Tue): Alphabetically first half of the class 20 mins each
  - 5th May (Thu): Alphabetically second half of the class 20 mins each



Schedule for the Term Paper

- Abstract due: 15th Feb (Tue)
- Midterm Report due: 15th Mar (Tue)
- Final Report due: 14th Apr (Thu)
- Presentation:
  - 14th Apr (Thu): Alphabetically second half of the class 20 mins each
  - 19th Apr (Tue): Alphabetically first half of the class 20 mins each

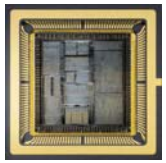


Grading Policy

A >= 90
90 > B >= 80
80 > C >= 70
70 > D >= 60
60 > F

NOTE: (i) Grading policy may change if University or Dept. decide so.

(ii) There will be no border grade concessions.



Some Questions ??

- What's the background of individual student ?
- Why are they taking this course ?
- What's their expectation from this course ?
- How much time can a students spend on this course per week ?
- Has a student ever done logic design course ?
- Has a student ever done computer organization, computer architecture, etc. courses ?
- Does a student have physics or maths background ?