

Lecture Instructor

Md Maruf Ahamed

Office: 307 Durham Center

Office Hours: Tuesday and Thursday (11:30AM.-12:30PM), 307 Durham Center (or by appointment)

Phone: (515) 294-6323

Email: maruf@iastate.edu

Lectures

Tuesday and Thursday: 9:30 AM - 10:50 AM, COOVER 1011

Labs

Since the seating capacity in the lab is limited, **attendance is mandatory** during your regularly scheduled lab section. Switching section is not allowed and there are 3 lab sections mentioned below:

Section 1: Tuesday 5:10 PM - 8:00 PM (Coover Hall, Room 2046)

Section 2: Wednesday 2:10 PM - 5:00 PM (Coover Hall, Room 2046)

Section 4: Wednesday 11:00 AM - 1:50 PM (Coover Hall, Room 2046)

Lab Policy:

- Unless stated otherwise there will be a **2.50-hour lab every week** other than first week. The instructions for each lab will be available on Canvas.
- Each lab is worth 2.5% of your final grade and there are **11 labs, but the first one will not be graded.**
- All labs must be worked in **groups of two, with a single lab report** submitted by each group. You might **switch lab partners during the semester**; this is a good way to find a compatible partner for the final project. No change of lab partner will be permitted once the final project has begun.
- Lab reports are submitted **before first 5 minutes of the subsequent session.**
- **We will not accept any late lab report. Period.**
- Many announcements will be made during labs (hints, corrections, changes, etc.) and absentees are not excused from any announcements made during lab hours.
- Keep each report to one binding. If the report has too many pages, use a large stapler. The final project may be in a folder if necessary.
- Lab reports should be submitted within the lab time or within the first 5 minutes of the subsequent session. Late labs will not be accepted.
- Lab reports should be neat, typed, and professionally presented. Diagrams and figures may be hand drawn.
- Lab announcements may be made in class, by e-mail or through the class webpage. Therefore, please attend classes, check your email and check class webpage regularly.
- The final project report should be very formal. The format requirements and guidelines will be given in the project handout.

Teaching Assistants

1. Praise Farayola

Email: farayola@iastate.edu

Office Locations: Coover 3102 (Desk 5)

Office hours: 1:00pm - 2:00pm on Monday, 4:00pm - 5:00pm on Tuesday

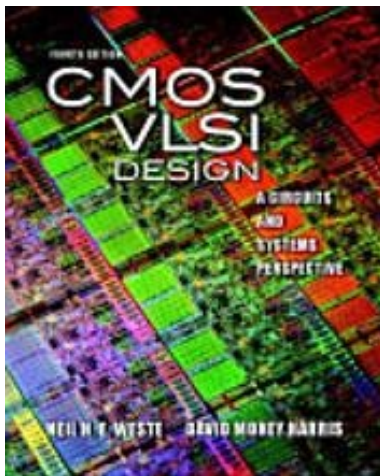
2. Second TA: Updated office hour will be available on Canvas.

Course Catalog Description and Prerequisite

Digital design of integrated circuits employing very large scale integration (VLSI) methodologies. Technology considerations in design. High level hardware design languages, CMOS logic design styles, area-energy-delay design space characterization, datapath blocks: arithmetic and memory, architectures and systems on a chip (SOC) considerations. VLSI chip hardware design project.

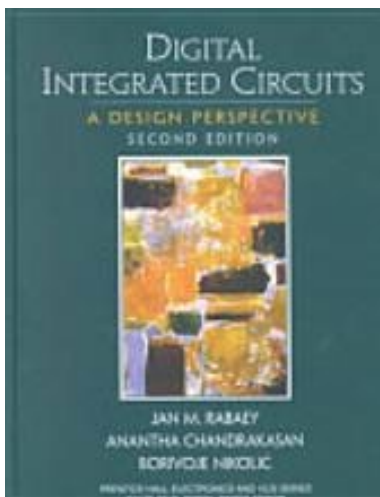
Prerequisites: EE 330 Integrated Electronics

Required Textbooks



Neil Weste and David Harris, "CMOS VLSI Design: A Circuits and Systems Perspective", 4rd edition, Addison Wesley, 2011.

Reference:



Rabaey, Chandrakasan, Nikolic, "Digital Integrated Circuits: A Design perspective", second edition, Prentice Hall, 2003.

Learning Outcomes

Students who successfully complete CPRE 465 Digital VLSI Design will have:

- Understand technology considerations in design.
- Understand the VLSI design process
- Analyze the design tradeoff of area-energy-delay
- Design digital circuits in different circuit families
- Design both combinational and sequential circuits
- Learn datapath functional units, memory array subsystems, and power and clock subsystems
- Describe designs in high level hardware design languages.
- Utilize common EDA tools in digital design

Homework Assignments

There will be a total of 10 homework assignments. You will have more than a week to complete each one of them. These assignments will be used to emphasize and clarify important concepts discussed in the lectures.

Homework Policy:

- Homeworks and exams are to be done alone. You may discuss homework problems with other students, but the work turned in must be your own. All homework's must be submitted to the instructor **BEFORE the start of the lecture period** on the day on which they are due. Please write clearly and **staple all of your pages** before you submit your homework.
- Also, please write the following three on the first page: **1) your full name; 2) your student ID number; and 3) your lab section number.** If any of these three are missing, then you will **lose 10% of your grade** for that homework. All graded homework's will be returned during the labs, which is why we need that lab section number.
- **We WILL NOT accept any late homework. Period.**

Exams

Midterm Exams:

- There will be a midterm exam for this class and the date will be announced on class.
- There will be a review session prior to the midterm exam.

***** Bring a picture ID or your midterm exam will not be graded! ******

Final Exam:

- There will be a final exam during the finals week and the date will be announced on class and on Canvas.
- There will be a review session prior to the final exam.

***** Bring a picture ID or your final exam will not be graded! ******

Class Attendance Policy

You are expected to attend ALL lectures and ALL labs. If you have a valid reason to miss a class (e.g., because you are ill) then it is your responsibility to find out what we have talked about in class, including any announcements that were made during class.

Policy on Collaboration

You are encouraged to form study groups and discuss the reading materials assigned for this class. You are allowed to discuss the homework assignments with your colleagues. However, each student will be expected to write his/her own solutions/code. Sharing of code is not allowed. No collaboration will be allowed during the exams.

IMPORTANT: Cheating, plagiarism, and other academic misconducts will not be tolerated and will be handled according to the [ISU's academic dishonesty procedures](#).

Grading Policy

Grading Scale:

93 – 100	= A
90 – 92.99	= A-
87 – 89.99	= B+
83 – 86.99	= B
80 – 82.99	= B-
77 – 79.99	= C+
73 – 76.99	= C
70 – 72.99	= C-
67 – 69.99	= D+
63 – 66.99	= D
60 – 62.99	= D-
0 – 59.99	= F

Grading Percentages:

Homeworks:(10 x 2.2%)	22%
Labs: (10 x 2.5%)	25%
Final Project:	20%
Midterm Exam:	15%
Final Exam:	20%
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TOTAL:	102%

Note: If you submit all homeworks and participate in-class activities, you might get a 2% bonus. Try to take advantage of that as you may lose points on the exams.

Appealing a Grade:

You will have a two-week window of appeal after each homework/exam is graded and returned. The grade challenge must be in writing and must clearly state the specific problem on the homework/exam in question and the reason for your challenge. The written statement and the original exam must be submitted to the instructor during the two-week window. After two weeks the grade cannot be changed.

Lab Safety

This class has a substantial hands-on laboratory section. Students will be using expensive, sensitive, and potentially hazardous equipment. Safety in the lab is a number one priority for students and instructors and to ensure a safe laboratory experience, a brief safety presentation will be given during the first lab session. It is mandatory that all students attend this presentation. Moreover, it is expected that students follow any and all posted safety guidelines. All students must sign the [lab safety form](#).

For reference, a copy of the University Laboratory Safety Manual can be found at: www.ehs.iastate.edu/sites/default/files/uploads/publications/manuals/labsm.pdf

See also the [safety page of the ECpE Department](#).

Religious Accommodation

If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the [Dean of Students Office](#) or the [Office of Equal Opportunity](#).

Students with Disabilities

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in [Student Accessibility Services office \(SAS\)](#) to establish eligibility. SAS will then provide electronic access to Notification Letters through that system. Both student and instructor will receive an email with a link to access the NL within Accommodate. Students are suggested to meet with the instructors in person or contact via email, to discuss the implementation of the indicated accommodations and each should digitally sign the NL (vs. sign a paper copy). Students are encouraged to contact SAS as early in the semester as possible. SAS, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr. Contact SAS by e-mail at accessibility@iastate.edu or by phone at 515-294-7220 for additional information.

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, [Student Assistance](#) at 515-294-1020 or email dso-sas@iastate.edu, or the [Office of Equal Opportunity](#) at 515-294-7612.

How to Access Course Materials?

1. Follow the link below and log on to Canvas with your NetID
<https://canvas.iastate.edu/>
2. Select the course (e.g., CPRE 281 from the Dashboard)

Small Print

The instructor reserves the right to change any and all aspects of this class for whatever reason or no reason at all (a.k.a., academic freedom).