CMPE 315: Principles of VLSI Design

Course:

CMPE 315: Principles of VLSI Design, Fall 2021 4 credits.

Course Instructor:

Chintan Patel, Associate Professor, Computer Science & Electrical Engineering
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Text: Neil H.E. Weste and David Harris, "CMOS VLSI Design: A Circuits and Systems Perspective," Fourth Edition, Addison Wesley (2011)

Supplementary text:

Ken Martin, "Digital Integrated Circuit Design", Oxford University Press (2000).

Jan M. Rabaey, A. Chandrakasan, B. Nikolic "Digital Integrated Circuits, A Design Perspective", Second Edition, Prentice Hall (2003).

Grading:

The distribution of weights for the exams, homeworks and projects is as follows:

Midterm Exam	20%
Final	20%
Labs/Homework	25%
Project	30%
Class Participation, In-class exercise, Attendance.	5%

No incompletes will be given, except as required by university policy for truly exceptional circumstances.

The final exam is cumulative. However, material covered after the second exam will be emphasized.

Students are encouraged to participate in class.

NOTE: Cheating at any time in this course will cause you to fail the course.
Please refer to the guidelines on the next page.
For a complete description of academic dishonesty, refer to the UMBC Student Handbook.

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The following is taken from the UMBC Student Handbook:

DEFINITIONS OF ACADEMIC MISCONDUCT

Academic misconduct may include but is not limited to the following:

Cheating: knowingly using or attempting to use unauthorized material, information, or study aids in any academic exercise.

Fabrication: Intentional and unauthorized falsification or invention of any information or citation in an academic exercise.

Facilitating Academic Dishonesty: Intentionally or knowingly helping or attempting to help another commit an act of academic dishonesty.

Plagiarism: Knowingly representing the words or ideas of another as one's own in any academic exercise, including works of art and computer-generated information/images.

POLICY FOR RESOLVING CASES OF ACADEMIC MISCONDUCT

Individual faculty members have the right and responsibility to deal directly with any cases of academic misconduct which arise in their courses. Instances of academic misconduct may be identified in one of two ways. If a faculty member believes a student has committed an act of academic misconduct--for example, by direct observation of student behavior, by comparing the contents of an assignment with that submitted by another student, or by reviewing notated sources or references--the faculty member, in consultation with the Chair of the Academic Conduct Committee, will assess the student's alleged misconduct and the faculty member's options. If a student believes that academic misconduct has occurred, the student will notify either the faculty member or the Chair of the Academic Conduct Committee.

It is particularly important that the Chair of the Academic Conduct Committee be consulted. The Chair can provide knowledge and insight for the faculty member. Communication of instances of academic misconduct also protects the integrity of the university by providing a means of recording infractions that may be repeated by a particular student, or which may prove endemic to a particular course or department. Consultation with the Chair of the Academic Conduct Committee provides a formal record of the infraction and resolution, protecting the student, professor, and university should any questions later arise.

The student will have the opportunity to respond to an accusation of academic misconduct.

COVID Related Requirements

UMBC has set clear expectations for masking while on campus that include the requirement that you must wear a face mask that covers your nose and mouth in all classrooms regardless of your vaccination status. This is to protect your health and safety as well as the health and safety of your classmates, instructor, and the university community. Anyone attending class without a mask or wearing one improperly will be asked by the instructor to put on a mask or fix their mask in the appropriate position. Any student that refuses to comply with this directive will be asked to leave the classroom immediately and failure to do so will result in the instructor requesting the assistance of the University Police. Students who refuse to wear masks may be referred to Student Conduct and Community Standards and may face disciplinary action for violations of the Code of Student Conduct, specifically, Rule 2: Behavior Which Jeopardizes the Health or Safety of Self or Others and Rule 16: Failure to Comply with the Request of a University Official. UMBC's on-campus safety protocols, including masking requirements, are subject to change in response to the evolving situation with Covid-19.

Students who are absent from class due to COVID-19-related situations are expected to communicate directly with the course instructor. Students should submit notification of the absence in writing to their instructor either prior to the absence or as soon afterwards as possible. If the COVID-19 related absence coincides with graded work (e.g., homework, in-class activities, quizzes, presentations, activities, etc.), students should work with the instructor to arrange for an academic accommodation. It is important to affirm that class absences, COVID-19-related or not, do not alter the academic requirements of any course and students remain responsible for information and material missed during the absence. Additionally, COVID-19-related absences are not considered a "disability" and as such do not require that students seek accommodations from the Office of Student Disability Services.

More information on Covid-related Classroom absences is available here.

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Tentative Course Outline:

Week #	Topic
1	Introduction (Lab: Linux/CADENCE setup/tutorial)
1	Basic CMOS Logic Gate Design
2	Transformations: layout/schematic/Boolean expressions
2	CMOS Processing Technology (Lab 1: VHDL)
3	CMOS Processing Technology
3	CMOS Processing Technology
4	MOS Transistors(Lab 2: Schematics and Simulation using SpectreS)
4	MOS Transistors (Lab 3: Layout and Circuit Extraction)
5	MOS Transistors
5	MOS Transistor (Lab 4: Advanced Layout and Simulations)
6	MOS Transistors
6	Technology and Abstractions (Lab 5: Layout and LVS)
7	Midterm Exam (Date subject to change depending on material covered)
7	Exam Review/Performance Estimation (Lab: Project groups and discussion)
8	Performance Estimation (Lab: Project specification/VHDL)
8	Silicon Run I Movie
9	TBD (Lab: Project VHDL/Schematic)
9	CMOS Circuit and Logic Design
10	CMOS Circuit and Logic Design (Lab: Project Schematic/Layout)
10	CMOS Circuit and Logic Design
11	CMOS Circuit and Logic Design (Lab: Project Layout)
11	Advanced Topics
12	Advanced Topics
12	Advanced Topics
13	Advanced Topics (Lab: Project Simulations)
13	Advanced Topics
14	Advanced Topics (Lab: Final project reports, demos and presentations)
14	Final review
Final week	Final exam

(Note: Changes/Additions to this schedule will be posted on my web site http://www.cs.umbc.edu/~cpatel2/)