

EENG 4710 VLSI Design
Fall 2023
Time: (M, W) 11:30 am – 12:50 pm
Meeting Place: NTDP B227

Instructor: Gayatri Mehta
Office: Discovery Park B262
Office Hours: (M, W) 1:00 – 2:00 pm
Office Phone: 940-369-5118
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TA: Danah Omary
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Welcome to UNT!

As members of the UNT community, we have all made a commitment to be part of an institution that respects and values the identities of the students and employees with whom we interact. UNT does not tolerate identity-based discrimination, harassment, and retaliation. UNT's full Non-Discrimination Policy can be found in the UNT Policies section of the syllabus.

Course Description:

This course focuses on the design of digital systems with an emphasis on hands-on chip design. Students will use industry CAD tools to design and simulate the VLSI circuits. The topics covered include MOS transistor, circuit characterization, circuit simulation, combinational and sequential circuits, static and dynamic logic circuits, and memories.

Topics:

- Introduction and Overview of VLSI systems
- CMOS logic and fabrication
- MOS transistor theory
- Circuit characterization and performance estimation
- Circuit simulation
- Logical Effort
- Combinational and sequential circuits
- Power dissipation in CMOS circuits
- Static and dynamic CMOS gates
- Memory system design
- Design methodologies and tools

Course Objectives:

By the end of the course, you will

- Understand the theory and characteristics of MOS transistor
- Understand the CMOS process and technology
- Understand combinational circuits
- Understand sequential circuits
- Understand power dissipation in CMOS circuits
- Understand memory system design

- Develop ability to use commercial CAD tools to design and simulate digital circuits
- Develop technical writing skills
- Develop project presentation skills

Prerequisites:

EENG 2710 and EENG 3510

Textbook(s) and/or required material:

CMOS VLSI Design 4th edition, Neil Weste and David Harris (Required textbook)
Digital Integrated Circuits by Rabaey, Chandrakasan, Nikolic (Reference)

Grading:

- Assignments: 50%
- Project 1: 25%
- Project 2: 25%

Course Evaluation

Student Perceptions of Teaching (SPOT) is the student evaluation system for UNT and allows students the ability to confidentially provide constructive feedback to their instructor and department to improve the quality of student experiences in the course.

Disabilities Accommodation:

The University of North Texas complies with Section 504 of the 1973 Rehabilitation Act and with the Americans with Disabilities Act of 1990. The University of North Texas provides academic adjustments and auxiliary aids to individuals with disabilities, as defined under the law. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please see the instructor and/or contact the Office of Disability Accommodation at 940-565-4323 during the first week of class.

Additional Policies and Procedures

Course material including syllabus, lectures, assignments, and announcements will be posted on Canvas. Assignments will be submitted only on Canvas using submission links provided. If you have any questions or concerns regarding the course, you can reach the instructor at gayatri.mehta@unt.edu. **Please use your UNT email address for all the communication.**

Assignments submitted more than 2 days late will not be graded. Late assignment is penalized at 10% per day. The penalty will be calculated based on the timestamp of the Canvas submission.

24 hours late – 10% penalty

24 – 48 hours late – 20% penalty

No late submissions are allowed for Projects 1 and 2. Projects submitted late will not be graded.

Students are expected to attend class sessions. If you know ahead of time that you will miss a class, contact me via email in advance.

Extra Help: Please do not wait until the last minute. If you are having trouble with this class, please let me know.

Academic Integrity Policy: Academic Integrity Standards and Consequences. According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

ADA Policy: UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the [ODA website \(https://disability.unt.edu/\)](https://disability.unt.edu/).

Emergency Notification & Procedures: UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Canvas for contingency plans for covering course materials.

Technical Assistance

Part of working in the online environment involves dealing with the inconveniences and frustration that can arise when technology breaks down or does not perform as expected. Here at UNT we have a Student Help Desk that you can contact for help with Canvas or other technology issues.

UIT Help Desk: [UIT Student Help Desk site \(http://www.unt.edu/helpdesk/index.htm\)](http://www.unt.edu/helpdesk/index.htm)

Email: helpdesk@unt.edu

Phone: 940-565-2324

In Person: Sage Hall, Room 130

Walk-In Availability: 8am-9pm

Telephone Availability:

- Sunday: noon-midnight
- Monday-Thursday: 8am-midnight
- Friday: 8am-8pm
- Saturday: 9am-5pm

Laptop Checkout: 8am-7pm

For additional support, visit [Canvas Technical Help \(https://community.canvaslms.com/docs/DOC-10554-4212710328\)](https://community.canvaslms.com/docs/DOC-10554-4212710328)

Academic Support Services

- [Academic Resource Center \(https://clear.unt.edu/canvas/student-resources\)](https://clear.unt.edu/canvas/student-resources)
- [Academic Success Center \(https://success.unt.edu/asc\)](https://success.unt.edu/asc)
- [UNT Libraries \(https://library.unt.edu/\)](https://library.unt.edu/)
- [Writing Lab \(http://writingcenter.unt.edu/\)](http://writingcenter.unt.edu/)

Please note that information in this syllabus is subject to change at any time during the semester with changes to be announced in class.