

EENG 2711.00x Digital Logic Design Lab –Syllabus FALL 2023

Electrical Engineering
University of North Texas

Dr. Shengli Fu
Room B276
Email: Shengli.Fu@unt.edu (940-891-6942)

Course Number, Title, Credit Hours: EENG2711.001 Digital Logic Design Lab, 1 Credit Hour

Course Description:

Provides the students an opportunity to design and debug digital circuits using logic gates and flip-flops, SSI, MSI integrated circuits and PLA's. The course also reinforces the concepts they learn in combinational and sequential logic and enhances report writing skills of the students.

Prerequisite(s): This class is restricted to College of Engineering students.

Corequisite(s): EENG 2710 (Digital Logic Design, which must be completed with a grade of C or better).

Textbook(s) and/or required material:

Fundamentals of Logic Design, 7th Enh. Ed., C. H. Roth Jr., L. L. Kinney, and E. B. John, Cengage Learning, Inc., 2021. ISBN: 978-1-337-62035-2.

<https://www.cengage.com/c/fundamentals-of-logic-design-enhanced-edition-7e-roth-jr/9781337620352/>

Additional material, as required, will be provided on Canvas.

There will be both software-based and hardware-based labs. For the software-based labs you will need the following (free) program:

<https://github.com/hneemann/Digital/releases/latest/download/Digital.zip>

It is Java-based and runs under Windows, Mac OS, and Linux. The software is also installed in the lab computers. *You are strongly advised to download the software, install it on your computer or laptop and attempt to do the lab on your own, before coming to the lab.*

For the hardware-based labs, each student will be provided with one set of components for the semester. You are responsible for bringing them to the lab each week. Any lost or broken components will need to be replaced by the student. The provided breadboard, wires, components, and box will be used throughout your time in the UNT EE program. The lab kit will contain everything you need to do the lab on your own home, at your convenience. *You are strongly advised to connect the circuit for the hardware labs and test it before coming to the lab.*

Even if you do the software and hardware labs at home at your leisure (strongly recommended), you are still required to come to the lab at the appointed times and show your work to the instructor.

Missed Labs:

You will be allowed to make up two missed labs, as indicated on the schedule.

Assignments:

Lab submission: Lab reports must be submitted electronically via Canvas. **No hand-delivered report will be accepted.** A Microsoft Word template will be provided on Canvas for every lab. You will complete the template and submit (via Canvas) the completed .docx file or a pdf version of it.

Lab reports must be submitted on the due date before the deadline. Late reports will be accepted but will be penalized as follows:

- 24 hours late: 5% penalty
- 24-48 hours late: 10% penalty

The precise time of submission is determined by Canvas and the appropriate penalty will be automatically deducted by the system. NO EXCEPTIONS. That means that if you are even one second late, the system will mark you as late. Conclusion: submit your work well before the deadline.

Tentatively, there will be 10 labs according to the schedule at the end of the syllabus.

Lab reports	90%
Lab performance and attendance	10%
Total	100%

Grading scale (based on total course points):

90% - 100%	A
80% - 89.99%	B
70% - 79.99%	C
60% - 69.99%	D
00% - 59.99%	F

Grade-related policies:

Turnaround Time

I aim to return graded work to you within one week of the due date. When this is not possible, I will send an announcement to the class.

Grade Disputes

You are required to wait 24 hours before contacting me to dispute a grade. Within that time, I expect that you will review the assignment details and reflect on the quality of the work you turned in. **You should then contact the grader and discuss the issue.** If you are not satisfied with the grader's response and you would still like to meet with me, email me to set up a meeting (I cannot discuss grade disputes over email). **In all email communications you should use your official UNT email account.** You should come to our scheduled meeting with specific examples that demonstrate that you earned a higher grade than you received. If you miss your scheduled meeting, you forfeit your right to a grade dispute. If you do not contact me to schedule a meeting within seven days of receiving your grade, you also forfeit your right to a grade dispute.

Extra Credit

There are no extra credit opportunities in this lab but there are make-up lab sessions as indicated on the schedule.

Academic Dishonesty:

Cheating will not be tolerated. Anyone found guilty of cheating on an assignment will be awarded an F grade for the course. Discussions of the assignments with your classmates is welcome and encouraged, however, sharing of solutions is not. If you need help, you should ask the instructor. Cheating includes, but is not limited to, all forms of plagiarism and misrepresentation. For your rights and responsibilities please refer to <http://www.unt.edu/csrr>

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 Access at 940-565-4323 **during the first week of class**. Information and requests for supporting letters can be obtained from: <https://disability.unt.edu/>

Additional Policies and Procedures:

1. Attendance is mandatory, will be checked during each lab session and is **REQUIRED** to pass the course. For COVID-19 cases, see the statement below.
2. State common law and federal copyright laws protect my lectures. They are my own original expression. Whereas you are authorized to take notes in class thereby creating a derivative work from my lecture, the authorization extends only to making one set of notes for your own personal use and no other use. You are not authorized to record my lectures, to provide your notes to anyone else or to make any commercial use of them without expressed prior permission from me. Synchronous (live) sessions in this course will be recorded for students enrolled in this class section to refer to throughout the semester. Class recordings are the intellectual property of the university or instructor and are reserved for use only by students in this class and only for educational purposes. Students may not post or otherwise share the recordings outside the class, or outside the Canvas Learning Management System, in any form. Failing to follow this restriction is a violation of the UNT Code of Student Conduct and could lead to disciplinary action.
3. This syllabus is subject to change at any time during the semester with changes to be announced in class.
4. An I (incomplete) grade is given only for extenuating circumstances and in accordance with University and Departmental Policies.
5. To comply with FERPA policies, I will communicate via email **but I will only respond to UNT email accounts**.
6. Each student should retain graded lab reports and software-generated files to document errors in recorded grades.
7. Challenges to the final course grade must be presented within 60 days of receipt of grade notices mailed by the university. This will ensure that instructor's records are still available to allow a

review of the assigned grade. You should first discuss your complaint with the instructor. If you wish to carry it further, contact the Program Coordinator by calling (940) 891-6872. To further pursue your complaint, contact the Department Chair, but ONLY after first discussing your concern with the previous two individuals.

8. The Student Perceptions of Teaching (SPOT) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider SPOT to be an important part of your participation in this class.
9. Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT's [Code of Student Conduct](https://deanofstudents.unt.edu/conduct) (<https://deanofstudents.unt.edu/conduct>) to learn more.

COVID-19 Impact on Attendance

While attendance is expected as outlined above, it is important for all of us to be mindful of the health and safety of everyone in our community, especially given concerns about COVID-19. Please contact me if you are unable to attend class because you are ill, or unable to attend class due to a related issue regarding COVID-19. It is important that you communicate with me prior to being absent so I may make a decision about accommodating your request to be excused from class.

If you are experiencing any [symptoms of COVID-19](https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html) (<https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Hotline at 844-366-5892 or COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure. While attendance is an important part of succeeding in this class, your own health, and those of others in the community, is more important.

Tentative Lab Schedule: *(subject to change in case of unforeseen circumstances)*

WEEK	LECTURE TOPIC	LAB
1	Course Introduction – Number Systems and Conversion – Binary Arithmetic	NO LAB
2	Negative Numbers – Binary Codes – Boolean Algebra	1A: Number Systems (recitation)
3	Laws of Boolean Algebra – SOP & POS Forms & Simplification	NO LAB (Labor Day)
4	Minterms/Maxterms & Applications of Boolean Algebra – Truth Tables and Incomplete Functions – Introduction to Karnaugh Maps	1B: Boolean Algebra (recitation)
5	Karnaugh Maps with 4 & 5 Variables – Review for Test 1 Prime Implicants – Quine-McCluskey method	2: Introduction to Logic Simulation (software)
6	Test 1 – Prime Implicants – Quine-McCluskey method	3: K-Maps and the QM method (software)
7	Multi-Level Gate Circuits – NAND and NOR Gates	4: Introduction to Hardware Implementation (hardware)
8	Combinational Circuit Design, Gate Delays, Timing Diagrams, and Hazards	5: NAND/NOR Equivalent Circuits (software)
9	Multiplexers, Buffers, Decoders, Encoders, and ROMs	Makeup lab 1
10	Latches and Flip-Flops – Registers and Counters (1)	6: Hardware Implementation of NAND/NOR (hardware)
11	Registers and Counters (2) – Analysis of Clocked Sequential Circuits	7: Decoders (software)
12	Review for Test 2 – Test 2	8: Multiplexers (software)
13	Derivation of State Graphs and Tables – Reduction of State Table State Assignment (1)	9: D flip-flops, shift registers (software)
Thanksgiving break	No lectures	NO LAB
14	Reduction of State Table State Assignment (2) – Sequential Circuit Design	10: Simple Sequential Circuits (software)
15	Review and/or additional material	Makeup lab 2