

EE 4375/5378 VLSI DESIGN
Fall 2021

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MW 1:30-7:30, Th 4:20-7:30

Important Note: You cannot be in EE5378 if you took EE4375.

Course Time: 4:30 – 5:50 pm MW LART 210

COVID Precautions: I highly encourage you to be both vaccinated and to wear a mask whether you are vaccinated or not. **I am vaccinated**, but I will still be wearing a mask at UTEP based on present conditions. During the summer, for a time, I did not wear a mask because I felt that after I was vaccinated and COVID cases were falling that I was safe enough. But COVID is tenacious, and with new variants, even vaccinated people are getting sick. Via empirical evidence, and some scientific, both the vaccines and masks help a lot. So please wear a mask in class to protect your classmates and professors. Most of your professors are old enough that a COVID infection would be very bad news. Another consideration, particularly for this class, is that I am the only one that can teach this class, and if I get sick, it will be quite hard to finish the class. Like in other areas in ECE, there are no easy substitute professors. So protect me, and the rest of the ECE professors, so that we can teach the full semester.

Office Hours: My office is not setup well to have face-to-face office hours. I will try the following. You can come by my office and call (747-6972) and we can arrange something. If we need to meet, my plan is to exit my office and we can meet in the big open area outside my office or perhaps a conference/class room. I should be available generally in the afternoon from about 1 to 3 M to Th.

Course Description: Introduces VLSI design and computer-aided VLSI design software. Projects are required that involve schematic capture, layout editing, simulation, logic verification, and testing.

Prerequisite: C or better grade in EE 3338

Textbooks: 1) CMOS VLSI DESIGN: A Circuit and Systems Perspective 4th ed.
by Neil Weste and David Harris
2) Other documentation from class.

Course Outcomes:

- 1) Students will understand the properties of and be capable of analyzing circuits containing MOS transistors.
- 2) Students will be able to use CMOS design approaches to create basic logic gates, implement Boolean logic functions and simple logical circuits.
- 3) Students will understand the layout rules and the process used to build MOS circuits on an IC.
- 4) Students will become familiar with and be able to utilize modern VLSI CAD approaches to create and analyze a MOS design.

Course Content: Course is divided into two parts: theoretical and applied portions. The theoretical material will be presented in lectures. This will be separated by projects devoted to practical learning that will allow the student to apply theoretical material.

Absence Policy: Make-up work is in general not possible and effort should be made to attend every lecture or scheduled class. The professor should be informed of any problems with attendance **at least a week prior to any absence** to allow for rescheduling of work for the entire class. In the event that an emergency or sudden sickness occurs, **inform the professor as soon as possible**. In such cases an oral quiz/exam may be administered to make-up a quiz/exam. A physician's note or a similar document may be required prior to such a make-up.

Undergraduate Grading: A 4 to 0 grading scale (as shown below) will be used to grade projects and exams and also to give a final grade in the course.

- 4: concept is understood,**
- 3: concept is mostly understood,**
- 2: concept is halfway understood,**
- 1: concept is mostly not understood, and**
- 0: concept is not understood.**

Scores between two of the above are expected. In general, a performance of 3.5 to 4 is considered an A, 3 to 3.5⁻ a B and so on.

It is anticipated that two exams and four projects will be given. Using the latter as a basis, each exam will be weighted to be worth 4 points, Projects 1 and 3 to be worth 1.3 points each and Projects 2 and 4 to be worth 0.7 points each towards the final grade, for a possible maximum total of 12 points. Thus, total Exam/Quiz scores will be worth 67% of the final grade and the projects as a group will represent the remaining 33%. Final grades are based on scaling the latter total points to a 4 point scale. **Scaling** will essentially mean dividing your total score by the total possible score on the Exams/Quizzes and projects (about 12) and multiplying by 4.

Thresholds between grades may vary somewhat (e.g. the threshold for a C might be lowered to 2.4). Class participation may be taken into account and could have a positive effect on your final grade. **In no case will a student with less than 2.0 overall average receive better than a D.** Any questions concerning an exam/project score must be brought up prior to the class meeting after the exam/project has been scored/returned. Any paper versions of exams/projects/etc. not picked up within a week of the end of the semester will be destroyed. Any questions concerning final grades should be brought up within one week of grades being posted to Goldmine.

Graduate Grading: Grading will follow the general outline set for undergrads above. However, graduate students can expect some differences in assignments and exams. These differences can include different problems and projects. In general, graduate students should also expect strict grade boundaries with no threshold shifts and no curves.

Copyright statement for course materials: All materials used in this course (including but not limited to recordings, assignments, handouts, quizzes, exams) are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. You may not further disseminate (i.e., share, send or post) any class materials/resources outside of this course. Doing so may result in disciplinary action.

Academic Dishonesty: “Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the *Handbook of Operating Procedures*, and available in the Office of the Dean of Students and the homepage of the Dean of Students at www.utep.edu, may result in sanctions ranging from disciplinary probation, to a failing grade in the work in question, to a failing grade in the course, to suspension or dismissal, among others.” (Quote from the Undergraduate and Graduate Catalog)

Accommodation under the ADA: For disability accommodation, contact the Center for Accommodations and Support Services at 747-5148, go to room 106E in the Union, or e-mail cass@utep.edu.

Exam Etiquette

Unless an exception has been approved by the instructor in advance, the following will be enforced during exams:

- 1) No caps, hats, or similar can be worn during exams.
- 2) Ears must be visible. Generally, no device can be plugged into or on your ears.
- 3) Only standard, basic prescription eyeglasses can be worn. No sunglasses.
- 4) Only T-shirts and other standard, simple shirts/blouses, and jeans and other simple pants or shorts are allowed. No cargo pants/shorts. No coats, hoodies, or similar can be worn during exams. No heavy clothing layering is permitted, but a simple cardigan-type sweater may be worn with approval.
- 5) No book bag is permitted at the desk during exam.
- 6) All exams are closed book and closed notes.
- 7) No watches, calculators, cell phones, tablets, laptops or other electronics allowed at desk during exam. Only pencils and an eraser are allowed. Pencils must be standard, hand-sharpened types (Bring several to exam.). Only small erasers (3" x 1" maximum size) are allowed. No pens or mechanical pencils.
- 8) Medical equipment may be allowed with instructor permission.
- 9) Water bottles and other drinks are not allowed without instructor permission.
- 10) No bathroom breaks during exam. Go to the bathroom before test. If you leave the room during test, you must turn-in your exam. You cannot return to continue the test.