

University of Texas at El Paso
EE 2369: Digital Systems Design I
Fall 2018

CRN: 16362

Class time: TR 3:00PM-4:20PM

Classroom: BUSN 319

Instructor Professor Miroslava Barúa

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Office Hours M 9:00AM –11:00AM, T 4:30PM-5:30PM or by appt.

Required Course Materials

1. Electronic Textbook from [zyBooks](#) → [Digital Systems Design I](#)
 - a. Sign up at [learn.zybooks.com](#) using your **miners** e-mail account
 - b. Enter zyBook **code** (*Code provided in class, instructions on Blackboard too*)
 - c. Choose corresponding course section
 - d. Click *Subscribe*
2. Use of **@miners** e-mail account, **Blackboard** and **iClicker** account for class resources, announcements and submitting certain assignments.

Course Description: In Digital Systems Design I you will learn about design and synthesis of digital systems using both combinational and sequential circuits

Prerequisite: EE 1305 or CS 1401 with a grade of "C" or better.

Co-requisite: EE 2169 (Lab for EE 2369). Hardware projects and software simulation projects are performed in this lab associated with our class. Student is responsible for completing the labs, and meeting with the Teaching Assistant at the formally scheduled time assigned to the section in which the student registered. Please note that the lab is 1 credit hour, and the grade for that lab is calculated separately from the grade in this class.

Students successfully completing EE 2369 will be able to:

1. Apply concepts of number systems to perform binary arithmetic and conversions
- 2. Analyze & synthesize digital circuits, both combinational & sequential**
3. Design combinational circuits, such as binary adders, code converters, etc., by using logic gates
4. Design sequential circuits, such as counters, registers, etc., by using flip-flops and other hardware
5. Design, simulate or implement, and test digital circuits both hands-on (using physical devices) and with CAD tools
- 6. Solve engineering problems with the Algorithmic State Machines (ASM) technique**
- 7. Design, simulate, and test digital circuitry using Verilog Hardware Description Language**
8. Design, implement, and test digital circuitry by prototyping designs using the selected development system

Grading & Course Assignments

There will be no curving of grades in this course.

Grading will be based on the standard scale:

90% >.....**A**

80% -89%.....**B**

70% -79%.....**C**

60% -69%.....**D**

Below 59%.....**F**

Course Assignment Distribution	
Exam 1	25%
Exam 2	25%
Final Exam	25%
Homework & Quizzes	20%
Instructor Assessment	5%

Exams: Each exam (1, 2 and final) will assess your knowledge of the digital systems design techniques studied during each period of the course. **All exams are closed book/closed notes and no calculators or other electronic devices are allowed.** I expect you to use your own class notes, problems and challenge activities from textbook, quizzes and handouts as your study guide. **No make-up exams will be given.** If there is an extenuating circumstance that can cause a student to miss one examination and the circumstance warrants an excused absence (by providing a medical excuse signed by physician or signed letter from boss on a company's letterhead), a COMPREHENSIVE make-up exam will be given at the end of the semester to replace that missed exam. The student will take both the final exam (exam #3) and the comprehensive exam on Thursday December 13, 2018.

Homework: A significant portion of your content mastery depends on completion of homework assignments. Homework assignments will include reading the textbook prior to class (complete participation and challenge activities), individual or group problem sets. You must submit your homework at the beginning of the class by the due date. Late homework will only be accepted in the case of illness or an emergency; you are responsible for notifying me as soon as possible (**before class**) of the situation (illness or emergency) necessitating late submission of homework. Good homework presentation, including neatness and legibility, are **expected and required.**

Quizzes: Random quizzes will be given to assess your basic understanding of the class topics or completion of reading assignments. Quizzes will provide you with feedback. Quizzes may be given at the beginning of the class or at any point during the session. No make-up quiz will be given if you are late or absent for any reason. **All quizzes are closed book/closed notes and no calculators or other electronic devices are allowed**

Extra credit: Extra credit may be assigned to the ENTIRE CLASS ONLY. No individual can request to present work for extra credit.

Learning Environment

Prepare in advance: In order to be successful, each student must come to class prepared to participate. This means that you must complete reading assignments, homework, and other assignments **BEFORE** you arrive to the classroom. Coming to class late is unprofessional and is very disruptive to the class. If you are late to class, you are to come in quietly and take your seat but **DO NOT** attempt to turn in assignments.

Classroom Etiquette/ Student Conduct:

You must be courteous, respectful and professional in the way you address others; either in person or in writing. **All submitted work must have Student's Name, Class Name & Section and Due date.**

E-mail Communication:

For all your class related e-mails use the prefix "**EE2369 TR Class:**" followed by the rest of the message's subject description (Example: "**EE2369 TR Class:** Question about homework"). Send all messages from your Miners account.

Course & University Policies

Mandatory Attendance: Attendance is the key to your academic success. If you miss a class session, you are responsible for obtaining notes, handouts, and assignments and for meeting the same deadlines as the rest of the class. If you have an excessive amount of absences from class I will ask you to meet with me to discuss your progress in the class, and you may be dropped from the course. The grade that you receive will be a W until **Nov 2, 2018, course drop deadline. After this date**, the grade **you receive will be an F**, and only under exceptional circumstances a W.

Electronic Devices: Use professional discretion with electronic devices by shutting them off, or setting them to mute before coming to class. **Do not use text messaging or web browser features while in class.**

Center for Accommodations and Support Services (CASS):

Students requiring unique accommodations must contact the CASS office and provide their instructor with the proper documentation at the beginning of the semester. CASS office may be contacted at 747-5148, cass@utep.edu or go to Room 106 Union East Building

Scholastic Integrity/Academic Honesty:

Any form of academic dishonesty will not be tolerated. "Plagiarism" is the unattributed use of someone else's work -- a classmate's, a website's, even a teacher's from another course. In accordance with University regulations, scholastic dishonesty on a given assignment **will** be subject to disciplinary action and **will** be referred to the Dean of Students. Dishonesty/cheating/plagiarizing may result in a zero on the assignment, an "F" in the course, or even suspension from the university. If you need assistance with your assignments, please consult authorized sources of help. For more information on Scholastic Dishonesty and/or Plagiarism, consult the [Handbook of Operating Procedures: Student Affairs](#), which is available in the Office of Student Life.

Tips for Success in this class:

1. Come to class, take good notes and keep everything organized.
2. Read and study e-book, hand-outs, and complete reading assignments **before** class.
3. Visit instructor during office hours if you need assistance, or use e-mail to set up an appointment
4. Finish your assignments early.
5. Don't cram for examinations; start your success by not falling behind!

Important Dates:

Fall 2018

Classes begin	Aug 27	Last day of classes	Dec 6
Labor Day – No classes	Sept 3	Dead Day	Dec 7
Course Drop deadline	Nov 2	Our Final Exam	Thursday, December 13th 4:00pm-6:45pm
Thanksgiving (no classes)	Nov 22-23		

Course Schedule:

This schedule is subject to changes at the discretion of the instructor to adapt to the needs of the class.

This is a TENTATIVE Course Schedule			
----- Instructor has the right to make announced necessary changes ----->			
Important Dates to remember:	Week #		<u>TENTATIVE</u> <u>EXAM DATE</u>
<i>Classes Begin - August 27</i>	1	Syllabus, Digital System Design overview, Number systems, Two's complement, arithmetic operations	
<i>Labor day - University closed Sept 3rd</i>	2	Basic Boolean operators, logic gates, logic diagrams, design of circuits	
<i>Census day - Sept 12</i>	3	Boolean algebra, equations, properties. Introduction to Verilog	
	4	Canonical and reduced equations, timing diagrams, design of combinational circuits	
	5	Sum-of-products, Product-of-sums, truth table, introduction to reduction methods	
	6	K-maps, don't cares, minimal cover // <i>Review for EXAM #1</i>	EXAM 1
	7	Quine-McCluskey, DeMorgan's law, XOR, XNOR, NAND, NOR, Universal gates	
	8	Adders, Signed numbers, subtractors, comparators	
	9	Multiplexer, decoders.	
<i>Course drop deadline -Nov 2nd</i>	10	Introduction to sequential circuits, latches, flip-flops. // Review for EXAM #2	EXAM 2
	11	Registers, Load registers, Multi-function registers, counters	
	12	Finite State Machines, reduction of states, Moore & Mealy machines	
<i>Thanksgiving - No classes Nov 22 & 23</i>	13	Introduction to Algorithmic State Machines, design considerations, design examples	
	14	ASM with MSI and LSI devices	
<i>Dead day- Dec 7th</i>	15	Other design considerations, complex design examples.	
FINAL EXAM	16		FINAL EXAM