CSE 2441 DIGITAL LOGIC DESIGN  
Fall 2020

Instructor Information

Instructor(s)
Bill Carroll, PhD, PE, Professor of Computer Science and Engineering; Chair, UTA Faculty Senate

Office Number
ERB 521

Office Telephone Number
817-272-3785 (CSE Department)

Email Address
carroll@uta.edu. This email is your primary means for contacting me. I respond promptly but not 24x7.

Faculty Profile
https://www.uta.edu/profiles/bill-carroll

Office Hours
MTuWTh 4:00 to 6:00 PM, or by appointment, or chance. During COVID-19, office hours will be held on MS Teams. I’ll send you an invitation, so you can join anytime during these hours. Additional help sessions will be scheduled as needed.

Lab TA/Grader
Nathan Fusselman
nathan.fusselman@mavs.uta.edu
Office hours: MW 12:00 to 1:00 PM, TuTh 3:30 to 4:30 PM, ERB 127

Course Information

Section Information
CSE 2441-001 (lecture) TuTh 11:00 AM to 12:20 PM on MS Teams  
CSE 2441-002 (lab)  F 9:00 AM to 12:00 PM on MS Teams and in ERB 126-127  
CSE 2441-003 (lab)  F 2:00 to 5:00 PM on MS Teams and in ERB 126-127  

Time and Place of Class Meetings
Lecture:  TuTh 11:00 AM to 12:20 PM on MS Teams. Lectures will be delivered synchronously online and you are expected to attend. Attendance will be taken and quizzes will be given on a regular basis. Exams will be given on-campus face-to-face. This is Hybrid 1 modality.
Labs:  F 9:00 AM to 12:00 PM, 2:00 to 5:00 PM, online on MS Teams and face-to-face in ERB 126-127. This is Hybrid 4 modality.

Description of Course Content
CSE 2441 Digital Logic Design -- Analysis, design and testing of combinational and sequential logic circuits. Topics include Boolean algebra, logic circuit minimization techniques, synchronous sequential circuit design, algorithmic state machine design, design of arithmetic/logic and control units, and Verilog programming of FPGA devices. Prerequisite: CSE 1320 and CSE 2315.

COURSE OBJECTIVES
COURSE OBJECTIVES -- You will learn the basic concepts, methods, and technologies needed to analyze, specify, design, build, and test combinational and synchronous sequential logic circuits with standard integrated circuits and programmable logic devices.
Student Learning Outcomes
By the end of the course, you will have demonstrated an ability to
1. Apply knowledge of basic discrete mathematics and computer engineering principles.
2. Design small digital systems that meet a specified need within realistic constraints.
3. Use modern industry standard design tools.

Required Textbooks and Other Course Materials

Descriptions of major assignments and examinations
There will be two face-to-face, on campus examinations (October 6 and November 24), weekly quizzes, weekly lab assignments, ten homework assignments, and a term project that will be due at the end of the semester. Examinations will be closed book and closed notes.

Technology Requirements
MS Teams, Canvas, and Respondus Lockdown Browser will be used in the course. You will also need a laptop computer capable of running Windows applications including MS Word, Excel, and Intel Quartus II Version 13.0sp1 (64-bit) CAD software. You will need a webcam and access to a printer and scanner.

Handouts and Course Materials
All assignments, handouts, and course materials will be posted on Canvas, https://uta.instructure.com/.

Grading Information

Grading
A: 100-90, B: 89-80, C: 79-70, D: 69-60, F: 59-0 with points computed as follows.

\[ 0.20 \times \text{Exam 1} + 0.20 \times \text{Exam 2} + 0.20 \times \text{Quizzes} + 0.20 \times \text{Lab} + 0.10 \times \text{Design Project} + 0.10 \times \text{Home Work} \]

Students not completing one or more of these requirements may receive an Incomplete (I) or F in the course. Students not completing all labs and the term project will receive a D or an F in the course. Late homework will not be accepted and cannot be made up. Late labs will be penalized 20 points per day late.

Make-up Exams
Make up of missed examinations and laboratory assignments will be handled case-by-case and, generally, be approved only if sufficient justification can be made and documented. Requests for make-up must be made to the instructor within one week of the missed work’s due date.

Expectations for Out-of-Class Study
Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 12 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing exams, etc.

Grade Grievances
Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. For undergraduate courses, see Undergraduate Grading Policies; for graduate courses, see Graduate Grading Policies. For student complaints, see Student Complaints.

Course Schedule
8/27: Course overview, digital systems, basic gates: AND, OR, NOT, NAND, NOR, XOR, basic adders. Lab 0 preview.
9/1: Combinational circuits; truth tables, functions, logic equations; number systems. Lab 1 preview.
9/3: Signed-number representation, two's complement number systems and arithmetic. Digital codes.
9/10: Minimization of logic equations and combinational circuits. Minimal forms.
9/15: Karnaugh maps. Incompletely specified functions. Lab 3 preview.
9/17: Combinational logic circuit design and analysis. Timing diagrams.
9/24: Multi-Level Circuits.
9/29: Higher-level combinational logic. Lab 5 preview.
10/1: Catch up, design examples, and review. Lab 6 preview.
10/6: Examination 1.
10/8: Verilog modeling and programming.
10/20: Synchronous circuit design. Lab 8 preview.
10/22: Design examples -- controllers.
10/27: Sequence recognizers. Lab 9 preview.
11/3: Timers and clocks. Lab 10 preview.
11/5: Multipliers and dividers.
11/10: Programmable logic. FPGAs. Cyclone II. Lab 11 preview.
11/19: Catch up, design examples, and review.
11/24: Examination 2.
12/1: Term project.
12/3: Term project.
12/8: Term project.

Institution Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Additional Information

Mandatory Face Covering Policy
All students and instructional staff are required to wear facial coverings while they are on campus, inside buildings and classrooms. Students that fail to comply with the facial covering requirement will be asked to leave the class session. If students need masks, they may obtain them at the Central Library, the E.H. Hereford University Center’s front desk or in their department. Students who refuse to wear a facial covering in class will be asked to leave the session by the instructor, and, if the student refuses to leave, they may be reported to UTA’s Office of Student Conduct.

Academic Integrity
Students enrolled in UT Arlington courses are expected to adhere to the UT Arlington Honor Code.

I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.
UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents’ Rule 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

Attendance
At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students’ academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I expect you to attend class and attendance will be checked on a regular basis. Those with excessive absences from the lecture and/or laboratory may have their final grade reduced appropriately. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients “begin attendance in a course.” UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

The lecture section of this course will be taught in Hybrid 1 modality meaning that lectures will be taught synchronously online and examinations will be given face-to-face on campus. You are expected to attend the lectures. The laboratory sections will be taught in Hybrid 4 modality which means that some lab assignments will be conducted remotely and others will require face-to-face on-campus demonstration of some work.

Cell Phones and Wireless devices
Please refrain from using cell phones during class times. All electronic devices must be powered off during examinations. Use of tablets or laptops for viewing class materials is permitted.

Lab Safety Training
Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities. Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., Fall through Summer II) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

Emergency Exit Procedures
Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit, which is located straight ahead as you exit ERB 126 and 127. Please refer to evacuation route maps in each room for more details. When exiting the building during an emergency, do not take an elevator but use the stairwells instead. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Success Programs
UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring by appointment, drop-in tutoring, etutoring, supplemental instruction, mentoring (time management, study skills, etc.), success coaching, TRIO Student Support Services, and student success workshops. For additional information, please email resources@uta.edu, or view the Maverick Resources website.

The IDEAS Center (https://www.uta.edu/ideas/) (2nd Floor of Central Library) offers FREE tutoring and mentoring to all students with a focus on transfer students, sophomores, veterans and others undergoing
a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

**The English Writing Center (411LIBR)**

The Writing Center offers FREE tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at the Writing Center (https://uta.mywconline.com). Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see Writing Center: OWL for detailed information on all our programs and services.

The Library’s 2nd floor Academic Plaza (http://library.uta.edu/academic-plaza) offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library’s hours of operation.

**Emergency Phone Numbers**

In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381