Objective: to understand the basic concepts for the design and analysis of digital logic circuits.

Prerequisite: Sophomore standing recommended.


Topics

Week 1: logic variables and functions
Week 2: truth table, AND, OR, NOT gates
Weeks 3: Boolean algebra
Weeks 4-5: Karnaugh map, SOP and POS minimization
Weeks 6-7: NAND and NOR gates, multilevel circuits analysis and synthesis
Weeks 8: Positional number representation, conversion among decimal, binary, and hex numbers
Week 9: signed and unsigned integer number arithmetic, carry and overflow
Weeks 10-11: Combinational circuits: multiplexers, decoders, encoders, code converters, arithmetic circuits
Weeks 12-13: flip-flops, registers and counters
Weeks 14-16: synchronous sequential circuits

Grading:

   Homework 10%, Attendance and In-class Performance 15%, Midterm Exam 35%, Final Exam 40%

   1. Coursework will be graded on both final results/conclusions and their derivation processes.
   2. If copying is found among students’ turned-in coursework, all involved parties will get zero credit.
   3. Any re-grading request must be submitted within one week.
Assignment:
1. Late submission will not be accepted except arranged in advance.
2. Homework is due right before class Thursday the next week following the assignment, if not notified otherwise.
3. Homework should be handwritten, and presented in a clear, readable form. For clarity of presentation, the homework should be written on only one side and on a standard size paper. The homework pages must be stapled in the upper left-hand corner.
4. No make-up for any missed exam or homework will be permitted unless arranged in advance.

Attendance and In-Class Performance:

Attendance is required. A student is counted as being present for a class if the student is present during the whole class time. A student cannot use personal electronic devices, talk, or do anything that introduces interference in a class.

Email communication:

Students must use their official UTRGV email accounts for any correspondence with the instructor. Otherwise, the email may not be replied.

ELEE Program Outcomes:

2. is able to design and conduct experiments and interpret the results.
3. is able to design electrical devices, systems or processes that meet given specifications.
8 is able to use state of the art computational hardware and software for analysis, design and documentation (techniques, skills, and modern engineering tools necessary for engineering practice).
(B2) familiarity with the analysis and synthesis of combinational and sequential logic circuits, at both the gate level and functional block level;
(B5) an understanding of the practical limitations of digital and analog circuits, familiarity with laboratory measurement techniques, and the ability to experimentally demonstrate digital and analog circuit performance.
(D1) familiarity with digital design tools, including an ability to analyze and synthesize digital circuits using hardware description languages;

CMPE Program Outcomes:
(B) an understanding of the principles of computer programming, software engineering, algorithms, data structures, computer organization and architecture, operating systems, and computer networking;
(C) an understanding of the principles of microprocessor systems, digital electronics, electrical circuits, electronics, and embedded systems, and an understanding of the applications of computer engineering principles;
(D) an ability to use analysis and design tools to produce integrated systems containing hardware and software;

**UTRGV POLICIES**

**STUDENTS WITH DISABILITIES:**
Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive academic accommodations should contact Student Accessibility Services (SAS) as soon as possible to schedule an appointment to initiate services. Accommodations can be arranged through SAS at any time, but are not retroactive. Students who suffer a broken bone, severe injury or undergo surgery during the semester are eligible for temporary services.

**Pregnancy, Pregnancy-related, and Parenting Accommodations**
Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Accessibility Services for additional information and to request accommodations.

**Student Accessibility Services:**
**Brownsville Campus:** Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at ability@utrgv.edu.
**Edinburg Campus:** Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at ability@utrgv.edu.

**Mandatory Course Evaluation Period:**
Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available on or about:

- **Module 1**  October 4 – 10
- **Module 2**  November 29 – December 5
- **Full Fall Semester**  November 15 – December 5

**Attendance:**
Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for
observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

**SCHOLASTIC INTEGRITY:**
As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism (including self-plagiarism), and collusion; 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. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

**SEXUAL HARASSMENT, DISCRIMINATION, and VIOLENCE:**
In accordance with UT System regulations, your instructor is a “Responsible Employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at [www.utrgv.edu/equity](http://www.utrgv.edu/equity), including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect that is free from sexual misconduct and discrimination.

**COURSE DROPS:**
According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

**STUDENT SERVICES:**
Students who demonstrate financial need have a variety of options when it comes to paying for college costs, such as scholarships, grants, loans and work-study. Students should visit the Students Services Center (U Central) for additional information. U Central is located in BMAIN 1.100 (Brownsville) or ESSBL 1.145 (Edinburg) or can be reached by email (ucentral@utrgv.edu) or telephone: (888) 882-4026. In addition to financial aid, U Central can assist students with registration and admissions.

Students seeking academic help in their studies can use university resources in addition to an instructor's office hours. University Resources include the Learning Center, Writing Center, Advising Center and Career Center. The centers provide services such as tutoring.
writing help, critical thinking, study skills, degree planning, and student employment. Locations are:

- Learning center: BSTUN 2.10 (Brownsville) or ELCTR 100 (Edinburg)
- Writing center: BLIBR 3.206 (Brownsville) or ESTAC 3.119 (Edinburg)
- Advising center: BMAIN 1.400 (Brownsville) or ESWKH 101 (Edinburg)
- Career center: BCRTZ 129 (Brownsville) or ESSBL 2.101 (Edinburg)