EE307E: Elements of Electrical and Computer Engineering

Fall 2019

Course:

EE 307E; Unique # 15940

Lecture:

MW 10:30 am – 12:00 pm in BUR 228

Recitation Session:

F 10:00am – 11:00am in EER 1.512

Instructor:

Dr. Nina K. Telang
Office Hours in EER 4.808 (starting 9/3/19): There will be some days when office hours will be cancelled. Make-up hours will be announced in class.
T 11:30-1:30pm
W 1-3pm
TH 11:30-1:30pm

Email: telang@ece.utexas.edu

Teaching Assistants and undergrad assistants:

Will be announced on Canvas.

Objective:

The purpose of this course is to introduce the student to the elements of Electrical and Computer Engineering. The course will give an overview of the fundamentals of electric circuits and computer programming through hands-on circuit building exercises and programming (using the Raspberry Pi microcontroller).

In general, this course will expose the student to

- The Engineering Profession
- Electrical and Computer Engineering, and the different technical areas within ECE
- Enhancing success in engineering study
- Basic circuit theory and circuit analysis techniques
- Breadboard circuit building using basic components such as resistors, LEDs, and switches
- Measurement of electrical quantities such as voltage and current.
- Basic computing concepts: number systems (binary, hexadecimal)
- Fundamentals of digital circuits: Gates, combinational circuits, sequential circuits, memory
- Fundamentals of programming the Raspberry Pi using Python

Text:

1. **Sign in or create an account at learn.zybooks.com**
2. **Enter zyBook code**

   UTEXASEE307ETelangFall2019

3. **Subscribe**

A subscription is $0. Students may begin subscribing on Aug 14, 2019 and the cutoff to subscribe is Dec 07, 2019. Subscriptions will last until Jan 05, 2020.

Reference materials:
Several handouts will be provided that cover all the above course content.

Prerequisites:
Students enrolled in EE307E are expected to be proficient in elementary algebra.

Homework:

Homework problems will be assigned almost every week. You are encouraged to form study groups and discuss homework problems and other related problems. I understand that much of your comprehension of course material will occur during your study time with peers. **However, your final homework solution must be an individual effort.** These need to be submitted on Canvas by the due date and time.

Portfolio Project:

This project includes five writing assignments that focus on the topic of enhancing your success in engineering study. These need to be submitted on Canvas by the due date and time.

Classwork:

We will have several in-class group activities and quizzes. Circuit building and programming will also be part of in-class activities. **Attendance is mandatory.**

Labs:

Students are expected to attend their 1 hour lab session each week. Hands-on circuit building exercises, hardware/software interfacing and microcontroller programming using the Raspberry Pi computer is an important component of these sessions. The labs are intended to build on each other, introducing a new programming concept each week. These lab sessions begin with a short lecture focusing on computer programming and the essentials of Python, chosen for its naturalistic syntax and general ease of use. Students learn fundamental breadboard circuit building using components such as resistors, LEDs, switches which are all connected to ports on the Raspberry Pi. The target programs focus on producing tangible results from user input in the form of lights on a breadboard or console output. The goals of a few labs are listed below.

- Provide power to an LED.
- Take input from the command line to make an LED blink a specified number of times.
- Implement a 2-digit binary display using command line input and LED output.
- Implement a 2:4 decoder using push button input and LED output.
- Implement a calculator using push button and command line input and LED output.

Students will need to submit an individual lab report for each lab. Clear instructions will be given on deliverables.

Late submission policy:

A 30 minute grace period is given to each assignment. This means that if the submission is made by 9:30 pm (rather than the due time of 9:00pm) it will not be marked late. Assignments that are from 31 minutes to 2 hours late will be given a 10% penalty, from 2 hours to 12 hours late will be given a 50% penalty, after which no credit will be given. Please **do not** approach the TA or instructor requesting exceptions to this policy **unless there is a medical or family emergency!**

Grading:

Homework	10 %
Quizzes/classwork	10 %
Labs	15 %
Exams (2)	15 % each
Final	25 %
Studying Engineering Project	10 %

Course Outline (Exam dates are tentative):

Week	Topic
1	Introduction to the course.
2	Introduction to Electric Circuits How to be a successful student in ECE
3	Fundamentals of Electric Circuits: DC Circuit analysis: Fundamental laws such as KCL, KVL, Ohm's law
4	DC circuit Analysis
5	Building circuits using resistors, LEDs and switches. Measurement of electrical quantities such as current and voltage.

6	Review; **Exam 1 (10/2/19)**
7	Basic Computing concepts Number systems: Decimal, Binary, Hexadecimal
8	Building blocks of digital circuits Gates, Combinational Logic circuits
9	Storage Elements, Memory; Finite State machines
10	Basics of programming; Programming in Python
11	Review; **Exam 2 (11/6/19)**
12	Raspberry Pi Microcontroller
13	Microcontroller programming using the Raspberry Pi
14	Microcontroller programming using the Raspberry Pi
15	Course review
	FINAL EXAMINATION: Monday, 12/16, 2-5pm (this is a tentative date; the date and time will be finalized towards the end of the semester)

Policies

Classroom Policies

Statement on Learning Success

Your success in this class is important to me. We will all need accommodations because we all learn differently. If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course. I also encourage you to reach out to the student resources available through UT. Many are listed on this syllabus, but I am happy to connect you with a person or Center if you would like.

Grading Policies:

Grade	Cutoff
A A-	93.3% 90%
B+ B B-	86.7% 83.3% 80%
C+ C C-	76.7% 73.3% 70%
D	65%
F	<65%

Student Rights & Responsibilities

- You have a right to a learning environment that supports mental and physical wellness.
- You have a right to respect.
- You have a right to be assessed and graded fairly.
- You have a right to freedom of opinion and expression.
- You have a right to privacy and confidentiality.
- You have a right to meaningful and equal participation, to self-organize groups to improve your learning environment.
- You have a right to learn in an environment that is welcoming to all people. No student shall be isolated, excluded or diminished in any way.

With these rights come responsibilities:

- You are responsible for taking care of yourself, managing your time, and communicating with the teaching team and with others if things start to feel out of control or overwhelming.
- You are responsible for acting in a way that is worthy of respect and always respectful of others.
- Your experience with this course is directly related to the quality of the energy that you bring to it, and your energy shapes the quality of your peers' experiences.
- You are responsible for creating an inclusive environment and for speaking up when someone is excluded.
- You are responsible for holding yourself accountable to these standards, holding each other to these standards, and holding the teaching team accountable as well.

Personal Pronoun Preference

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by a name different than what appears on the roster, and by the gender pronouns you use. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.

University Policies

Academic Integrity

Each student in the course is expected to abide by the University of Texas Honor Code: "As a student of The University of Texas at Austin, I shall abide by the core values of the University and uphold academic integrity." **Plagiarism is taken very seriously at UT.** Therefore, if you use words or ideas that are not your own (or that you have used in previous class), you must cite your sources. Otherwise you will be guilty of plagiarism and subject to academic disciplinary action, including failure of the course. You are responsible for understanding UT's Academic Honesty and the University Honor Code which can be found at the following web address: http://deanofstudents.utexas.edu/sjs/acint_student.php

Q Drop Policy

If you want to drop a class after the 12th class day, you'll need to execute a Q drop before the Q-drop deadline, which typically occurs near the middle of the semester. Under Texas law, you are only allowed six Q drops while you are in college at any public Texas institution. For more information, see: http://www.utexas.edu/ugs/csacc/academic/adddrop/qdrop

University Resources for Students

Your success in this class is important to me. We will all need accommodations because we all learn differently. If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course. There are also a range of resources on campus:

Services for Students with Disabilities

This class respects and welcomes students of all backgrounds, identities, and abilities. If there are circumstances that make our learning environment and activities difficult, if you have medical information that you need to share with me, or if you need specific arrangements in case the building needs to be evacuated, please let me know. I am committed to creating an effective learning environment for all students, but I can only do so if you discuss your needs with me as early as possible. I promise to maintain the confidentiality of these discussions. If appropriate, also contact Services for Students with Disabilities, 512-471-6259 (voice) or 1-866-329- 3986 (video phone). http://ddce.utexas.edu/disability/about/

Counseling and Mental Health Center

Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.

All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful.

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. http://www.cmhc.utexas.edu/individualcounseling.html

The Sanger Learning Center

Did you know that more than one-third of UT undergraduate students use the Sanger Learning Center each year to improve their academic performance? All students are welcome to take advantage of Sanger Center's classes and workshops, private learning specialist appointments, peer academic coaching, and tutoring for more than 70 courses in 15 different subject areas. For more information, please visit http://www.utexas.edu/ugs/slc or call 512-471-3614 (JES A332).

Undergraduate Writing Center: http://uwc.utexas.edu/
Libraries: http://www.lib.utexas.edu/
ITS: http://www.utexas.edu/its/
Student Emergency Services: http://deanofstudents.utexas.edu/emergency/

Important Safety Information:

If you have concerns about the safety or behavior of fellow students, TAs or Professors, call BCAL (the Behavior Concerns Advice Line): 512-232-5050. Your call can be anonymous. If something doesn't feel right – it probably isn't. Trust your instincts and share your concerns.

Title IX Reporting

Title IX is a federal law that protects against sex and gender-based discrimination, sexual harassment, sexual assault, sexual misconduct, dating/domestic violence and stalking at federally funded educational institutions. UT Austin is committed to fostering a learning and working environment free from discrimination in all its forms. When sexual misconduct occurs in our community, the university can:

1. Intervene to prevent harmful behavior from continuing or escalating.
2. Provide support and remedies to students and employees who have experienced harm or have become involved in a Title IX investigation.
3. Investigate and discipline violations of the university's relevant policies.

Faculty members and certain staff members are considered "Responsible Employees" or "Mandatory Reporters," which means that they are required to report violations of Title IX to the Title IX Coordinator. **I am a Responsible Employee and must report any Title IX related incidents** that are disclosed in writing, discussion, or one-on-one. Before talking with me, or with any faculty or staff member about a Title IX related incident, be sure to ask whether they are a responsible employee. If you want to speak with someone for support or remedies without making an official report to the university, email advocate@austin.utexas.edu For more information about reporting options and resources, visit titleix.utexas.edu or contact the Title IX Office at titleix@austin.utexas.edu.

The following recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, http://www.utexas.edu/safety/

Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.

- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors. Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
- Link to information regarding emergency evacuation routes and emergency procedures can be found at:
  www.utexas.edu/emergency