Department of Electrical and Computer Engineering
The University of Texas at Austin

EE 306, Introduction to Computing
The FIRST Computing Course for EE and CE Majors
Unique Numbers: 18270, 18280, 18290, 18295, 18305, 18310
Course Descriptor
August 25, 2025
Instructor: Yale Patt
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Important introductory information about EE 306 is also contained in a handout titled: Additional introductory comments about EE 306. Please be sure to read it. It expands on a number of items in this Course Descriptor. Also, make sure you read the handout titled: Course Outline (aka, Syllabus). It contains a lecture by lecture schedule of topics for the entire semester, the major emphasis of each discussion session, the due dates of problem sets and programming assignments, and the dates of all examinations.

Course Overview: This is the first course in computing for students of computer engineering and electrical engineering. The objective is to provide a strong foundation that a serious student can build on in later courses across the spectrum of computer science and engineering. The idea is that a more complete understanding of the fundamentals early in your education will help you acquire a deeper understanding of more advanced topics later, whether that topic is in computer architecture, operating systems, data base, networks, algorithm design, software engineering, or whatever. I call my approach "motivated" bottom-up. That is, after providing some overview of why a new concept is important (motivation), we attempt to tie that new concept to what you already understand. Starting with the transistor as a switch (much like wall switches you have been using all your life to turn on/off lights), we build logic gates, then more complex logic structures, then gated latches, culminating in an implementation of memory and a finite state machine. From there, we study the computer's instruction cycle, and then a particular computer, the LC-3 (for Little Computer 3). Why "3"? ...because I got it wrong the first couple of times! The LC-3 captures the important structures of a modern computer, while keeping it simple enough to allow complete understanding. The first programming assignment is in the machine language of the LC-3. From there, we will move up to Assembly Language, and learn how an assembler works. The remaining programming assignments are in LC-3 Assembly Language. We cover good programming style and practice, and teach debugging from the gitgo.

An LC-3 Simulator allows you to debug your own programs. Input (via the keyboard) and output (via the monitor) both use physical device registers. System service routines, written in LC-3 Assembly Language are used to perform Input and Output functions. They are invoked by user programs by the TRAP instruction and corresponding trap vector. Return to the calling program is handled by the Return from Trap or Interrupt instruction. Subroutine calls and returns complete the LC-3 instruction set.

Course Description: The course will cover the material of Chapters 1 through 10 of the textbook. See the Course Outline (aka Syllabus), available on the class web site.

Meeting info: The course consists of three hours of lecture + a one hour discussion section each week. Lectures will be in ECE 1.518. Discussion sections are scheduled at various times of the day on Fridays. The Course website lists the meeting times and room numbers for each of the 6 discussion sections. Each discussion section has its own unique id. 2 of the 6 discussion sections (18280, 18290) will not be held. If you are registered for one of them, please see “Lecture, Discussion Section, and Office hours schedule” on the website for more details on what you should do. Students are free to attend the discussion section of their choice, although I would like you to attend your assigned discussion section this first week of the course. Starting next week, you are free to move to whatever discussion session you prefer. In fact you are free to shop around as long as you wish. My hope is that you will find the TA whose explanations are best suited to your learning style.

Teaching Assistants: I have three TAs, one graduate student (my Head TA, Luke Mason, and two undergraduates Evan Lai and Madeleine Dreher. All my TAs have particularly good insights re: helping you learn the material of the course. I interviewed more than 30 students who wanted to TA this course with me, and think I have picked the best for the job. Please take advantage of them. They are here to help you learn.

Course Home Page: https://users.ece.utexas.edu/~patt/25f.306/webpage/index.html

Textbook: "Introduction to Computing Systems: from bits and gates to C, C++ and beyond"; Yale N. Patt and Sanjay J. Patel; Mc-Graw Hill, 3rd edition, 2019. You will need the 3rd edition. I made many substantial changes since the second edition. A digital version of this book is available through the Longhorn Network at a greatly reduced price, so I encourage you to take advantage of this. For those who want a hard (paper) version, I recommend the loose leaf version as the most cost effective. Because you are enrolled in EE306, the digital version is available to you right now. You can use it at no cost until the 12th day of classes, at which point, you will need to commit to either buying it or rejecting it. If you go to your CANVAS webpage and click on "My Textbooks," it should be clear what you need to do to access the textbook.

Additional Course Resources: Class handouts will be supplied when necessary to supplement the concepts discussed in lecture. Other information will be downloadable from the course homepage.

Prerequisites: There are NO computer pre-requisites. NO programming experience is assumed. On the other hand, we do assume that the student is able and highly motivated to learn and has the energy and intelligence to support that motivation. We also assume that your mathematics background is at least at the level where you are enrolled in a strong calculus sequence. ECE 306 is intended for freshmen, but is open to all students who want a serious introduction to computing in general and computer engineering in particular.

If you are one of those with no experience using computers, please do not be intimidated by those in the class with years of computer experience. It has been the case many times that students with no computer experience earn A in the course, and students with lots of experience earn C or lower. The reasons will become clear as the semester evolves.

Homework policy: Problem sets will be assigned periodically. Usually, students will have between one and two weeks to complete them. Students are encouraged to form study groups to work homework problems. Only one copy of a problem set per group need be turned in. There will be five programming assignments, one in machine language, four in assembly language. Dates and times when problem sets and programming assignments are due are contained on the Course Outline. Students may discuss the general structure of a program with other members of their group. However, the detailed algorithm and actual coding must be done by the student working alone. Collaboration on the algorithm and/or giving or accepting actual code for a program constitutes cheating, and will be dealt with harshly. **Please see the handout: Additional Introductory Comments about EE 306 for more information on what constitutes cheating.**

Quiz and Exam Policy: There will be two midterms during the semester, one on October 8, the other on November 12. There will be a final exam during the normal final exam period. Our preliminary information has the Final Exam scheduled for December 12 at 7pm. However, the registrar sometimes changes the dates of some final exams, so it is important to check the final exam schedule when it is formally posted. All exams will be closed book, with two exceptions:

(1) Each student may bring into the exam three sheets of paper on which the student is free to write anything he/she wishes. All three sheets must be original sheets in the student's own handwriting.

(2) The student may bring into the exam any handouts that have been expressly permitted by the instructor prior to the exam. The student may not have in his possession during any exam a calculator, a mobile phone, or any other mechanism that in the view of the instructor can distract from a fair and balanced examination. The purpose of each exam is to measure the student's comprehension of the course material. Therefore, the exam must be the student's own work with no help from anyone else during the exam period.

Final Exam: See above.

Grading Mechanics: Course Grade:

Problem sets (2% each, times 4 assignments = 8%)
Programming Assignments (2% each, times 5 assignments =10%)
Programming Assignment Checkout (15%)*
Two in-class exams (16% each = 32%)
Final exam (27%)
Other (8%)

*Due to our concern that too many students will cheat or use AI to complete their labs, we are planning to implement some form of lab checkout. It will be determined soon whether this will come in the form of a checkout with TA, multiple checkouts, or a short exam to serve as a programming knowledge check.

Policy: Problem sets and programming assignments are due on the date and at the time specified, with the following modification: Students will have five slack days that they can use during the semester to extend the deadline of programming labs. The deadline for a single lab can be extended by one or two days if a student wishes. The five slack days represent the cumulative total for the five labs. Make-up exams will not be given except under very rare circumstances. Excused absence from an in-class exam must be obtained in advance except in very rare circumstances.

A common course evaluation form will be used to evaluate the instructor and the TAs in this course.

Additional details:

The deadline for dropping a course without special permission is **November 19, 2025**.

Allegations of Scholastic Dishonesty will be dealt with according to the procedures outlined in https://extension.utexas.edu/policies-and-guidelines.

The University of Texas at Austin provides, upon request, appropriate academic adjustments for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 512-471-5017 or the Office of Students with Disabilities, 512-471-6259.