ECE 190 - Introduction to Computing Systems

Instructors:

This course is taught by various CompE professors. Professor Steve Lumetta has taught this course multiple times; most recently, it was taught by Professor Yih-Chun Hu. Professor Sanjay Patel is an author of the textbook for this course. They all have a lot of experience teaching this course. The textbook, Introduction to Computing Systems by Patt and Patel has been the textbook for the course for over five years and all instructors follow the format of the book very closely. Thus, the approach to the course and its format is consistent among different instructors.

Prerequisites:

ECE 110 is listed as a prerequisite. ECE 190 is a programming intensive class and any background in programming will make this class easier to understand, making it worthwhile to have a feel for programming before the class. The programming language used in ECE 190 is C, a high-level programming language widely used in the CompE curriculum. Getting familiar with the first 2-3 chapters of the textbook before the class is also useful as those chapters are meant as review.

When to Take It:

In rare cases, exceptional freshmen with a background in computing-related topics (familiarity with bits, logic, algorithms, programming syntax) may be able to take ECE 110 and 190 together in the same semester. For such students, it is the practice of the ECE department to send a 'friendly warning' that explains the course load and gives statistics on past students who take the two classes concurrently. However, students who are not yet accustomed to the workload necessary to complete successfully the core math and science courses should not take ECE 110 and 190 together, regardless of previous programming experience. For students interested in CompE, it is ideal to take this course in the freshman year because the class is a good window into the curriculum. EE majors often take this class their third semester with ECE 210.

Class Content:

The class gives an introduction to the many layers of computing. While the course starts with a theme about the applications of programming in C, the main course content gradually moves from the lower level with bits, logic units, and state machines to the higher level with machine language, assembly language, and ultimately C. The class teaches problem solving methods and good practices in code implementation and debugging techniques, all of which are valuable concepts to learn and practice early. Assembly language, the LC3 ISA, and C programming are all concepts used in higher CompE classes like ECE 290, ECE 391, and ECE 411.

Work:

As mentioned before, the textbook is followed closely, making it important to keep on track with the reading for assignments and exams. The class has written exercises for the first month which involve extensive problems which are mostly from the first few chapters of the textbook. The class introduces the concept of Machine Problems (MPs), which are programming assignments to be electronically turned in. There are 5 assignments as follows: The first is a simple problem to be implemented in C. The second MP is done in machine language. The third is done in assembly language using the LC3 instruction set. The last two MPs are in C. Each MP is divided into 2 checkpoints, meaning that one checkpoint is due every week after the first month. The MPs take 10-20 hours a week, which varies with the difficulty of the checkpoint. Bear in mind that much of this time will be spent debugging your code. Because the later MPs tend to be long and complicated, it is advised that students not only start early, but seek help early as well. There are only so many TAs, and surveying a student's code can be time-consuming, which leads to situations where many students need help debugging, but there aren't enough TAs to help them all. It also helps to code meticulously, using comments often and making sure you know what each line of code does.

There are three exams in the class and a cumulative final. Each exam may have a written portion focusing on theory and/or a programming portion that requires students to code and correctly solve a given problem, just like an MP. The programming portion is done on a computer and is the majority of the exam, in time allotted and in score weighting. Partial credit is sometimes available for the programming parts but is fairly hard to earn, which is one of the main reasons why the exam averages are fairly low. Each exam is followed by a regrading process which requires students to correct the mistakes and submit the requests. Overall, ECE 190 requires a fairly large weekly time commitment in relation to other ECE courses. Past students said they have spent between 4.6 and 17.2 hours per week on this course.

Life After:

The class is an overview of the CompE classes to follow and is an essential introduction to programming before venturing into other classes that cover data structures, systems programming, network programming, the DSP lab and system organization classes. Most students go on to take ECE 290, the digital logic class, in the following semester or two; the basic computer architecture concepts carry over, as well as basic knowledge about assembly language programming. CS 225 (Data Structures) is also a common next step, as it is a required course for CompEs and the gateway to all upper-level CS classes.