CS 431 - Embedded Systems

Instructors:
Prof. Lui Sha, who has done significant research involving embedded systems, teaches this course.

Prerequisites:
The listed prerequisites are either CS 241 or ECE 391, but you can get by without those as long as you know C programming really well and have a basic understanding of how processors and schedulers work.

When to Take It:
Most people take this course as either junior or senior; you might see some grad students in the course as well.

Class Content:
CS 431 goes through various problems and concerns especially significant in embedded systems - small special-purpose computers inside larger devices, such as microwaves, cars, or the automatically-tilting tables you'll be working with in the labs. The implicit model for all the lectures, which becomes explicit in the labs, is that you're working with a limited-memory system that takes analog input from environmental sensors and outputs some result depending on the input values. The lectures teach you how to deal with issues significant in this sort of system, such as serial I/O, PID (porportional integral-derivative) feedback controls, timers, interrupts, and analysis of periodic task schedulability. In the labs, you actually implement most of these things as you build up to a tilting table controller which will tilt the table so as to move a ball placed anywhere to a given point.

Work:
The class has a single midterm and a final; be sure to review before both tests. In addition, there are about four homeworks (each of which can probably be done in about three hours) and weekly labs. The lab and lecture work together quite nicely; if you come to lab prepared, you should get the project done easily within the two-hour lab period.

Life After:
The logical sequel is CS 424 (Real-Time Systems), also taught by Prof. Sha. If you enjoy this field, there are many career options open to you after graduation.