**Instructors:**

This class is usually led by TAs who are graduate students in the microelectronics or electric circuits fields. Over the past several semesters the course head has been Professor Chandra Radhakrishnan, who usually comes in at the beginning of lab sessions to overview that day's procedure. Expect most instruction to come from the TAs, though.

**Prerequisites:**

The prerequisite for this class is ECE 342 (Electronic Circuits). It is often taken concurrently with ECE 342. A solid knowledge of circuit analysis is necessary for this class.

**When to Take It:**

This class should ideally be taken along with ECE 342, but it is also practical to take it during a following semester. It is offered each semester, including the summer term, and it counts as a lab class for EE majors. This class should be taken as soon as possible by any students interested in hardware and circuit design, as it provides excellent experience in design, simulation, and optimization of electronic circuits.

**Class Content:**

Material in this lab is closely related to that of ECE 342. Students will work with fundamental circuits, investigating the different parts of each circuit and seeing how changes in components affect output characteristics. Main topics include network analysis of "black box" circuits, evaluation of CMOS circuit characteristics such as noise margin, propagation delay, and power dissipation, use of rectifiers, filters, and voltage regulators to design an AC/DC power supply, and design of an op-amp using MOSFETS. Most material is covered in 342 before it appears in the lab, but there are some cases where students will encounter topics first in the lab, depending on the professor's pace in 342.

Except for the first project, which is designed for students to brush up on their circuit analysis tools, each project follows a general structure. Given a circuit and a set of design parameters, students must perform analysis of the circuit by hand to determine initial components. Once these components are found, PSPICE software is used to model and simulate the circuit. Students often manipulate the circuit in some way, such as changing the value of a resistor or the width of a MOSFET, and evaluate how the circuit characteristics change as a result. It is then necessary to optimize the circuit in order to satisfy all of the design parameters. Physical circuits are also built and bench tested to verify simulation results. This process of designing to meet performance specifications is similar to that in the hardware and circuit design industries, giving students valuable design experience.

**Work:**

The workload for this class is fairly light. ECE 343 is a closed lab, meaning that students should be able to complete each lab phase within the allotted three hours each week. There are four major projects which make up the lab, each of which is usually broken into three or four phases. At the conclusion of each project, students are expected to write a lab report which includes their analysis, simulations, and bench test results. These reports are spaced evenly throughout the semester due to each project being completed over the course of several weeks. Be careful about putting off the reports, though, as each one can take a substantial amount of time to complete. It is highly recommended that students work on the report as each phase is completed, rather than wait to write the entire report in the week between the final phase and the due date. There is no open-ended work for this lab (that is, no final project).

**Life After:**

Students who have taken and enjoyed ECE 343 are well prepared for a variety of courses related to hardware and circuits. ECE 343 is a prerequisite specifically for ECE 469 (Power Electronics Laboratory), so students interested in power should consider taking 469 and its companion, ECE 464 (Power Electronics). Students interested in circuit and hardware design should also consider classes such as ECE 482 (Digital IC Design), ECE 483 - Analog IC Design, and ECE 453 (Wireless Communications Systems).