

At the present time, ECE443 students complete four projects. The PSPICE circuit simulator is used for all of them. PSPICE is not used in any of the senior-level circuits classes, nor is it widely used in industry. Therefore, the students would receive far more benefit from using HSPICE.

One proposal for a revised ECE343 is presented here. Other faculty members will surely have additional ideas and modifications will be made to the proposal. The curriculum committee is advised to proceed with the revisions to ECE342 and work on 343 in subsequent semesters.

Project 1: HSPICE. Students will become fully familiar with all important features of the leading circuit simulator. Topics to be covered include: netlist construction and schematic capture, model files, different types of analysis, tolerances, subcircuits. Most exercises will involve RLC circuits, so that this lab can be performed early in the semester before the students have much experience with non-linear circuits.

Project 2: Digital CMOS. Required lab supplies include breadboards, dc power supplies, small ICs containing logic gates, pulse generators, oscilloscopes. Students will measure the noise margin of the logic gates. Students will measure propagation delay as a function of fan-out. Students will also do HSPICE simulations of digital logic gates.

Project 3: Amplifiers. Required lab supplies include dc power supplies, breadboards, network analyzers, IC amplifiers. Students will obtain the gain plots (Bode plots) for different dc bias conditions. Also, students will learn how to use HSPICE to simulate the frequency response of an amplifier.

Project 4: Op amp. This will be a self-contained unit, somewhat independent of ECE342. Use of op amps will be emphasized as opposed to design of op amps. Op amps can be configured in the inverting configuration, non-inverting configuration, as integrators, etc.; all of these configurations will introduce students to the concept of feedback. Rigorous treatment of feedback is provided in ECE483. Note that ECE443 currently has a unit on op amps and it can serve as a template for this unit.

Development of a new laboratory course is extremely time consuming and an incentive may be needed to entice any faculty member to take on this task; possible incentives include a reduced teaching load or summer salary support.

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