Proposed Guidelines for EE Senior Lab Electives

Background:
The current EE curriculum requires students to complete three hands-on scheduled laboratory courses: ECE 2031, 3041, 3042. The proposed curriculum replaces the third required laboratory with a senior-level lab elective, providing students with greater flexibility and the opportunity to select laboratory experiences more closely related to their individual areas of interest.

Proposed Guidelines:
Courses approved by the ECE Undergraduate Committee to satisfy the senior lab elective requirement are expected to meet the following requirements:

- The course must include at least 3 hours per week of laboratory content, as specified in the course credit-hour distribution. It may be a stand-alone laboratory course, an optional laboratory companion to a lecture course, or an integrated lecture-laboratory course. At least one ECE 3XXX level lecture course must be a prerequisite (e.g., ECE 3040) along with at least one of the required lab courses; i.e. ECE 2031 and/or ECE 3043.

- The laboratory component must provide a hands-on, physical experimental setting and include a series of assignments on a regular schedule throughout the majority of the semester. The laboratory may be operated on either a scheduled or unscheduled basis, as appropriate to the facility and experimental requirements.

- The laboratory experience is expected to include design, implementation, and evaluation of electrical/computer engineering components and/or systems, as well as analysis and interpretation of evaluation data and appropriate documentation of the results.

- The laboratory experience should include use of appropriate engineering techniques, skills, and tools, including software-based tools and techniques.

- The course must have defined Course Educational Objectives and Course Educational Outcomes, including the following mandated ones (italicized items in braces may be modified to reflect the specific technical focus of the course):

  As part of this course, students ...
  1. design, analyze, simulate, implement, and evaluate \{electronic components, circuits, and systems\}. [b,c]
  2. use engineering techniques, skills, and tools, including software-based methods. [k]
  3. develop basic skills in writing laboratory reports and other documentation. [g]

  Upon successful completion of this course, students should be able to ...
  1. design and implement \{electronic components, circuits and systems\}.
  2. develop evaluation methods for these circuits and analyze and interpret the resulting data.
  3. write laboratory reports and documentation conforming to technical writing standards.

Possible Courses:
The following list, while not exhaustive, identifies current and proposed courses that would probably satisfy these guidelines, subject to appropriate changes in prerequisites and objectives/outcomes:

- ECE 4xxx, Senior Electronics Laboratory (replacement for ECE 3042)
- ECE 4175, Embedded Microcontroller Design
- ECE 4180, Embedded System Design
- ECE 4360, RF-Microwave Measurement Laboratory
- ECE 4435, Operational Amplifier Design
- ECE 4xxx, Audio Engineering Laboratory (proposed companion lab for ECE 4445)
- ECE 4xxx, Optical Fiber Communications (proposed revision of ECE 4501)
- ECE 4xxx, Feedback Control Systems (proposed replacement for ECE 4551)
- ECE 4602, Communication Systems Laboratory
- ECE 4752, Integrated Circuit Fabrication