I. Assessment Outcomes from the Course Syllabus

- (A) Ability to apply knowledge of mathematics, science and engineering.
- (C) Ability to design a system, component, or process to meet desired needs.
- (D) Ability to function on multidisciplinary teams.
- (E) Ability to identify, formulate, and solve engineering problems.
- (F) An understanding of professional and ethical responsibility.
- (G) Ability to communicate effectively in written and oral formats.
- (H) A broad education necessary to understand the impact of engineering solutions in global, economic, and societal context.
- (I) Recognize the need for, and have the ability to engage in lifelong learning.
- (J) Have a broad education and knowledge of contemporary issues.
- (K) Ability to use techniques, skills and modern engineering tools necessary for engineering practices.

II. List of Course Topics from the Course Syllabus

1. Introduction to electronics.
2. Operational amplifiers.
3. Diodes: physics, small-signal model, applications.
4. BJTs: physics, biasing, small-signal model.
5. BJT single-stage amplifiers: analysis and design.
6. BJT current mirrors.
7. BJT differential amplifiers: analysis and design.
8. MOSFETs: physics, biasing, small-signal model.
9. MOSFET single-stage amplifiers: analysis and design.
10. MOSFET current mirrors and differential amplifiers.
11. Frequency response.
III. Course Assessment Summary Table: one row of the table should be devoted to each of the checked outcomes in part I.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Topics</th>
<th>Specific Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Ability to apply knowledge of mathematics, science and engineering.</td>
<td>2 - 11</td>
<td>Examinations</td>
</tr>
<tr>
<td>(C) Ability to design a system, component, or process to meet desired needs.</td>
<td>1 - 5</td>
<td>Homework problems 4.39, 5.24, 7.60</td>
</tr>
<tr>
<td>(K) Ability to use techniques, skills and modern engineering tools necessary for engineering practices.</td>
<td></td>
<td>Homework problems 4.39, 5.24, 7.60</td>
</tr>
</tbody>
</table>

IV. Using the table as a guide, for each outcome summarize your evaluation of the students’ achievement of that outcome; cite student performance on the identified measures as evidence to support your conclusions.

(A) Ability to apply knowledge of mathematics, science and engineering.

I consider in-class exams to be the most rigorous measure of Outcome (A) for a theory course. There were two “midterm” exams and a final exam. The averages on the three exams (neglecting the one student who got a D in the course) were 78%, 74% and 81%.

(C) Ability to design a system, component, or process to meet desired needs.

I chose three design oriented homework problems to form a measure for this outcome. Problem 4.39 asked students to design a four-resistor bias circuit for a common-emitter BJT amplifier with given parameters. Problem 5.24 asked students to design a self-biased NMOS source follower given specified transistor parameters. Problem 7.60 asked students to design a source-coupled differential amplifier with given specs. Students were to verify their results using SPICE. No “right” answers existed but designs did, or did not produce the specified performance. In all students were able to produce functioning designs.

(K) Ability to use techniques, skills and modern engineering tools necessary for engineering practices.

I selected the same set of homework problems to measure this outcome also. The tool in question was SPICE which students used to check their designs. Students showed competence in using SPICE for these modestly complicated circuits.
V. Qualitative Assessment of Student Performance: using the arguments above and other data support the claim that students who completed this course with a grade of C or better have achieved each of the intended outcomes of this course.

With a small class such as this the instructor has a very good feeling for the performance level of each student. One of the six students received a D grade. For the remaining five students the lowest course grade was C. This C student did achieve outcomes (A), (C) and (K) to a minimally acceptable level. In no case was he unable to, or did he fail to, attempt an exam or homework problem. His answers were not the strongest, but they did display a basic grasp of the material.

VI. Concerns: state any concerns you may hold about this class – were the students adequately prepared coming into it? Are there topics or outcomes where (some) students were weak after completing the course? Other concerns? Were there any comments on students’ course evaluations that should be addressed in future instances of the course? This section is very important for improving our program: it provides critical input to the curriculum committee for identifying areas requiring attention.

Students seemed to be adequately prepared in terms of math and basic circuit theory. I think it would be advisable to replace one or more homeworks with an extended design project and to use that as the measure for Outcome (C).

Signature: Scott Hudson

Date: 2007-05-11

Please email a copy of the completed form to Patricia Arnold, patricia@eecs.wsu.edu and deliver a signed hardcopy to her mailbox.