I. Assessment Outcomes from the Course Syllabus

☐ (A) Ability to apply knowledge of mathematics, science and engineering.
☐ (B) Ability to design and conduct experiments as well as analyze and interpret data.
☐ (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. MOSFETs: physics, biasing, small-signal model.
5. MOSFET single-stage amplifiers: analysis and design.
6. BJTs: physics, biasing, small-signal model.
7. BJT single-stage amplifiers: analysis and design.
8. BJT/MOSFET current mirrors and differential amplifiers.
9. Miller’s Theorem
10. Device/Amplifier High 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 (Samples should be available in the course materials file for inspection.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Ability to apply knowledge of mathematics, science and engineering.</td>
<td>2-10</td>
<td>Most homework, quizzes and exams</td>
</tr>
<tr>
<td>(C) Ability to design a system, component, or process to meet desired needs.</td>
<td>2-10</td>
<td>Selected Homework Problems, Quizzes and Exam Problems. Examples: Quiz 3, Ex1,P 3; Ex 2 P 4,5, Ex 3 P2; HW with prefix “D”</td>
</tr>
<tr>
<td>(K) Ability to use techniques, skills and modern engineering tools necessary for engineering practices.</td>
<td>2 - 10</td>
<td>Many Homework, Exam and Quiz problems emphasize problem solving skills. CAD tools are taught in accompanying lab</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.

Mathematic sophistication is very elemental in this course and science preparation in basic physics and physical chemistry is all that is required. Most all students possess the necessary skills to perform the operations required however there inability to do mental arithmetic compromises their performance. The real challenge in this course lies with the problem formulation and problem solving skills in general. The superficial approach to thinking and reasoning separates the good performers from those that perform poorly. This is most evident in the overall performance on Exam 1 which is generally quite poor. Improvement in this area is apparent as the class progresses.

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

Although most of the course emphasizes analysis of circuits, more emphasis is directed to design and problem solving in the latter part of the course. Students are continuously required to make meaningful simplifications and judge the reasonableness of their answers. Performance on exams 2 and 3 are good measures of this ability.

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

Techniques introduced in this class include small and large-signal models, small-signal analysis, Miller’s theorem and summing point constraints for op-amps. Half of the final exam questions concern these techniques.
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.

The final comprehensive examination is used as an assessment tool of the student’s performance and can be used in comparing them to other groups. Students often comment that this is one of their “hardest” classes. This semester, the gap between students that performed well (A or B) to those with passing grades of C seemed to widen. Students with a C clearly have deficiencies in their knowledge and ability on selected topics and have not mastered all of them. They do possess the necessary knowledge to proceed to more advanced courses in the discipline, but their success in those courses will require that they master skills and topics that they did not successfully master in this course. My sense is that students earning C’s in this class are in general less capable than students receiving a similar grade in previous classes.

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.

A 35% attrition in students successfully completing the class is unacceptable and needs to be improved.

I am concerned that we are expecting too much from students whose only exposure to electronics is a single class without any background in electronic materials or any requirement of an associated laboratory to demonstrate the concepts. In my view, more emphasis needs to be placed on revising the curriculum to provide a broader student exposure to the discipline of electronics. Recent curriculum changes have resulted in removing the associated lab as a required course, even for Computer Engineering, and not requiring a material science course that addresses electronic materials.

Signature _________________________________ Date: February 13, 2007

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