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. Radiowave propagation.
2. Empirical propagation models and link budgets.
3. Multipath and fading.
4. Diffraction and computer propagation tools.
5. Cellular concept, frequency reuse, and queuing theory.
6. AM, SSB, and FM.
7. Digital modulation.
8. Spread spectrum.
10. Encryption, Equalization
11. Channel and source coding.
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)</td>
<td>Ability to apply knowledge of mathematics, science and engineering.</td>
<td>1 - 11</td>
</tr>
<tr>
<td>(B)</td>
<td>Ability to design and conduct experiments as well as analyze and interpret data.</td>
<td>1 - 11</td>
</tr>
<tr>
<td>(C)</td>
<td>Ability to design a system, component, or process to meet desired needs.</td>
<td>5 - 9</td>
</tr>
<tr>
<td>(I)</td>
<td>Recognize the need for, and have the ability to engage in lifelong learning.</td>
<td>9</td>
</tr>
<tr>
<td>(J)</td>
<td>Have a broad education and knowledge of contemporary issues.</td>
<td>5, 9</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 chose the midterm exam as a specific measure of Outcome (A). Midterm scores were 42/60 and 39/60. These scores indicate that the two students who completed the course (with grades of B- and C+) achieved this outcome at an acceptable level.

(B) Ability to design and conduct experiments as well as analyze and interpret data.

EE 432 has ¼ of its credit devoted to laboratories. I chose the first lab as a specific example of students conducting an experiment. This particular lab required students to measure the strength of received 915-MHz radio signals as a function of distance between transmitter and receiver in the presence of a reflecting ground plane. They then had to develop empirical models to describe this radio environment. Both students did an adequate job. There scores were 7/10 and 8/10.
(C) Ability to design a system, component, or process to meet desired needs.

In homework assignment #8 students need to design an on-off-keying receiver system and simulate its performance in the presence of channel noise. Scores were 9/10 and 10/10.

(I) Recognize the need for, and have the ability to engage in life long learning.

Homework assignment #5 required students to compare 1st and 2nd generation cellular systems. In doing so they learn how quickly these technologies are changing and how important it is to keep abreast of this field. Both of the students who completed this course performed adequately on this assignment. Scores were 8/10 and 9/10.

(J) Have a broad education and knowledge of contemporary issues.

In homework assignment #6 students had to make calculations of RF field strength near cellular transmitters. This is an issue of some public contention as many people fear adverse health effects might result from having cellular transmitters in populated areas. Both students performed adequately on this assignment. Scores were 10/10 and 10/10.

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 two students who completed this course received grades of B- and C+. Clearly neither was a particularly strong student, but, as I have described above, both achieved minimally acceptable measures for the five ABET outcomes associated with this course.

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.

Computer programming is essentially to this course. The laboratory assignments in particular involved extensive programming for the purposes of model fitting and simulation. EE students continue to have weak programming skills. The only solution I see is to increase the amount of programming required throughout the curriculum.

Signature: Scott Hudson Date: 2007-05-11

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