Washington State University  
School of EECS  
Electrical Engineering Course Assessment Report

Course Number: EE 331  
Course Title: Electromagnetic Fields and Waves  
Semester Offered: Fall 2005  
Instructor: T. Garlick  
10th Day Enrollment: 5  
Number Completing Successfully (C grade or better): 3

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 life long 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 electromagnetics.  
2. Transmission lines.  
3. Vector analysis.  
4. Electrostatics.  
5. Magnetostatics.  
### 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>1 - 6</td>
<td>Final exam</td>
</tr>
<tr>
<td>(E) Ability to identify, formulate, and solve engineering problems.</td>
<td>1 - 6</td>
<td>Homework assignment #10</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.**

Essentially all homework and exam problems require students to apply knowledge of mathematics, science and engineering. Due to the control the instructor has over the environment in which they are completed, exams form a more rigorous assessment tool than homeworks. I have therefore chosen the final exam as the specific measures for outcome (A). Final exam scores of the three students who completed the course were: 85%, 92% and 93%. Based on these scores I conclude that all three students achieved this outcome.

**(E) Ability to identify, formulate, and solve engineering problems.**

Homework assignment #10 involved problems in magneto-statics. The average score on this assignment #10 was 90%. This particular measure indicates that students were able to solve engineering problems appropriate to this course.

### 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.

All students achieved acceptable measures for the two outcomes (A) and (E). These outcomes are closely related and so course grades also provide a good measure of outcome achievement. Based on these results, students completing this course with a grade of C or better achieved the intended outcomes.
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.

EE 331 requires students to use multi-variable calculus and complex numbers to a great extent. They use complex numbers in several other courses, but EM is the only subject in which they use gradient, divergence, curl and so on. In light of that it might not be surprising that this area of math is their biggest weakness in this course. More math review during the first weeks might be necessary.

Signature Todd Garlick 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.