Course Prerequisites

- Three semesters of calculus
- One semester of linear algebra
- One semester of differential equations
- Two semesters of physics
- EE 261 or equivalent

Comprehensive Assessment Exam

The comprehensive assessment exam is a quasi-standardized test designed to test the students' overall knowledge of the material presented in EE 331. The assessment exam was given as half of a two-part final exam; it consisted of 50 multiple choice and fill-in-the-blank questions. In an effort to provide continuity with results from previous semesters, problems on this semester's assessment exam were a mixture of questions taken from assessment exams for the previous two semesters. The assessment exam counted as 12.5% of the final grade for the course. The exam was closed book and closed notes; calculators and crib sheets were not allowed. Students were allowed approximately 55 minutes to complete the exam.

Thirty eight students took the comprehensive assessment exam. The high score was 92%, the low score was 42%, the average was 66.3%, and the standard deviation was 14.2%. These results are consistent with those reported for the past two semesters.

Basic Competency Test

All EE 331 students were required to pass a basic competency test (BCT), which covers basic math, calculus, and vector calculus. The exam consisted of fifteen to twenty mathematics problems and was offered five times during the first six weeks of classes. A perfect score was required on the BCT in order to pass the course, though students missing one question were allowed to attempt an oral exam covering the missed topic.

Performance Assessment

EE 331 assesses students for their ability to apply knowledge of mathematics, science, and engineering (ABET criterion 3a) and their ability to identify, formulate, and solve engineering problems (ABET criterion 3e).
Student performance improved slightly over the previous time this instructor taught this course (in Fall 2003). The average for the comprehensive assessment test increased by about 4%.

One problem area is that many of the students do not have the mathematics abilities which they were to have acquired from the course prerequisites. Basic calculus and the choice of coordinate system and the differential lengths, areas, and volumes appropriate to a particular problem seemed especially problematic. The students’ performance on the BCT indicates that most students have acquired, to some extent, the basic mathematical skills required but often have difficulty applying these skills to an engineering-type problem.

Conclusions and Recommendations

1. Enhance the BCT to assess the students' ability to translate a worded problem into its mathematical representation.
2. Increase the number of introductory lectures dealing with vector algebra, coordinate transformations, and especially vector calculus. These lectures should emphasize application of these skills to engineering-type or word problems. Additional review relative to phasors and complex arithmetic would also be helpful, to better prepare students for the transmission line analyses.