General Information

1. Name / Number of Course / Sequence:
   PHYS 1610/PHYS 1617: Engineering Physics II and Honors Physics II

2. SLO(s) being assessed:
   Student will understand and appreciate methods and issues of science and technology.

3. Department:
   Physics

4. Department Representative:
   Dr. Chin-Che Tin

5. AGSC Content Alignment:
   AREA III: Science and Math

Assessment Information

6. Assessment Method: [Explain how assessment for the measures associated with this SLO – not grading for the course as a whole was conducted.]

   The department has identified the following assessment areas: homework problems, laboratory experiences, classroom interactive sessions and test questions. Faculty may elect to use any or all of these assessment areas to evaluate the effectiveness of their teaching. However as a department it has been agreed that all faculty teaching Physics 1610 and 1617 will use homework problems in Mastering Physics as the primary assessment tool. The five measures for SLO-10 have been entered into the software as our Learning Outcomes. Up to five problems are assigned throughout the semester that
relate well to each of these five measures associated with SLO 10 (i.e. a total of 25 problems) and the performance of our students is compared to the National Average. However, the instructor for the PHYS 1617 course decided to use a different approach in his teaching. Students were asked to solve problems in class instead of formal lectures. This approach was found not to be as successful as hoped. No SLO assessment was made. The instructor has retired and a different instructor is currently assigned to teach this course.

Only the assessment data for PHYS 1610 are presented here.

Data from two assessment methods are given because the online MasteringPhysics tool was phased into our General Physics and Engineering Physics courses in Fall 2010 starting with PHYS 1500 and PHYS 1600. Therefore, the instructor for PHYS 1610 used the traditional tests and examination assessment method.

7. Findings: [What assessment data did each assessment method produce?]

The data collected from tests and final examination were the percentage of students who answered correctly. The data collected from tests and exam is always lower than that from assignments, as expected. However, these data more accurately reflect a student's understanding of the basic concepts and materials.

The data collected using MasteringPhysics were percentage of students completing the assigned problems (% Complete), average percentage score of those students completing the assigned problems (% Average Score), and average percentage national score of students given the same problems in those institutions in the U.S. using this online assignment, MasteringPhysics(% National Score). The % National Score data are derived from a sample of several thousand students.

Our findings show that of those who completed the assigned problems, the average score of Auburn University students is about 6% below the national average. Though these numbers are comparable with that of other courses, the result is also tempered by the fact that about 20% of the students in the course did not complete the assigned problems.

Fall 2010 Assessment Method: Tests and Final Examination
% Average Score: 57

8. How did you or will you use the findings for improvement: [What questions / issues/ concerns did your data raise for the faculty teaching the course? What discussion did the faculty have about the findings? What future actions to improve student attainment of this outcome will the department / program take as a result of this analysis?]
The percentage of student completing the assignments is typically about 75-80%. This means that 20-25% of the students have difficulty completing the problems. This is typical in our introductory physics courses.

Student performance in assignments is always better than their performance in a true testing environment, such as quizzes, tests and examination. Therefore, actual student performance, as indicated by their final grades, is generally lower than that indicated by the data collected from assignments as presented here.

The lack of student preparedness and motivation are our main concerns.

As expected, there was a distinct performance difference between students who participated in class and those who skipped classes.

The assessment data showed that students had achieved a mastery of the fundamental concepts but still had issues with some of the more advanced concepts.

The instructors believe that frequent reviews would be helpful but these reviews are restricted by limited class hours and the large amount of materials to be covered in the syllabus. Students would benefit from weekly recitation sessions. Instructors would ask TA's to more rigorously enforce the recitation policies and to conduct more peer-instruction activities.

9. Additional comments: [What else would you like the Committee to know about your assessment of this course or plans for the future?]

   The names of the instructors are given in the assessment data. These data should not be viewed as an assessment of the effectiveness of an instructor. In spite of much efforts and time with group meetings, email notifications, etc., not all instructors have submitted assessment data and those that did should be commended for their contributions to this assessment effort.

   The main problem for us is in the choice of the questions to satisfy the different measures within SLO-10.

   The problems that we have used are typical textbook-type Physics problems with underlying historical foundation and principle that may not be obvious to others. For instance, it is not common to see a problem involving the basic Coulomb's Law to start with "Centuries ago, Coulomb discovered that the electric force is inversely related to the square of the distance...". Instead you would see "What is the electric force between two 20 microcoulomb charges placed 1.0-cm apart?".

   The problems we have used are those from the textbooks. In adopting the online MasteringPhysics assignment tool, we are restricted to the problems in the textbooks. We can author our own questions to make their relevance to the Learning Outcomes
more obvious. But in doing so, we would lose using the national average as a comparison data.
As we progress with our assessment efforts, we will gradually tighten the number of allowed questions for our instructors. Instructors will be provided with a common set of questions that they have to include in their assignments.

10. Core Curriculum General Education Committee Comments:

Good attempt which shows progress and faculty input. There is a wide variation in assessment problems from instructor to instructor--some relate well to the measures, some don't.