



Student Learning Outcomes for PHYS 4B

Physics for Scientists and Engineers (Electricity and Magnetism)

Team Members:

Team Leader:

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Additional team members/notes about team:

Ronald Francis, David Newton,

Additional Notes:

Outcomes:

Outcome 1 Phase I: Statement

Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of electricity and magnetism.

Outcome 1 Phase II: Assessment Strategy Used:

Assessment Quarter: Winter 2011

Assessors: Eduardo Luna

Assessment Tools: *No tools assigned.*

Sections being assessed: 01, 02

Outcome 1 Phase III: Reflect & Enhance

Number of people involved in Phase III: 1

Changes:

Methods:

As assessment tools we used selective new un-encountered problems on the lecture final. Assessment was then based on the scores obtained on these selective problems on an

individual and overall class basis. The following problem on the lecture final was used as an assessment: A hollow, spherical conducting shell of inner radius 'b' and outer radius 'c' is concentric with a solid conducting sphere of radius 'a' as shown below. The sphere carries charge $-Q$ and the shell carries a net charge $+3Q$. Both conductors are in electrostatic equilibrium. a) Find an expression for the potential difference from infinity to the surface of the sphere. b) Find the work required to move a charge $+q$ from the surface of the sphere to the outer surface of the shell.

Findings and Conclusions:

a) 60% of the class was able to solve the problem correctly, 20% did acceptably well, and 20% did not perform well. b) About 20% of the class needed to improve their analytical and problem solving skills. c) 80% success was acceptable for the class, but not outstanding. d) Areas for improvement would be to further help students develop their analytical and problem solving skills using the principles/laws/theories of electricity and magnetism. e) The results are typical in this type of class and reasonably acceptable considering the size and difficulty of the class.

Enhancement (Planned Actions)

Part I:

The assessment results suggested areas of student learning improvement. In order to improve student learning and success, the instructor should address the SLOs and the assessment results in an effective pedagogical approach.

Part II:

Supplementing our teaching methods with computer-based technology and traditional physics demonstrations would be ideal to help students understand physics principles from a conceptual and practical viewpoint.

Outcome 2 Phase I: Statement

Gain confidence in taking precise and accurate scientific measurements, with their uncertainties, and then with calculations from them, analyze their meaning as relative, in an experimental context, to the verification and support of physics theories.

Outcome 2 Phase II: Assessment Strategy Used:

Assessment Quarter: Winter 2011

Assessors: Eduardo Luna

Assessment Tools: •

Sections being assessed: 01, 02

Outcome 2 Phase III: Reflect & Enhance

Number of people involved in Phase III: 1

Changes:

Methods:

Proper knowledge of the Scientific Lab Report as accessed in the lab final including;

scientific measurements with uncertainties, error analysis, calculations, and hands-on experience with the experimental method. The following problem was used as an assessment in the lab: USING THE OSCILLOSCOPE a) Measure the period, frequency, and amplitude of the output signal shown on one of the oscilloscope. Make sure to draw a sketch of the signal and label all information needed. b) Calculate the time-constant making sure to draw and label all pertinent information required to make calculation.

Findings and Conclusions:

a) About 70% of the class was able to solve the problem correctly, 10% did acceptably well, and 20% did not know how to solve it. b) 80% success was partially acceptable for the class and thus there weren't any apparent student needs and issues revealed. c) 80% success on error analysis was acceptable for the class, but not outstanding. d) Area for improvement would be to further help students develop a conceptual and practical understanding of the physics principles in the lab. e) Based on previous performances for such a class, the results are reasonably acceptable.

Enhancement (Planned Actions)**Part I:**

The assessment results suggested areas of student learning improvement. In order to improve student learning and success, the instructor should address the SLOs and the assessment results in an effective pedagogical approach.

Part II:

Supplementing our teaching methods with computer-based technology and traditional physics demonstrations would be ideal to help students understand physics principles from a conceptual and practical viewpoint.

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