

2011-2012 Annual Academic Program Assessment Plan

Program: Physics

Division: SME

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Assessment team members: Thomas Herring

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Program Goal:

The primary goals will be to increase enrollment in the physics program and provide 4 year institutions with a group of well prepared and interested students that can continue towards BS degrees in physics and related fields (i.e. engineering, math, chemistry, etc.). Additionally the structure of the program should slowly shift to an activity based learning environment which has been shown to increase student understanding. To serve these ends the faculty will take part in training and national conferences through the American Association of Physics Teachers (AAPT), the American Physical Society (APS) particularly in regards to physics education but also in regards to physics research activities and their relevance to modern society. Also, the program goals and student learning outcomes should be reviewed and possibly changed to better serve students interested in physics and to take into account results from physics education research.

Outcome:

In order to begin the move towards an activity based learning environment student learning outcome 3, "Apply new knowledge in the areas of Newtonian mechanics, electricity and magnetism, and physical principles in modern physics." will be the focus of this year's assessment. The outcome will be addressed by examining gains on standard tests used in physics education research.

Assessment Methods and Criteria for Success:

In order to measure knowledge gained the Force Concept Inventory (FCI), a standard test used to assess physics programs throughout the United States, will be administered as a pre/post test at the beginning and end of each semester in PHYS 180. Also, a similar test, the Conceptual Survey of Electricity and Magnetism (CSEM), will be administered as a pre/post test to PHYS 181 classes each semester.

Success will be determined by calculating a normalized gain, $\langle g \rangle$, as described by Hakeⁱ. This is the standard for assessing the success of physics programs nationwide. Gains are grouped into low ($\langle g \rangle < 0.3$), medium ($0.3 < \langle g \rangle < 0.7$), and high ($\langle g \rangle > 0.7$). Medium or high gains would indicate a program that exceeds gains seen in most physics courses nationwide.

Planned Use of Results:

Results will be published on the WNC website at http://www.wnc.edu/institutional/academic_program_assessment/. The results will also be used to alter the physics course curricula to address any deficiencies found. Also, some suggestions about other courses in the program may arise (i.e. math or chemistry) that could help address any student deficiencies.

ⁱ Hake, R.R. (June 6, 1999), *Analyzing Change/Gain Scores*. Retrieved May 19, 2011 from <http://www.physics.indiana.edu/~sdi/AnalyzingChange-Gain.pdf>