Physics Department
Assessment Plan
April 23, 2010

Physics Mission

The Physics Department at Albion College is committed to providing intellectually rich and challenging learning experiences for students as part of their preparation for their life's work. We are a learning-centered community of students and faculty that seeks to make relevant, qualitative, and quantitative conclusions from observations of the physical world.

Our program has several specific goals, including 1) to provide a high quality major program with sufficient depth and breadth of study in the core areas of physics to enable students to pursue advanced studies in physics or engineering or to be successful in physics-related careers, 2) to provide high quality major and minor programs for secondary education certification and the elementary integrated-science program, 3) to provide cognate courses for students in other sciences, including biology, chemistry, geology, and health sciences, 4) to provide the physics curriculum for the dual-degree program in engineering, 5) to provide high quality physics and astronomy courses for the general education requirement, and 6) to provide faculty as participants in interdisciplinary courses and programs, such as the Honors Institute, the First-Year Experience program and the Environmental 'Category' requirement.

Goals and Outcomes

Learning Goals for All Areas

1. Students in our program will develop proficiency in the theory and practice of physics as appropriate to their major, minor or program of study.

2. This proficiency will prepare students well for further education or careers as physicists, educators, or any other relevant life's work.

Desired Outcomes

Assessment Area: Physics major curriculum, Combined Course Physics major curriculum, Physics with secondary education curriculum, Mathematics/Physics major curriculum

OUTCOME I. Physics graduates will have knowledge required to participate in advanced studies in Physics or related areas.

OUTCOME II. Physics graduates will have the skills necessary to participate in advanced experimental research in Physics or related areas.

OUTCOME III. Physics graduates will be able to clearly articulate theoretical and experimental concepts in oral and written presentations.

Program Components

Program components and learning objectives are identified in the table on the next page. Here, the Physics major program includes Phys 167, 168, 191, 243, 244, 245, 250, 291, 325, 336, 350, and one or more upper level courses. The Combined Course Physics major includes 167, 168, 191, 243, 244, and 245, and additional coursework that transferred from the engineering school. The Physics major with elementary education certification includes Phys 167, 168, 191, 243, 244, 245, 250, 291, 325, and 336 with two elective courses which can include Phys 105 or Phys 206. The Interdepartmental Mathematics/Physics major includes Phys 167, 168, 243, 244, 250, 325, 336, and 380 with additional mathematics courses. Also listed in the table below are the introductory and intermediate astronomy courses (105 and 206, respectively). Not included are courses in the "pre-medical" curriculum (115 and 116), and other "General Education" courses (101 and 102).

Outcome	Learning Objectives	105	105L	205/206	205L206L	167	167L	168	168L	191/291	243	244	245	245L	250	308	322	325	336	350	380	384	387	Assessment Measure
1. Students in Physics courses will demonstrate knowledge of the fundamentals of physics and/or or astronomy principles.	Students will explain and apply their understanding of mechanics	X		x		x	x											x		x				MFT
	Students will explain and apply their understanding of electricity, magnetism, and optics	X						x	x				x			x	x		x	x				
	Students will explain and apply their understanding of thermo-dynamics							x	x													x		
	Students will explain and apply their understanding of quantum mechanics														x					x			x	
	Students will learn to interpret and create mathematical models and/or simulations of physical phenomena.					x	x	x	x		x	x	x	x						x	x		x	
	Students will be able to explain and apply their understanding of astronomical phenomena.	x	X	X	x						x	x						x			x			
2. Students who take laboratory courses in physics will be able to (C) conduct experiments using accepted experimental methodologies and/or (D) design experiments to explore problems of practical and theoretical importance.	Students will learn the skills that are necessary to conduct experiments that seek to elucidate physical phenomena						C		C					C, D						C, D				Lab Exam
3. Students will clearly articulate theoretical and experimental concepts in oral and written presentations.	Students will learn how to make effective oral and written presentations.	x					X	X	x	x				x						x				Presentation

Outcomes:

Quantitative Measures and/or Qualitative Indicators

ASSESSMENT I. Physics graduates will receive scores on the Major Field Test which are consistent with national norms. Knowledge will also be assessed in introductory courses using pre-tests and post-tests that have national benchmark standards. Admission to graduate and professional schools will be used as an indirect indicator of student preparation for advanced work, as will alumni surveys.

ASSESSMENT II. Physics graduates will have satisfactory performance on a skills test that is administered in Phys 350, *Advanced Laboratory,* and those who participate in advanced independent research experiences will have, or will develop, the skills necessary to participate in those experiences. Also, external evaluation of student preparation for off-campus research experiences will be considered when available. Admission to graduate and professional schools will be used as an indirect indicator of student preparation for advanced work, as will alumni surveys.

ASSESSMENT III. Physics graduates will demonstrate proficiency in writing technical reports, in critically interpreting scientific literature and in delivering a technical oral presentation on primary or secondary scientific investigations.

Analysis and Interpretation

(Varies by year)