Department of Physics and Astronomy Self-Study Executive Summary

The learning goals for physics majors at Millikin University are:

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beyond. The department is housed in the Leighty-Tabor Science Center (LTSC), which

During their junior and senior years, a typical physics major will take an assortment of standard courses, including Theoretical and Applied Mechanics, Electromagnetism, Physical Chemistry, and Quantum Mechanics. Along with these courses will be a number of math and other science classes, depending on student interest and career goals. These courses are primarily theory-based, and will involve extensive integration of material from a variety of classes and fields. However, during the junior year, students will take a more advanced experimental research class (Experimental Physics II - PY 362), which will introduce them to National Instruments LabView™, the industry and academic standard in experimental control and data acquisition. As seniors they will complete an extensive individual research project, to act as a capstone experience.

A key component of the Physics program at Millikin is that each student will design their own major, in consultation with their advisor and any other relevant faculty. This will allow for greater flexibility in the curriculum, which experience shows is highly desirable to many students. Because of the flexibility in the program, advising is especially important. Since each student's interests and goals influence what classes they take and what path they take

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MFTs were introduced in 1989, and are given, in a variety of disciplines, at over 700 colleges and universities (including the MU Chemistry department). The scores will be tracked over the (up to) three years that students take the exam, and progress will be measured both on how individual students improve as well as how MU students compare to national results. There are three scores reported by ETS – a Scaled Score, ranging between 120 and 200 (2004 median score for seniors – 144), an Introductory Physics Score, ranging between 20 and 100 (2004 median score for seniors – 44), and an Advanced Physics Score, ranging between 20 and 100 (2004 median score for seniors – 46).

It is expected that students will improve as they progress through Millikin, so that a satisfactory result for a sophomore would be lower than that for a junior, etc. The departmental goals for each of the three courses are listed below (in terms of average percentile ranking for the overall scaled score):

Soph.	G reen: Percentile ranking	25	Yellow. Percentile ranking
Junior	G reen: Percentile ranking	45	Yellow: Percentile ranking
Senior	Green: Percentile ranking	60	Yellow. Percentile ranking

Goals 2 and 3 will be evaluated through the rubrics discussed below. Because for the 2005-2006 AY, there were no senior physics majors and one only junior physics major, the

Item	Criteria			
	Excellent	Adequate	Unsatisfactory	
Background	[5 points]	[3 points]	[1 point]	
Research	A thorough explanation and analysis of previous work, development of appropriate and insightful study questions and hypotheses, synthesis into a coherent proposal.	Shows some evidence of the process but fails to meet a significant amount of criteria for excellence.	Restates some general ideas or	

Written Presentations:

	Excellent	Adequate	Nominal
Clarity of Writing	[5 points] Clear logic and structure of paper. Strong command of language, spelling, and grammar. Clear confidence in command of material. Easy to read.	[3 points] Overall, a solid paper, but fails to meet a significant amount of criteria for excellence. Could use proofreading.	[1 point] Poorly organized paper – no clear structure or logic. Poor grammar or spelling. Difficult to understand and read.
Length and Appropriateness of paper	[5 points] Length of paper appropriate for forum or meets assigned criteria. Included enough material to keep paper consistently strong, but not too dense. No filler. Paper aimed at appropriate audience – professional, classmates, general audience, etc. Humor, etc, takes into account audience level and composition.	[3 points] Paper a little too long or too short, but otherwise lacking filler and not too dense. Generally appropriate level of writing, but at times above or below heads of audience. Some remarks perhaps inappropriate for audience.	[1 point] Significantly too much or too little material of substance. Failed to take audience into account when writing.
Demonstration of understanding of physics	[5 points] Clear understanding of subject and definitions of presentation- specific terms. Insight into material beyond what!		

VII. <u>Improvement Plans</u>

For obvious reasons, the department is in a state of flux. Therefore, everything that exists in terms of curriculum, instruction, and assessment is under construction. Based on prior experience and a limited amount of data taken at Millikin, it appears that the above goals are reachable, assuming that appropriate levels of support are provided. For AY 2005-2006, we have added an additional hour to the weekly laboratory sessions for PY 201, 202, 226, 236, st *k*A-

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	Problem Solving	Experimentation	Communication
PY 100 - The Planets			
PY 101 - Stars and Galaxies			
PY 104/ 105 - Lab			
PY 106 - Physics of Sports	YES		
PY 111 - College Physics I	YES		
PY 112 - College Physics II	YES		
PY 151 - University Physics I	YES	YES	
PY 152 - University Physics II	YES	YES	
PY 253 – Modern Physics	YES	YES	
PY 262 - Experimental Physics I		YES	YES
PY 300 - Astrophysics	YES		YES
PY 303 - Physical Chemistry I	YES		

Appendix I Curriculum Map