

Assessment: Reporting Unit Four Column

Physics - B.S.

Objectives	Assessment Methods	Results/Observations	Meaningful Changes
<p>16-20 PLLO 1 - Students will be able to solve problems in PHY 460 in the following areas: Newton's laws, Central force motion, Conservation of energy, Lagrangian dynamics, rigid bodies.</p> <p>Objective Status: Active</p> <p>Objective Type (Control-click to select multiple): 16-20 Plan, BS General Physics, Critical Thinking Learning Objective, Program-Level Learning Objectives (PLLO)</p>	<p>Homework Assignments involving: Newton's laws, Central force motion, Conservation of energy, Lagrangian dynamics, rigid bodies.</p> <p>Criterion: Students will be able to solve exam problems</p> <p>Schedule: Annually</p>	<p>Result Status: Result Open-Further action needed</p> <p>Result/Observation Type: Limitation</p> <p>The indication is that 80% of the students are performing at a satisfactory or better level, according to graded assignments and exams. (04/30/2017)</p>	<p>Meaningful Changes: Dr. Ciocca has covered more material in the current semester than he has in the past, and plans to cover even more material in spring 2018. (04/30/2017)</p> <p>Meaningful Changes: Based on faculty strategic planning workshops and consultations, the Department of Physics and Astronomy is working to align our Annual Planning and Progress Report results and meaningful change with best practices. Throughout the 16-17 academic year, we will be developing the course activities that will serve as direct measures of student learning (as opposed to course grades). In addition, we are working to better understanding our BS Physics and BS Physics/Teaching majors to best meet their post-graduation needs for careers and/or graduate school. (06/30/2016)</p>
		<p>Result Status: Result Open-Further action needed</p> <p>Result/Observation Type: Strength</p> <p>Students in 460 have satisfactorily completed homework assignments in the above areas during Spring 2017</p>	<p>Meaningful Changes: Dr. Ciocca has covered more material in the current semester than he has in the past, and plans to cover even</p>

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<p>16-20 PLLO 2 - Students will be able to solve problems in PHY 470 in the following areas: Schrodinger equation in one dimension, angular momentum, hydrogen atom, perturbation theory.</p> <p>Objective Status: Active</p> <p>Objective Type (Control-click to select multiple): 16-20 Plan, BS General Physics, Critical Thinking Learning Objective, Program-Level Learning Objectives (PLLO)</p>	<p>Homework problems involving: Schrodinger equation in one dimension, angular momentum, hydrogen atom, perturbation theory.</p> <p>Criterion: Students will be able to solve exam problems and conceptual questions.</p> <p>Schedule: Annually</p>	<p>semester. This will be monitored every spring since that is the frequency with which the course is taught. (04/30/2017)</p> <p>notes: This is an ongoing process.</p> <p>Result Status: Result Open-Further action needed</p> <p>Result/Observation Type: Strength</p> <p>Homework problems and test questions and problems have been assigned in all of the above mentioned areas. Each assessment has been graded by the instructor (Blose). The results for the homework assignments are excellent, with each student (albeit only four are enrolled) achieving 90% or higher on each homework. It should be emphasized that these homework assignments are lengthy, complex, and difficult. The exam results are mixed. Students are missing far too many conceptual questions than students with their abilities should be missing. Test questions taken from the Physics GRE have proved to be extremely vexing to all but one student. A much stronger emphasis on conceptual understanding, even a course of action as basic as "read the text with understanding" has been employed, and will be employed in a much stronger manner when this course is taught in spring 2018. (04/30/2017)</p> <p>notes: This is an ongoing assessment and will be continued every spring, as that is the frequency of offering for the course.</p>	<p>more material in spring 2018. (04/30/2017)</p> <p>Meaningful Changes: A new approach was taken for the first half of the course whereby Dirac notation was used from the beginning in an effort to enable the students to be "fluent" with that notation. In my opinion, the results were only moderately successful, although better than they would have been otherwise. Use of GRE test questions on course exams really challenged the students. They will continue to be used in the future, both because they will better prepare the students for the Physics GRE and because they are very good questions and problems that tax the students and make them think harder. (04/30/2017)</p>
<p>16-20 PLLO 3 - Students will be able to solve problems in PHY 456 in the following areas: Laws of thermodynamics, entropy, Boltzmann statistics and partition functions, phase equilibria, photon statistics.</p> <p>Objective Status: Active</p> <p>Objective Type (Control-click to select multiple): 16-20 Plan, BS General Physics, Program-Level Learning Objectives (PLLO)</p>	<p>Home work problems involving: Laws of thermodynamics, entropy, Boltzmann statistics and partition functions, phase equilibria, photon statistics.</p> <p>Criterion: Students will be able to solve exam problems.</p> <p>Schedule: Annually</p>	<p>Result Status: Result Open-Further action needed</p> <p>Result/Observation Type: Strength</p> <p>This course was taught in fall 2016 by Blose. It was still a hybrid in the sense that five weeks of introductory thermodynamics at the Serway level was covered. Because of the advent of PHY 211 Intermediate Physics, which has been taught for the first time this spring, the 456 course will be a strict upper level statistical mechanics course without the introductory material previously covered, except as a quick review. In the fall 2016 course all of the above topics were covered (and more!) . An enrollment of only four students, each very bright, enabled us to cover far more material than we have in the past, even with the necessity</p>	<p>Meaningful Changes: We covered more advanced material in this course than we have covered in the previous comparable course (PHY 375 formerly "Thermodynamics"). The homework and test problems were more challenging (by a small degree perhaps), but the level of student ability (only four students and all of them general physics majors) was much higher than for previous classes. Quantum</p>

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		<p>of covering Serway level thermodynamics. The performance on homework and exam problems was routinely excellent. Students were able to achieve perfect scores on more than 90% of the problems assigned for homework. Two of the students had 90% exam averages and two had 70 % exam averages. More than anything else this indicates a difference in level of effort and focus than native ability. There are no particular subject areas that are in need of special coverage or gross modification. (04/30/2017)</p> <p>notes: Since this course will be modified once again for fall, we will probably cover more advanced topics than were covered during this past fall, although the class was able to handle an extraordinary amount of material in a shorter time than most classes who have taken this course. This is probably because there are general physics majors only in the class. No longer do fire protection/safety engineers or even pre-engineers enroll in this course. To be precise, this course was formerly called PHY 375 Thermodynamics, and the fire protection and pre-engineers still enroll in a modified PHY 375 Engineering Thermodynamics course, while the general physics majors enroll in PHY 456.</p>	<p>statistics and magnetic phenomena related to "negative temperatures" were covered far more comprehensively than before and the performance of students in both homework and test problems related to those topics was routinely excellent. (04/30/2017)</p>
<p>16-20 PLLO 4 - Students will be able to solve problems in PHY 421 in the following areas: Gauss' Law, boundary value problems in electrostatics, electrostatics in media, magnetostatics.</p> <p>Objective Status: Active</p> <p>Objective Type (Control-click to select multiple): 16-20 Plan, BS</p>	<p>Homework problems involving: Gauss' Law, boundary value problems in electrostatics, electrostatics in media, magnetostatics.</p> <p>Criterion: Students will be able to solve exam problems.</p> <p>Schedule: Annually</p>	<p>Result Status: Result Open-Further action needed</p> <p>Result/Observation Type: Strength</p> <p>Students have been assigned and turned in homework problems in the above-mentioned areas and have completed the assignments successfully. Exam performance in those areas has also been satisfactory with virtually all students earning an A or B in the course. (04/30/2017)</p> <p>notes: We will continue to monitor</p>	<p>Meaningful Changes: Students who have struggled in other advanced physics courses have performed better than usual in this course. (Some students who often earned C's are earning A's and B's.) This indicates that the instructor (Piercey) is able to extract more from these students</p>

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<p>General Physics, Program-Level Learning Objectives (PLO)</p>		<p>student performance in the 421 course each fall. Next fall Dr. Lair will replace Dr. Piercey as instructor for the course and we will follow the progress of the students as well as track changes (if any) in the course itself.</p>	<p>than others have in the past. His veteran teaching style appears to resonate well with these students as the results are usually A's and B's in an extremely difficult course. (04/30/2017)</p>
<p>16-20 PLO 5 - Students will be able to solve problems in PHY 422 in the following areas: Faraday's Law, Potentials and fields, electromagnetic radiation, special relativity as it relates to electromagnetic theory. Objective Status: Active Objective Type (Control-click to select multiple): 16-20 Plan, BS General Physics, Program-Level Learning Objectives (PLO)</p>	<p>Homework problems involving: Faraday's Law, Potentials and fields, electromagnetic radiation, special relativity as it relates to electromagnetic theory. Criterion: Students will be able to solve exam problems Schedule: Annually</p>		
<p>16-20 PLO 6 - Students will be able to satisfactorily complete experimental procedures in PHY 406. Objective Status: Active Objective Type (Control-click to select multiple): 16-20 Plan, BS General Physics, Program-Level Learning Objectives (PLO)</p>	<p>Data analysis and written reports for experiments in PHY 406. Criterion: Students will be able to successfully undertake data analysis and complete written reports for experiments in PHY 406. Schedule: Annually</p>	<p>Result Status: Result Closed-No further action needed Result/Observation Type: Limitation For the 15-16 academic year, we have no results to report on this program-level learning objectives. Due to significant revisioning of our strategic goals, this is a new objective and we will be designing a methodology to collect baseline data from the 16-17 academic year, to be reported in our 2017 Annual Planning and Progress Report. (04/30/2017)</p>	<p>Meaningful Changes: The course has run very well and really needed only one major change: We limited enrollment. In spring 2016, there were 15 or 16 students enrolled in the class which was about twice the number that can be sufficiently instructed in a class of that nature. This year the enrollment was limited to 9 students, which is far more manageable, and both the instructor and the students benefitted greatly from this. Advanced physics laboratory experiments, techniques, analysis, etc. require very low numbers of enrolled students in order to be beneficial. We intend to keep enrollments limited to 8 or 9 students, even if it means we will</p>

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		<p>Result Status: Result Open-Further action needed Result/Observation Type: Strength Students have both undertaken data analysis and completed written reports successfully in PHY 406, according to Dr. Ciocca, the instructor for the course. Students have increased their writing acumen by revising the lab reports and using LATEX for all reports. (04/30/2017)</p>	<p>someday have to offer the course in both fall and spring. (04/30/2017)</p> <p>Meaningful Changes: Based on faculty strategic planning workshops and consultations, the Department of Physics and Astronomy is working to align our Annual Planning and Progress Report results and meaningful change with best practices. Throughout the 16-17 academic year, we will be developing the course activities that will serve as direct measures of student learning (as opposed to course grades). In addition, we are working to better understanding our BS Physics and BS Physics/Teaching majors to best meet their post-graduation needs for careers and/or graduate school. (06/30/2016)</p> <p>Meaningful Changes: This course will be monitored every spring semester. I do not foresee major changes being made to the course, save for a new experiment added to the course on occasion, but probably only every two to three years at most. (04/30/2017)</p>
<p>16-20 PLLO 7 - Students will demonstrate knowledge and application of research skills Objective Status: Active Objective Type (Control-click to select multiple): 16-20 Plan, BS General Physics, Critical Thinking Learning Objective, Program-Level</p>	<p>Student work samples produced during research experience (rubric evaluation) Schedule: Annually</p>	<p>Result Status: Result Open-Further action needed Result/Observation Type: Strength We have no current samples of work produced by students from research experiences (at or away from EKU) at this time. Furthermore it is apparent that none of our students have been accepted to REU programs at other universities for this summer. We have had students engaged in the</p>	

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<p>Learning Objectives (PLO), Research/Scholarship</p>	<p>Research sponsor evaluations of student performance during the research experience Schedule: Annually</p>	<p>beginning stages of research projects in both Laser Physics and Astrophysics during the current semester, but they have not reach a point where a written report is pertinent. (04/30/2017) notes: We are hoping to increase the number of students involved in on campus research as well as during summers in REU programs.</p>	
<p>16-20 PLO 8 - Students in the program will be more confident in solving problems in physics after having taken PHY 201 and PHY 202. This objective focuses on critical or creative thinking/communication skills Objective Status: Active Objective Type (Control-click to select multiple): 16-20 Plan, BS General Physics, Communication Skills Learning Objective, Critical Thinking Learning Objective, Program-Level Learning Objectives (PLO)</p>	<p>Survey concerning confidence in solving Physics problems given at the beginning of Phy 201 and at the end of Phy 202. Criterion: 80 % of students in the program will indicate a higher level of confidence in solving Physics problems after taking Phy 201 and 202. Schedule: The survey cycle will be completed annually.</p>	<p>Result Status: Result Open-Further action needed Result/Observation Type: Strength Informal polling of students in PHY 201 and 202 indicate that all (100%) believe that they are better problem solvers than before taking the course. This is completely expected, but is also completely necessary to ensure that we are doing a good job in teaching those courses. (04/30/2017) notes: We will monitor this question every year, although it is virtually impossible to imagine less than 100% agreement with this after courses such as 201 or 202. Even students who perform relatively poorly are still much better problem solvers than when they began.</p>	<p>Meaningful Changes: Because PHY 211 (Intermediate Physics) was offered for the first time this semester, all of the coverage of optics was relegated to that course. This enabled Dr. Mark Pitts to cover AC circuits in PHY 202, rather than try to force feed geometric optics in two weeks, as has been done in the past. The 211 class has benefitted classes such as 201, 202, 456, and indirectly 460, 421 and 422. This will become more and more obvious in the coming years. (04/30/2017)</p>