

Summary of 2013-2014 Annual Progress Report

- **SLO 1:** Students will demonstrate ability to apply foundational knowledge to the solution of problems in physics. [**K-State SLO:** *Knowledge, Critical Thinking*]

An assessment instrument was developed to assess student's ability to solve level appropriate, classical problems in introductory physics. The instrument (an on-line, KSOL based problem solving set) was administered to a group of students who had, within the last year, successfully completed Engineering Physics I & II and were then in PHYS 325. Unfortunately, few students completed the web-based assignment and so the results of the instrument were deemed of no use.

Instead, the department has decided to use the average exam score of PHYS 223 & PHYS 224 as a more reliable way to assess our students skill at solving, level appropriate problems.

Assessment Instrument: Average Exam Score in PHYS 223 (Physics I)			
Academic Year	# of Students	% Proficient	% Exemplary
2013-2014	18	72% (13)	17% (3)

Assessment Instrument: Average Exam Score in PHYS 224 (Physics II)			
Academic Year	# of Students	% Proficient	% Exemplary
2013-2014	12	100% (12)	0% (0)

2013-2014 Summary: This is a new assessment instrument to replace the on-line problem solving assignment originally intended to be utilized this assessment cycle. The department feels that average exam scores are a better and more reliable assessment instrument that students can not opt out of. The results of the Physics I assessment are reasonable and within the expected range. Physics I is the first introduction that students have to university level, calculus based physics and is therefore inherently difficult. Students are just learning the study and cognitive skills necessary to succeed in the discipline. The results of Physics II are both encouraging and concerning at the same time. First, encouraging in that 100% of our students met proficiency, but also concerning that none met exemplary standards. Physics II is a more demanding class, both mathematically and intellectually than is Physics I and that might, in large part, account for the lack of exemplary grades. It will be interesting to see how this first time assessment compares to subsequent assessment cycles.

- **SLO 2:** Students will demonstrate skill in collecting, recording and analyzing data

Assessment Instrument: PHYS 325 (Relativity & Quantum Physics) Average Lab Score			
Academic Year	# of Students	% Proficient	% Exemplary
2010-2011	26	88% (23)	77% (20)
2011-2012	26	92% (24)	62% (16)
2012-2013	28	100% (28)	100% (28)
2013-2014	29	81% (22)	52% (15)

2013-2014 Summary: Students in PHYS 325 are generally proficient with the a slight majority meeting exemplary standards. This is fewer students meeting both levels compared to the previous few years, which we believe is largely due to two reasons: 1) Several students withdrew late in the course or just generally had poor attendance; And 2) a deliberate effort has been made to be more objective with our assessment methods regarding lab grades. As stated in last year's results for the SLO, the department felt it necessary to develop more reliable and consistent assessment methods.

- **SLO 3** Students will demonstrate the ability to effectively communicate information, scientific or otherwise in both written and verbal form

PHYS 636 (Physical Measurement and Instrumentation): Capstone Project Scores†			
Academic Year	# of Students	% Proficient	% Exemplary
2010-2011	3	100% (3)	0% (0)
2011-2012	7	100% (7)	43% (3)
2012-2013	n/a	n/a	n/a
2013-2014	n/a	n/a	n/a

PHYS 506 (Advanced Physics Lab): Written Lab Scores			
Academic Year	# of Students	% Proficient	% Exemplary
2010-2011	10	100% (10)	50% (5)
2011-2012	15	93% (14)	67% (10)
2012-2013	18	100% (18)	94% (17)
2013-2014	17	17 (100%)	9 (53%)

2013-2014 Summary: PHYS 506 continues to be an effective method of teaching our students to communicate well, especially to relate well to the scientific community.

PHYS 506 (Advanced Physics Lab) Oral Exam			
Academic Year	# of Students	% Proficient	% Exemplary
2014-2015	-	-	-

2013-2014 Summary: This instrument was not used for assessment purposes for this cycle.

† This assessment instrument (PHYS 636 Capstone Project Scores), used as an instrument for assessing the verbal component of **SLO 3**, is being replaced with the Oral Exam Scores from

PHYS 506, Advanced Physics Lab. This new instrument better assesses the verbal component of scientific communication and is a more reliable and consistent instrument. A consistent grading rubric for assessment of this instrument is being developed.

- **SLO 4** Students will demonstrate the ability to apply knowledge of physics at the advanced undergraduate level

* PHYS 522 (Mechanics): Final Exam Scores			
Academic Year	# of Students	% Proficient	% Exemplary
2011-2012	16	75% (12)	13% (2)
2012-2013	19	79% (15)	47% (9)
2014-2015	15	80% (12)	7% (1)

* PHYS 532 (Electromagnetic Fields I): Final Exam Scores †-changed to Exam Ave Scores			
Academic Year	# of Students	% Proficient	% Exemplary
2011-2012	13	46% (6)	0% (0)
2012-2013	12	67% (8)	25% (3)
2014-2015†	16	94% (15)	44% (7)

* PHYS 662 (Intro to Quantum Mechanics): Final Exam Scores			
Academic Year	# of Students	% Proficient	% Exemplary
2011-2012	14	43% (6)	14% (2)
2012-2013	12	91% (11)	36% (4)
2014-2015	18	56% (10)	6% (1)

2013-2014 Summary: The majority of our students meet proficiency for these assessment instruments. The numbers of students at the proficient and exemplary levels is common for advanced, demanding classes and is consistent with traditional grade distributions in these upper level physics courses.

PHYS 662 is a challenging course with students typically struggling to do well. Improvement had been made over the past year or so in the numbers of students meeting proficiency and exemplary standards. That was not the case last year.