Course Outcomes Guide

Directions: Please complete this form to document your progress toward improving student learning. For each item, indicate your progress and your anticipated next steps. Thank you!

Course/Program Title: **PHS 104**   **Date: Oct. 2014**
                                  Physical Science

Course/Program Team: **Veronica Stein, Karen Wilson and Adjuncts**

Expected Learning Outcomes
During the completion of General Physical Science, students will:
1. Discuss the nature of science, the scientific method, and the historical development of some of the laws of nature;
2. Apply the most basic laws of nature, e.g. Newton's Laws of Motion, laws of thermodynamics, electricity and magnetism, atomic structure to elementary problems in class and in the laboratory;
3. Relate the universality of the conservation of energy to classical physics and chemistry.
4. Access, process, analyze and synthesize scientific information.

Assessment (How do or will students demonstrate achievement of each outcome? Please attach a copy of your assessment electronically.)
1. In-class exams with combination of multiple-choice, short answer, and problem solving.
2. Written laboratory worksheets with a grading rubric.
3. Homework questions and problems from textbook author, completed online.
4. Written assessments of current events articles. (fracking/energy/Higgs Boson)

Validation (What methods have you used or will you use to validate your assessment?)
A common final was developed by the adjuncts and full time faculty that consists of 50 multiple choice questions. Also, general education assessment consisting of 9 multiple choice questions have been given to the students.

Results:
The following table presents the mean to the common final for each section and the overall mean for the semester (combining all sections). The Fall exam is a baseline exam, since it the first time we are using this exam and approach in class. The Fall 09 semester have similar means between 32-33,

PHS 104					
Semester	n	mean	section	Combined mean	n_{total}
09/FA	19	30.0	01	32.7	36
	17	35.7	02		
10/SP	15	28.9	01	32.5	33
	18	35.6	02		
10/FA	17	27.1	01	31.7	49
	17	36.5	02		
	15	31.5	03		

Semester	n	mean	section	Combined mean	n_{total}
			PHS 104		
11/SP	21	30.6	01	35.0	43
	22	39.2	02		
11/FA	20	39.8	01	39.6	40
	20	39.4	02		
12/SP	19	38.9	01	39.2	28
	9	39.8	02		
12/FA					
13/SP	18	34.7	01	34.4	36
	18	34.1	02		
13 FA	20	?	01	36.5	38
	18	?	03		
14 SP	21	37	01	38	41
	20	38.5	03		

Follow-up (How have you used or how will you use the data to improve student learning?)
Individual instructors will receive the analysis of exam results to see areas of weakness and determine best way to emphasize those areas. Resources to help students understand concepts of waves – electromagnetic waves, interference, velocity and wavelength proportionality – will be researched and requests will be made for any useful instructional materials. More graphing skills have been included in lab write-ups and instructors should continue to check student understanding on a regular basis.

Budget Justification (What resources are necessary to improve student learning?)
Instructional resources to teach concepts of waves (especially electromagnetic) will be investigated.

Data Table 2
Course: PHS104   **SLOA Data**   **Faculty Team: V. Stein/K Wilson**

	SU 2012	FA 2012	SP 2013	SU 2013	FA 2013	SP 2014	SU 2014	FA 2014	SP 2015	SU 2015	FA 2015	SP 2016	SU 2016
# Active students		44	37		38	41							
%W		2.3%	0%		2.6%	4.9%							
*% walk-away Fs No final exam/grade = F		4.3	9.7		0	0							
% Success (A,B,C)		84.1%	83.8%		86.8%	90.3%							
Common Comprehensive Final Exam Score		/50	34.3/50		36.5/50	38/50							
Gen Ed Assessment		-	3.4/5		6/9	6.39/9							
Mean course grade					78.9%	80.55%							
Item Analysis **Weakest Content Areas**		**	**		***	***							

*% Walk-away Fs = Did not take the final exam and received a grade of F.

Content Areas
**Weak area: interpolation of graph to access data; math analysis of data. Same areas for two semesters.
*** Weak area: no overwhelming areas. Slightly weak in concepts dealing with light waves, distinguishing between law and theory and one question on interpreting a graph.