Course Title & Number: PHY122: General Physics II

Competency Area: **SCIENTIFIC KNOWLEDGE / UNDERSTANDING** (Goal: Students will gain a broad base of scientific knowledge and methodologies in the natural sciences. This will enable them to develop scientific literacy, the knowledge and understanding of scientific concepts and processes essential for personal decision making and understanding scientific issues.)

Faculty submitting the Learning Outcomes: Pete Benzi ***Date***: 3/7/2013

[Instructions: *Please match the Learning Outcomes in the left hand column to those of the course you are submitting for Gen Ed approval. List the corresponding course outcomes in the right hand column to indicate a match*.]

BOR TAP's Learning Outcomes	Corresponding Outcomes for Course Named Above
1. Communicate using appropriate scientific terminology.	• Define the Dot and Cross Product and apply those principles to coordinates and vectors. • Distinguish between position, velocity and acceleration. Use these definitions to accurately describe motion. • Recognize the similarities between harmonic motion and wave motion and use that to solve waves and sound problems. • Describe Electric fields and their behavior in various circumstances. • List the rules governing circuits and demonstrate the functionality of these laws as they apply to circuits. • Discuss the basic principles of magnetic fields. List and calculate the results of charges in motion. • Discuss the basic principles of oscillating charges. Recall the results of harmonic motion and apply these to electro-magnetic waves. • Describe the laws that govern the behavior of light and relate these to electromagnetic waves.
2. Use representations and models to communicate scientific knowledge and solve scientific problems.	• Distinguish between position, velocity and acceleration using appropriate representations and use those concepts to solve harmonic motion problems. • Recognize the similarities between harmonic motion and wave motion and use that to solve waves and sound problems. • Describe Electric fields and demonstrate understanding by solving problems involving forces on charges and electric potential. • List the rules governing circuits and demonstrate the functionality of these laws by solving circuit problems.

	• Employ Gauss' Law to solve problems involving charges and electric fields. • Discuss the basic principles of magnetic fields. List and calculate the results of charges in motion. • Discuss the basic principles of oscillating charges. Recall the results of harmonic motion and apply these to electro-magnetic waves. • List the laws that govern the behavior of light and relate these to electromagnetic waves.
3. Plan and implement data collection strategies appropriate to a particular scientific question.	• Implement the data collection plan in the laboratory and construct data tables, graphs and charts from the data collected. • Evaluate the rigor of conclusions from laboratory experiments by comparing different data sets.
4. Articulate the reasons that scientific explanations and theories are refined or replaced.	• Describe Electric fields and discuss the advantages of Guass's Law vs Coulomb's Law. • Discuss the relationship between Kirchhoff's rules and Faraday's Law. Show that Kirchhoff's rules are only a special case of Faraday's Law. • Compare Maxwell's Equations to Newton's Laws. Discuss how this comparison leads to The Special Theory of Relativity. • Describe the Special Theory of Relativity and how it modifies Newton's Laws.
5. Evaluate the quality of scientific information on the basis of its source and the methods used to generate it.	• Evaluate the rigor of conclusions from laboratory experiments by comparing different data sets. • Consider the quality of information from multiple sources and examine how experimental results are related to the quality of information.
	Additional Outcomes