Common Course Outline for: PHYS 2250 Modern Physics

A. Course Description

1. Number of credits: 4
2. Lecture hours per week: 4
3. Lab hours per week: 0
4. Prerequisites: PHYS 1121, 1122, MATH 2510. Recommended MATH 2520.
5. Co-requisites: None
6. MnTC Goals: 3 Natural Science

A one-semester introduction to the topics of modern physics including the special theory of relativity, solid state physics, and quantum theory. This course requires a background in calculus-based physics and differential equations. This course is generally required for electrical engineering, physics, and astronomy majors.

B. **Date last revised:** April 2017

C. Outline of Major Content Areas:

Special Relativity, Quantum Theory, Solid State Physics

D. Course Learning Outcomes

Upon completion of this course, students should be able to:

1. Solve problems relating to
   a. Special Relativity
   b. Kinetic theory/statistical physics and blackbody radiation
   c. Schroedinger's equation, Heisenberg Principle, one-dimensional wave mechanics, and the wave-particle duality
   d. Atomic, nuclear, and elementary particle physics
   e. Physics of molecules
   f. Physics of solids, metals, and semiconductors
2. Use the terminology of physics intelligently.
3. Explain the significance of seminal modern physics experiments and the relationship between those experimental results and the theories of Modern Physics.
4. Prepare written reports that demonstrate both an understanding of physics and the ability to clearly express ideas.

E. Methods for Assessing Student Learning

Assessment methods are at the discretion of the instructor and may include written and/or oral reports, homework, activities, other projects, quizzes, exams, and a final exam.

Special Information: