COMMON COURSE OUTLINE: Course discipline/number/title: PHYS 1127: Classical Physics I

A. CATALOG DESCRIPTION
1. Credits: 5
2. Hours/Week: 5 hours lecture and 2 hours lab per week
3. Prerequisites (Course discipline/number): MATH 1127 (can be taken concurrently)
4. Co-requisites (Course discipline/number): None

This course is the first semester of a two-semester introduction to classical physics using the mathematics of vectors and calculus. Topics studied include vectors, motion in one and two dimensions, Newton’s Laws of motion, work and energy, conservation of momentum, torque and rotational motion, simple harmonic motion, waves, sound, and fluid mechanics. These topics are studied through lecture, discussion, interactive problem-solving, demonstrations, hands-on laboratories, and independent work. Free-body diagrams are used extensively. Emphasis is on both conceptual learning and problem solving. The laboratory experience will provide the student with opportunities for discovery, measurement, technical writing and data analysis. College level reading and writing skills are required.

B. DATE LAST REVISED (Month, year): April, 2008

C. OUTLINE OF MAJOR CONTENT AREAS:
Lecture:
1. Units and measurement
2. Problem solving strategies
3. Linear motion
4. Vectors and motion in two dimensions
5. Newton’s three laws of motion
6. Work and energy
7. Linear momentum and collisions
8. Circular motion
9. Torque
10. Rotational dynamics
11. Angular momentum
12. Statics
13. Simple harmonic motion
14. Fluid mechanics
15. Waves
16. Physics of sound
17. Applications of calculus to physics

Lab:
1. Measurement
2. Significant figures
3. Basic statistics
4. Graphing
5. Error analysis
6. Data analysis
7. Scientific method
8. Instrumentation
9. Technical writing

D. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Learn common definitions of terms found in physics.
2. Explain and apply physics principles to their everyday lives.
3. Explain many phenomena using these principles.
4. Learn problem-solving techniques and be able to apply algebra and differential calculus to problem solving.
5. Learn to think critically and conceptually about the physical world.
E. LEARNING OUTCOMES (MNTC):
Goal 2/Critical Thinking: The student will be able to:
1. Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive and conscious of possible bias in the information selected.
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives, which can give alternative meanings or solutions to given situations or problems.
3. Analyze the logical connections among the facts, goals and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.

Goal 3/Natural Sciences: The student will be able to:
1. Demonstrate understanding of scientific theories and the ways in which scientists develop, express and question theories in the field of physics.
2. Formulate and test hypothesis by performing laboratory or simulation experiments requiring the collection of data, its statistical and graphical analysis and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses and interpretations both orally and in writing.
4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented and make informed judgments about science-related topics and policies.

F. METHODS FOR EVALUATION OF STUDENT LEARNING:
Evaluation methods may include any or all of the following:
1. Objective exams
2. Essay exams
3. Research papers
4. Quizzes
5. Written homework
6. Small group projects
7. Oral presentations
8. Laboratory reports
9. Or any other as deemed appropriate by the instructor and so indicated by his/her syllabus (original or revised)

G. SPECIAL INFORMATION (if any):
A scientific calculator is required.