A. Course Description

Credits: 5

MATH 120 Precalculus
OR
MATH 115 College Algebra

Lab Hours/ Weeks: Corequisites: None

Lecture Hours/ Week :

MnTC Goals: Goal 03 - Natural Science

Physics investigates concepts of energy involved in everyday life. General Physics is designed for students interested in science and technology related careers and majors. It is taught at the algebra/trigonometry level and it incorporates conceptual understanding, laboratory work, and mathematical problem solving. General Physics I covers motion, heat, and wave motion.


C. Outline of Major Content Areas:

See Course Description for major content areas.

D. Learning Outcomes (General)

1. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
2. Demonstrate understanding of scientific facts and theories in physics.
3. Formulate and test hypotheses by experiment in physics, including the collection of data, statistical and graphical analysis of results, and interpretation of its sources of error and uncertainty.
4. Apply principles of energy and linear momentum conservations in solving problems involving kinetic and potential energy as well as collisions between objects.
5. Demonstrate understanding of the properties of vectors, describe motion in terms of position, velocity and acceleration, and use vectors to describe projectile and circular motion.
6. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.
7. Understand and analyze rotational motion in terms of angular displacement, velocity and acceleration, the connection between force and torque.
8. Understand and apply Newton’s laws of motion, the concepts of work, energy and power, and the connection between forces and motion.
9. Understand oscillatory motion and waves, including superposition, interference, and diffraction of waves, sound waves and Doppler effect.
10. Understand the concepts of heat and internal energy and use the first law of thermodynamics as applied to heat Engines.
11. Understand the properties and phenomena of fluids including buoyancy and laminar flows, and gasses including gas laws and the kinetic theory of gases.
12. Ability to use all of the above listed physics knowledge in quantitative problem solving.
13. Demonstrate quantitative reasoning skills and competency with arithmetic, algebra and elementary statistics at a level appropriate for graduates of bachelors degree programs.
14. Recall, describe and apply the concepts, knowledge and vocabulary of physics at the level necessary for success in a second semester General Physics course.

E. Learning Outcomes (MN Transfer Curriculum)
Goal 03 - Natural Science

1. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students’ laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.

2. Demonstrate understanding of scientific theories.

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.

G. Special Information

None