

Prepared by the Department of Natural Sciences & Applied Technology

Date of Departmental Approval: February 15, 2017

Date approved by Curriculum and Programs: February 22, 2017

Effective: Fall 2017

1. **Course Number:** PHY106 and PHY106L
Course Title: Survey of Physics and Survey of Physics Laboratory
2. **Description:** Classical and modern physics presented conceptually and experimentally for students desiring a one semester introduction to physics. The class will emphasize verbal and conceptual understanding of the way the world works using as little mathematics as possible. This course is appropriate for non-science majors and as a preparation for PHY211. (3 class/ 2 laboratory hours)
3. **Student Learning Outcomes (instructional objectives, intellectual skills):**
Upon successful completion of this course, students are able to do the following:
 - Describe the scope of the field of Physics and its basic historical development.
 - Effectively utilize appropriate quantities and units to describe physical phenomena.
 - Use a calculator to solve basic one and two step problems.
 - Use appropriate laboratory devices and techniques, collect and analyze meaningful data, and present coherent laboratory results within a provided framework.
 - Clearly and cogently describe (using Standard American English) the activities and results for some laboratory exercises.
 - Work cooperatively in a small group setting to complete various laboratory exercises, following the written instructions provided.
 - Define, compare and contrast displacement (distance), velocity (speed), and acceleration.
 - State and interpret Newton's three laws of motion.
 - Describe and discuss circular motion and projectile motion.
 - Describe the gravitational field (locally and universally).
 - Define work, energy, power and momentum.
 - Discuss conservation of energy and conservation of momentum.
 - Explain some of the ways in which Physics can be applied to the problems of society in general.
 - The individual instructor of this course will normally expand upon this list of learning outcomes.
4. **Credits:** Four credits
5. **Satisfies General Education Requirement:** Natural or Physical Science
6. **Prerequisite:** MAT030 (Elementary Algebra) or MAT035 (Algebra for Non-STEM), ENL108 (Critical Reading & Thinking) or satisfactory basic skills assessment scores
7. **Semesters Offered:** Varies
8. **Suggested General Guidelines for Evaluation:**
Course grading procedures and make-up policies are detailed in a student handout. In summary, 75% of the course grade evaluation is based on achievement in the lecture portion of the course, while 25% is based on the laboratory portion of the course.
9. **General Topical Outline:** See attached.

PHY106. Survey of Physics Content Outline

I. Mechanics

A. Motion

1. distance, velocity and acceleration
2. average vs. instantaneous
3. free fall

B. Newton's Laws

1. inertia
2. $F = ma$
3. action - reaction
4. mass, force, weight and their units

C. Motion in 2 Dimensions

1. circular motion
2. projectiles

D. Gravitation

II. Conservation Laws

A. Momentum

1. definition
2. collisions
3. angular momentum

B. Energy

1. work
2. kinetic and potential energy
3. power

III. Additional topics from the following (selected by the individual instructor)

A. Matter and Waves

1. Structure of Matter
 - a. atoms
 - b. temperature and heat
 - c. ideal gas law
 - d. heat flow
2. Vibrations and Waves
 - a. vibrations
 - b. waves
 - c. sound

B. Optics; Electricity and Magnetism

1. Light
 - a. properties of light
 - b. geometric optics
2. Static Electricity
 - a. charge
 - b. electric force and field
3. D.C. Circuits
 - a. series
 - b. parallel
4. Magnetism
 - a. magnetic fields
 - b. induction

C. Modern physics

1. Relativity
2. Early quantum physics
3. Atomic and nuclear physics
4. Cosmology