Course Outcome Summary

General Education Satisfier Course

PHY 101 Technical Physics

Course Information
Division: Science/Mathematics
Contact Hours: 75
Lecture Hours: 45
Lab Hours: 30
Total Credits: 4

Prerequisites
English 090 and Reading 090 and MATH 124 or MATH 151 or higher or a qualifying score on ACT or COMPASS tests

Course Description
This course is designed for technical majors to provide an understanding of physical principles and their application to industry and certain technical occupations. Topic coverage reflects the general needs of the various technician programs while giving a broad overview of the physical world around us. Topics included are measurement, kinematics, mechanics, rotational motion and dynamics, simple machines, matter, fluids and fluid flow, heat and thermodynamics, waves, sounds, optics and some electricity and magnetism. Course requires laboratory work.

This course is approved as a General Education competency satisfier.

General Education Goal: Critical Thinking
Competency: Understand the elements of scientific inquiry and scientific principles in a natural science college laboratory course setting.
Learning Outcome: Students will use the scientific method to define a problem, utilize appropriate methods to solve the problem, and propose and evaluate a solution to the problem.

General Education Learning Objectives
A. Observe and describe natural phenomena and formulate hypotheses.
B. Plan and implement scientific experiments to test hypotheses.
C. Utilize scientific laboratory skills for data collection within a college laboratory setting.
D. Evaluate experimental data and propose solutions based on this data.
E. Evaluate the proposed implications of a solution.

Course Outcomes
In order to evidence success in this course, the students will be able to:

1. State and demonstrate understanding of the Scientific Method.
   Applies to General Education Objectives
   A. Observe and describe natural phenomena and formulate hypotheses.
   B. Plan and implement scientific experiments to test hypotheses.
   C. Utilize scientific laboratory skills for data collection within a college laboratory setting.
   D. Evaluate experimental data and propose solutions based on this data.

2. Explain the need for the standardization of measurement and how to classify measurement error.

3. Distinguish vectors and scalars and be able to add or subtract each, respectively.
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4. Apply kinematic equations to solve two dimensional motion problems.

5. Describe Newton's three laws of motion and be able to apply them in dynamical problems.

   Applies to General Education Objectives
   A. Observe and describe natural phenomena and formulate hypotheses.
   B. Plan and implement scientific experiments to test hypotheses.
   C. Utilize scientific laboratory skills for data collection within a college laboratory setting.

6. Define the concepts of work, energy, and power and use the conservation of energy to solve problems involving kinetic and potential energy

7. List the types and be able to analyze the mechanical advantage and efficiency of simple machines.

   Applies to General Education Objectives
   A. Observe and describe natural phenomena and formulate hypotheses.
   B. Plan and implement scientific experiments to test hypotheses.
   C. Utilize scientific laboratory skills for data collection within a college laboratory setting.
   D. Evaluate experimental data and propose solutions based on this data.
   E. Evaluate the proposed implications of a solution.

8. State and be able to apply Newton's Universal Law of Gravitation to weight, free fall, and planetary motion.

9. Define and describe the three types of matter

10. Calculate pressures, apply Archimedes’ principle, and analyze fluid flow using Bernoulli’s principle.

    Applies to General Education Objectives
    A. Observe and describe natural phenomena and formulate hypotheses.
    B. Plan and implement scientific experiments to test hypotheses.
    C. Utilize scientific laboratory skills for data collection within a college laboratory setting.
    D. Evaluate experimental data and propose solutions based on this data.
    E. Evaluate the proposed implications of a solution.

11. Distinguish between heat and temperature, be able to use and convert between common temperature scales. List the three methods of heat transfer and analyze heat transfer applications including specific heat, latent heat, the method of mixtures, and linear expansion.

12. State the Ideal Gas Law and be able to solve for P, V, or T given any two of these variables.

    Applies to General Education Objectives
    A. Observe and describe natural phenomena and formulate hypotheses.
    B. Plan and implement scientific experiments to test hypotheses.
    C. Utilize scientific laboratory skills for data collection within a college laboratory setting.
    D. Evaluate experimental data and propose solutions based on this data.
    E. Evaluate the proposed implications of a solution.
13. Be able to describe sound and electromagnetic waves. Include the Doppler effect for sound waves and the seven components of the electromagnetic spectrum.


15. Be able to draw the geometric optics of reflection and refraction.

16. Identify Ohm's law and apply it to simple two resistor parallel and series circuits.

   Applies to General Education Objectives
   
   A. Observe and describe natural phenomena and formulate hypotheses.
   B. Plan and implement scientific experiments to test hypotheses.
   C. Utilize scientific laboratory skills for data collection within a college laboratory setting.
   D. Evaluate experimental data and propose solutions based on this data.
   E. Evaluate the proposed implications of a solution.