PHY111
ELEMENTARY COLLEGE PHYSICS I
5 Credit Hours

Prepared by: Cliff Castle

Revised Date: January, 2009
by
Cliff Castle

Arts & Science Education
Dr. Mindy Selsor, Dean
PHY111 Elementary College Physics I

I. CATALOG DESCRIPTION

A. Prerequisites: Satisfactory completion of three units of high school mathematics, or MTH133 and MTH134, or MTH141, or MTH121.

B. 5 semester hours credit

C. Elementary College Physics I is a fundamental course dealing with mechanics, sound, electricity, magnetism, light, and the structure of matter. This course is required of agriculture, forestry, architecture, and science majors in fields other than physics and chemistry. The course is composed of four hours of lecture and two hours of laboratory per week. Elementary College Physics I partially meets the science requirement for the Associate of Arts degree. (F)

II. EXPECTED LEARNING OUTCOMES/ASSESSMENT MEASURES

<table>
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<tr>
<th>Students will develop their knowledge of the fundamental laws of physics</th>
<th>Classroom discussions, homework, exams.</th>
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<tr>
<td>Students will develop their comprehension of the methods and techniques used by physicists in the analysis of physical problems</td>
<td>Classroom discussions, homework, exams, laboratory write-ups.</td>
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<tr>
<td>Students will become acquainted with the phenomenon that have had and are continuing to have a great impact on society</td>
<td>Classroom discussions, homework, exams, laboratory write-ups.</td>
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<tr>
<td>Students will comprehend the difference between science and pseudoscience.</td>
<td>Classroom discussions, presentation of alternative theories, exams.</td>
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III. COURSE OUTLINE WITH UNIT OBJECTIVES

A. History and Measurements
   1. Understand the development of modern concepts in physics.
   2. Understand the development and basic assumptions involved in the world's major system of measurements.
   3. Convert from one system of measurements to another.

B. Kinematics
   1. Develop the concept of vectors.
   2. Use the basic equations of kinematics to determine the motion of objects in one and two dimensions.
C. Dynamics
1. Appreciate Newton’s need to develop and codify the concept of force.
2. Understand Newton's three laws of motion.

D. Work and Energy
1. Trace the outline of the development of the concept of energy.
2. Show the relationship between work and the potential and kinetic energies.

E. Thermodynamics
1. Develop the concept of internal energy.
2. Develop the concept of thermometry.

F. Static Electricity
1. Develop the concept of electric charge.
2. Understand and apply Coulomb's Law.
3. Relate electric charge to the proton and electron.
4. Determine the need for the concept of electric field.

G. Electric Current
1. Develop an understanding of electrical potential energy.
2. Relate electrical potential energy to the concept of potential difference.
3. Draw conclusions about the motion of electric charges using potential difference.
4. Identify the relationship of electric current to the motion of electrons.
5. Develop the concept of resistance.
6. Relate resistance, voltage, and electric current.

H. Magnetism
1. Develop a relationship between the behavior of electric charge and magnets.
2. Show Oersted's experiment.
3. Develop the relationship between electric currents and magnetic fields.
4. Show that all magnetism comes from electric currents.
5. Use Faraday's Law to show how electricity is produced for modern technology.

I. Nuclear Physics
1. Investigate the discovery of radiation.
2. Define nuclear decay modes.
3. Describe why atoms have different isotopes.
4. Students will utilize the biological effects of radiation.
IV. METHODS OF INSTRUCTION

A. Lecture

B. Laboratory Activities

C. Classroom Discussion

D. Homework

V. REQUIRED TEXTBOOK

Serway/Vuille, *College Physics*, Brooks/Cole (most recent edition), and *Physics Software Guide* by Cliff Castle

VI. REQUIRED MATERIALS

Calculator and flash drive

VII. SUPPLEMENTAL REFERENCES

None

VIII. METHOD OF EVALUATION

A. Graded Homework

B. Formal Lab Write-ups

C. Examinations

IX. ADA STATEMENT

Any statement requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-797-3000, ext. 169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College Website).