JEFFERSON COLLEGE

COURSE SYLLABUS

PHY112

ELEMENTARY COLLEGE PHYSICS II

4 Credit Hours

Prepared by: Cliff Castle

Revised Date: January 2009

by

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Arts & Science Education
Dr. Mindy Selsor, Dean
I. CATALOG DESCRIPTION
   A. Prerequisite: PHY111 with a grade of C or better
   B. 4 semester hours credit
   C. Elementary College Physics II is an advanced study of topics from Elementary College Physics I and is designed to meet the requirements of pre-medicine students. The course is composed of three hours of lecture and two hours of laboratory per week.

II. EXPECTED LEARNING OUTCOMES/ASSESSMENT MEASURES

| Students will develop their knowledge of the fundamental laws of physics | Classroom discussions, homework, exams. |
| Students will develop their comprehension of the methods and techniques used by physicists in the analysis of physical problems | Classroom discussions, homework, exams. |
| Students will become acquainted with the phenomenon that have had and are continuing to have a great impact on society | Classroom discussions, homework, exams. |
| Students will comprehend the difference between science and pseudoscience. | Classroom discussions, presentation of alternative theories, exams |

III. COURSE OUTLINE WITH UNIT OBJECTIVES

A. Friction - Understand the difference between static and kinetic friction.

B. Statics
   1. Develop a more detailed free body diagram.
   2. Show that statics is just a special case of Newton's Second Law.
   3. State the First Condition for Equilibrium
   4. State the Second Condition for Equilibrium.

C. Uniform Circular Motion
   1. Diagram centripetal force.
   2. Explain why centrifugal force is imaginary.
D. Elastic and Inelastic Collisions
   1. State collisions that involve only conservation of momentum.
   2. State collisions that involve both momentum and energy conservation.
   3. Analyze two dimensional collisions.

E. Angular Motion
   1. Derive the angular equations of motion.
   2. Describe torque.
   3. Classify angular momentum.
   5. Utilize Conservation of Angular Momentum.

F. Fluids
   1. Recite the Gas Laws
   2. Analyze Archimedes' Principle

G. Periodic Motion
   1. State concepts of period, frequency, and amplitude.
   2. Examine wave motion
   3. Define the Simple Pendulum

H. Electrical Capacitors - Investigate capacitors as storage devices for electrical energy.

I. Kirchoff's Laws
   1. Identify voltage nodes and current loops.
   2. Calculate combinations of resistors.
   3. Calculate combinations of capacitors.
   4. Analyze complex electric circuits.

J. Alternating Current
   1. State the relationship between direct and alternating currents.
   2. Describe the production of alternating current.

K. Wave Optics
   1. Treat light as a wave.
   2. Distinguish between the types of lenses
   3. Define refraction
   4. Utilize Snell's Law

L. Quantum Mechanics
   1. Recount the historical development of quantum mechanics.
   2. Criticize Rutherford's Planetary Model of the atom.
   3. Outline the conflict with Newton's Laws
   4. Review deBroglie's wave-particle duality.
5. Generalize Schrödinger's treatment of the electron as a wave.
6. Investigate the probability interpretation of the wave equation.

IV. METHODS OF INSTRUCTION
A. Lecture
B. Classroom Discussion
C. Homework
D. Laboratories

V. REQUIRED TEXTBOOK (with publication information)

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

VI. REQUIRED MATERIALS

Calculator and flash drive

VII. SUPPLEMENTAL REFERENCES

None

VIII. METHOD OF EVALUATION
A. Required Homework
B. Lab Writeups
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).