Date Board Approved:
(Prior to Fall 2003)

Date Prepared/Revised: 03/30/04

This is an important document. Keep it! In the future, it could save you TIME AND MONEY!

Iowa Central Community College
Science Department

Iowa Central Community College

Course Syllabus

Course Name: College Physics II (General Physics 2) Course Number: PHY-172 (PHY-158)		
Class Location and Time: Room: SC - 302 Day: MTWRF Time: 12:40-1:40 pm Room: Day: Time:		
Course Start Date: 1/14/2010	Course End Date: 5/7/2010	
Instructor: Carl Gross	Office Location: SC – 301A	
E-mail Address: gross_c@iowacentral.edu (preferred contact method)	Office Hours: Days: MW Times: 1:50-2:50pm Days: Times: Days: Times:	
Phone: (515) 574-1227 or 800 362-2793, x 1227		
Final Exam: Day: Wednesday Date: 5/05/10 Time: 11:30-1:00 pm		
Departmental Assistance: For help with course selection, class registration, transfer information, and other academic assistance, please contact the department associate, Jenny Williamson, in Science 110H, at (515) 574-1252 or 1-800-362-2793, ext. 1252, or by e-mail: williamson@iowacentral.edu		

1. Total Semester Hour Credit: 4

2. Total Contact Hours per Semester: Lecture: 54 Lab: 36 Clinical:

3. Catalog Description:
   This course is a continuation of PHY-162 College Physics I. Topics covered include heat, thermodynamics, kinetic theory of gases; electric forces and fields; direct and alternating currents; magnetic forces and fields; ray optics and image formation; and atomic structure.
   Prerequisite: PHY-162 College Physics I

4. Prerequisites and/or Co-requisites:
   PHY-162 College Physics I

5. Textbook Required:
   - Knight, Jones, Field. *College Physics*, 2nd edition. Prentice-Hall, 2007. ISBN 9780321595492

6. Supplemental Materials Required:
   - Calculator with trigonometric functions – minimum
     - Programmable graphing calculator (Ti-86 or higher) – recommended
   - Laboratory notebook – any notebook with non-removable pages

- USB flash drive

7. College Procedures:

- **Children in the Classroom:**
  - Students are not allowed to bring children into the classrooms, labs, shops, or hallways during class times.
- **Electronic Devices in the Classroom:**
  - Cell phones, pagers, timers and similar devices are not to be operational during classroom, lab, and clinical times.
- **Inclement Weather Statement:**
  - The final decision to attend college classes can only be made by the individual based on their specific extenuating circumstances that may make it hazardous for them to travel.

8. Additional Course Information:
   - Attendance
     - Attendance is required for success. Please be sure to attend class regularly. Refer to your student handbook for college attendance policy.
   - Late Work
     - Is ***NOT*** accepted unless arrangements are made with the instructor **prior to the due date**.
   - Make-up Work
     - Arrangements must be made with the instructor **prior to due date** if possible.
       - At minimum a phone call, e-mail, or Facebook message must be received by the end of the day to be eligible for make-up work.
     - When available, make-up work will likely be different from in-class versions.
     - Make-up work will be evaluated on a case-by-case basis.
     - Missed presentations can't be made up unless arrangements are made **at the time the presentation is assigned**.

9. Grading Policy:

Letter Grade Minimum Percent	
A	>90
B	>80
C	>70
D	>60
F	<60

Grade Weighting	
Homework	30
Quiz	20
Lab Work	20
Midterm	15
Final	15

10. Course (Student) Outcomes:
    - The student will have a basic understanding of important physics principles outlined below.

11. Unit (Competencies) Outcomes:

Outcome 1: Understand the basic nature of temperature, heat transfer, thermodynamics, and heat engines.

- Task 1: Given a temperature in Fahrenheit, Celsius, or Kelvins, determine the temperatures in the other two scales.
- Task 2: State and explain the zeroth law of thermodynamics.
- Task 3: Solve problems concerning heat transfer (expansion, specific heat, final temperature of mixtures, heats of fusion and vaporization).
- Task 4: Define and give illustrated examples of adiabatic, constant volume, cyclical and free expansion processes and be able to interpret a P-V diagram.
- Task 5: Define the second law of thermodynamics stated in terms of entropy, energy transfer, or engine efficiency.
- Task 6: Discuss the tenets of the Kinetic theory of gases.
- Task 7: Describe an ideal gas. In the description include discussion of pressure exerted in terms of particle speed, and average translational kinetic energy.
- Task 8: Derive and use relationship between temperature, pressure, and volume for ideal gases.
- Task 9: Describe a heat engine in terms of an energy flow diagram and calculate the work done in a cycle.
- Task 10: Derive and investigate the relationship between work done by a heat engine and changes in the pressure and volume of the engine's working medium.

Outcome 2: Understand the concepts of electric charge, interaction of charge, electric field, and relationship of charge and force.

- Task 1: Use Coulomb's law to solve problems involving force between two or more charges of like or different sign.
- Task 2: Define electric field and calculate the field of a point charge, and a system of point charges.

Outcome 3: Understand the concept of electric flux and its relationship to Gauss' Law.

- Task 1: Use electric field lines and electric flux to describe the magnitude and direction of the electric field in a small region of space.
- Task 2: Define Gauss' Law and use it to calculate the electric fields that result from highly symmetric distributions of electric charge (near the surface of a charged conductor, near a sheet of charge, and inside and outside a spherical shell).

Outcome 4: Understand the meaning of electrical potential and its relationship to electric field.

- Task 1: Use electric field lines and electric flux to describe the magnitude and direction of the electric field in a small region in space.
- Task 2: Determine electric field lines from equipotential surfaces and vice versa.

Task 3: Calculate electric potential due to a point charge or a group of point charges.
Task 4: Map equipotentials in a plane resulting from two point charges.

Outcome 5: Understand current electricity within direct current circuits.
Task 1: Use symbols to draw circuit diagrams and wire simple circuits.
Task 2: Define current, voltage and resistance and apply the relationship between them for a resistance with negligible temperature dependence (Ohm's Law).
Task 3: Calculate current, voltage, resistance, and capacitance within series and parallel circuits.
Task 4: Use Kirchhoff's laws to solve problems involving multiloop circuits.
Task 5: Define capacitance and calculate the capacitance of a parallel plate capacitor.
Task 6: Solve problems involving RC circuits.

Outcome 6: Understand the concepts of magnetic fields and the sources of magnetic fields.
Task 1: Use a galvanometer to construct an ammeter and a voltmeter by adding appropriate resistors to the circuit.
Task 2: Use forces on an electron moving in a magnetic field to measure the ratio of its charge to its mass, e/m.
Task 3: Calculate the magnetic force on a current carrying wire and between two parallel conductors.
Task 4: Calculate the magnetic field of a solenoid and due to a long straight wire.
Task 5: Solve problems involving torque on a current loop.

Outcome 7: Understand the concept of magnetic induction and AC circuits.
Task 1: Interpret the meaning of Lenz's Law and energy conservation.
Task 2: Calculate the potential difference, current and the inductive time constant for RL circuits.
Task 3: Calculate the energy stored in a magnetic field.
Task 4: Calculate inductive reactance in an RL circuit.
Task 5: Calculate capacitive reactance in an RC circuit.
Task 6: Interpret the meaning of "ELI the ICE man."
Task 7: Solve for phase constant, power factor, and power in AC circuits.
Task 8: Calculate input and output currents and voltages in transformer circuits.

Outcome 8: Understand the concept of electromagnetic waves.
Task 1: Compare the difference in the various frequencies and wavelengths of the electromagnetic spectrum.
Task 2: Solve problems involving the equation E/B = C.
Task 3: Compare polarized light with non-polarized light.

Outcome 9: Understand the concepts of geometrical optics.

Task 1: Compare reflection and refraction and solve problems using the laws of reflection and refraction.
Task 2: Solve for the index of refraction using Snell's Law.
Task 3: Compare reflection in plane, concave and convex mirrors.
Task 4: Calculate object and image distance and magnification in all mirror types.
Task 5: Compare image formation in convex and concave lenses.
Task 6: Solve problems dealing with image and object formation and magnification in thin lenses.
Task 7: Solve problems using the lens maker's equation.