Douglas College

Course Information

A: Division: INSTRUCTIONAL

Department: SCIENCE & TECHNOLOGY

DATE: May 27, 1997

New Course: _____

Revision of Course Information form: X

DATED: November 29, 1993

C: PHYS 207 (Subject & Course No.) D: Introduction General Physics II (Descriptive Title) E: 5 (Semester Credit)

F: Calendar Description: This is a non-calculus based course. Topics include geometric optics; waves, interference, diffraction, and polarization of light electrostatics; direct current circuits, magnetic force and field; electromagnetic induction; atomic physics and radioactivity; temperature, thermal properties of matter; gas laws; laws of thermodynamics.

Summary of Revisions:
(Enter date & section)
Ex: Section C,E,F, &R

1997-05-29

H

G: Type of Instruction:

	Hours Per Week/ Per Semester	
Lecture	4	Hrs.
Laboratory	3	Hrs.
Seminar		Hrs.
cal Experience		Hrs.
Field Experience		Hrs.
Practicum		Hrs.
Shop		Hrs.
Studio		Hrs.
Student Directed Learning		Hrs.
Other		Hrs.
TOTAL	7	HOURS

H: Course Prerequisites:
PHYS 107 or Math 12 (C or higher) with either Physics 11 (C or higher) or PHYS 104

I: Course Corequisites:

J: Course for which this course is a pre-requisite
with PHYS 107 serves as pre-requisite for PHYS 321, 322, 420 & 421

K: Maximum Class Size:
36

L: College Credit Transfer X

College Credit Non-Transfer _____

M: Transfer Credit:
Requested ___
Granted X
Specify Course Equivalents or Unassigned Credit as Appropriate

U.B.C.
S.F.U. (Attached)
U. Vic.
OTHER:

COURSE DESIGNER(S)

DEAN

VICE PRESIDENT (INSTRUCTION)

REGISTRAR

N: Textbooks and materials to be purchased by students
(Use Bibliographic Form):

Cuttnell and Johnson, **Physics, Second Edition**, Wiley and Sons, 1992.

Douglas College, **Physics 207 Laboratory Experiments**

Complete Form with Entries Under the Following Headings:

O. Course Objectives; P. Course Content; Q. Method of Instruction;

R. Course Evaluation

O. Course Objectives:

The student will be able to:

1) identify the following mechanical quantities and their SI units (where applicable):
wavelength, frequency, velocity, index of refraction, focal length, radius of curvature, f-number, magnification, electric charge, force, electric field, potential, potential difference, capacitance, permittivity, dielectric constant, electromotive force, current, resistance, resistivity, power, energy, time constant, magnetic field, torque, permeability, magnetic flux, radiation, half -life, temperature, coefficient of expansion, pressure, volume, mass, mole, gas constant, molecular mass, Avogadro's number, heat, specific heat, latent heat, thermal conductivity, internal energy, work, efficiency.

2) demonstrate an understanding of the following concepts, procedures, and principles of mechanics through the solution of problems:
- 2.1) law of reflection
- 2.2) law of refraction/Snell's law
- 2.3) total internal reflection
- 2.4) mirror equation
- 2.5) lens makers equation
- 2.6) thin lens equation
- 2.7) constructive and destructive interference with light waves
- 2.8) Brewster's law
- 2.9) Rayleigh's criterion
- 2.10) Coulomb's law
- 2.11) vector addition via components
- 2.12) electric field
- 2.13) electric potential energy, potential, and potential difference
- 2.14) charged particle motion in electric field
- 2.15) capacitance
- 2.16) capacitor combinations
- 2.17) energy storage in capacitors
- 2.18) electric current

O. Course Objective (continued)

2.19) Ohm's law
2.20) resistance and resistivity
2.21) electric energy and power
2.22) resistor combinations
2.23) Kirchhoff's rules
2.24) capacitor charging
2.25) magnetic force on moving charge
2.26) magnetic force on current carrying conductor
2.27) torque on a current loop
2.28) Ampere's law
2.29) Faraday's law
2.30) Lenz's law
2.31) motional emf
2.32) thermal expansion of solids and liquids
2.33) gas laws
2.34) heat capacity
2.35) phase change
2.36) conservation of energy
2.37) calorimetry
2.38) heat transfer via conduction
2.39) first law of thermodynamics
2.40) thermodynamic processes
2.41) efficiency
2.42) Carnot cycle
2.43) entropy

3. perform laboratory experiments and analyze the data obtained using appropriate graphing techniques, scientific notation, significant figures, and experimental uncertainty consideration;

4. write a formal laboratory report in the conventional format required for submissions to scientific journals.

P. Course Content

1. Light
   1.1) Wave nature of light
   1.2) Reflection and refraction
   1.3) Mirrors and lenses
   1.4) Optical devices
   1.5) Polarization of light

2. Electricity and Magnetism -
   2.1) Electrostatic force and field
   2.2) Electric potential
   2.3) Capacitance
   2.4) Direct current circuit elements
   2.5) Direct current circuit analysis
   2.6) Magnetic force and field
   2.7) Magnetic force applications
   2.8) Ampere's law
   2.9) Direct current meters
   2.10) Electromagnetic induction
   2.11) Generators

P. Course Content (continued)

3. Heat
   - 3.1) Temperature and thermometers
   - 3.2) Thermal expansion of solids and liquids
   - 3.3) Gas Laws
   - 3.4) Heat capacity and latent heats
   - 3.5) Heat transfer
   - 3.6) Thermodynamics

4. Laboratory Experiments -
   - 4.1) The Spectrometer
   - 4.2) Wavelength Determinations
   - 4.3) Thin Lenses and Spherical Mirrors
   - 4.4) Charged Particles in an Electric Field
   - 4.5) Electric Circuits and Resistance Measurements
   - 4.6) Kirchhoff's Rules for Circuit Analysis
   - 4.7) Radioactivity
   - 4.8) Motion of Charged Particles in a Magnetic Field
   - 4.9) Thermal Linear Expansion of Solids
   - 4.10) Heating Effect of an Electric Current

Q. Method of Instruction

Classroom time will be divided between the presentation and discussion of concepts in mechanics on the one hand and the application of these concepts in problem solving on the other, with the majority of time devoted to the latter. The laboratory program will involve weekly, three hour sessions during which students will perform a set number of experiments.

R. Evaluation

The final grade assigned for the course will be based upon the following components:

a) final examination - maximum of 30%
b) minimum of three tests administered during the semester - minimum 45% / maximum of 50%; and
c) submitted laboratory reports - minimum 20% / maximum of 25%.

M. Transfer Credit

U.B.C. - with 107, Physics 110

S.F.U. - i) Physics 100 and 130
ii) with 107, Physics 100, 130, plus five units unassigned (Physics)
iii) with 107 and grades of A or B in both, Physics 101, 102, 130 plus two units unassigned.

U.Vic. - with 107, Physics 102*
*If a grade of A or B is obtained in the combination, a student should contact Department of Physics about placement.