Douglas College

EFFECTIVE: JANUARY 2003

CURRICULUM GUIDELINES

A: Division: **Science and Technology**

B: Department/ Program Area: **Physics**

Date: **15 May 2002**

New Course | | Revision | **X**

If Revision, Section(s) Revised: **J,L,M,N,P,Q**

Date Last Revised: **27 May 1997**

C: **PHYS 210** (Subject & Course No.) **D:** **Electromagnetism, Optics, Modern Physics** (Descriptive Title) **E:** **5** (Semester Credits)

F: Calendar Description: This is a calculus-based course. Topics include electrostatics; capacitance; direct current circuits; magnetic force and field; electromagnetic induction; ac circuits; wave nature of light; geometric optics; wave optics; elements of quantum, atomic and nuclear physics.

G: Allocation of Contact Hours to Types of Instruction/Learning Settings

Primary Methods of Instructional Delivery and/or Learning Settings:

Lecture/Laboratory

Number of Contact Hours: (per week / semester for each descriptor)

7 hours per week

Number of Weeks per Semester:

14

H: Course Prerequisites:
PHYS 110 (or PHYS 107 with at least B-) and MATH 120

I. Course Corequisites:
MATH 220 should be taken concurrently

J. Course for which this Course is a Prerequisite:
Nil

K. Maximum Class Size:
36

L: PLEASE INDICATE:

- [ ] Non-Credit
- [ ] College Credit Non-Transfer
- [X] College Credit Transfer: Requested [ ] Granted [X]

SEE BC TRANSFER GUIDE FOR TRANSFER DETAILS (www.bccat.bc.ca)

SFU	SFU PHYS 121 (3) & SFU PHYS 131 (2)
UBC	UBC PHYS 102 (3); DOUG PHYS 110 & DOUG PHYS 210 = UBC PHYS 153 (6)
UVIC	UVIC PHYS (1.5) 100 lev; DOUG PHYS 110 & DOUG PHYS 210 = UVIC PHYS 112 (3)

M: Course Objectives/Learning Outcomes

The student will be able to:

1) identify the following quantities and their appropriate units; electric charge; force; electric field, energy, potential, and potential difference; capacitance; permittivity; dielectric constant; electromotive force; current; resistance; resistivity; power; time constant; magnetic field; torque; permeability; magnetic flux; wavelength; frequency; index of refraction; focal length; radius of curvature; magnification; work function; disintegration constant; half-life; activity.
2) demonstrate an understanding of the following concepts, procedures, and principles through the solution of problems: Coulomb's law; electric field; vector addition of electric forces and fields; electric potential energy, potential, and potential difference; charged particle motion in electric field; capacitance; electric current; Ohm's law; resistance and resistivity; electric energy and power; resistor combinations; Kirchhoff's rules; magnetic force on moving charge; magnetic force on current carrying conductor; torque on a current loop; Biot-Savart law; Ampere's law; Faraday's law; Lenz's law; motional emf; electromagnetic waves; laws of reflection and refraction; polarization of light; image formation via mirrors and lenses; optical instruments; interference and diffraction of light; photoelectric effect; matter waves; periodic table; laser; radioactivity.
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.

N: Course Content

1. Electricity and Magnetism:
- Electrostatic force and field
- Electric potential
- Capacitance
- Direct current circuits
- Magnetic force
- Biot-Savart law and Ampere's law
- Electromagnetic induction
- Magnetic properties of materials

2. Optics:
- Wave nature of light
- Reflection and refraction
- Geometric optics
- Interference and diffraction
- Polarization

3. Modern Physics:
- Photon concept
- Photoelectric effect
- Matter waves
- Quantum numbers
- Periodic table
- Laser

Nuclear properties
- Radioactivity

4. Laboratory Experiments:
- Charged Particles in an Electric Field
- Resistance Measurements
- Circuit Analysis/Capacitance
- Oscilloscope Applications
- Moving Charge in a Magnetic Field
- Electromagnetic Induction
- Thin Lenses
- The Spectrometer
- Wave Optics
- Hydrogen Spectrum
- Radioactivity

O: Methods of Instruction

Classroom time will be divided between the presentation and discussion of concepts 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.

P: Textbooks and Materials to be Purchased by Students

Halliday, D., R. Resnick, & Walker, G. Fundamental of Physics, Sixth Edition, Wiley, 2001

Douglas College, Physics 210 Laboratory Experiments

Q: Means of Assessment

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

a) final examination - minimum 30% / maximum of 40%
b) at least two tests administered during the semester - minimum 40% / maximum of 50%; and
c) submitted laboratory reports - 20%

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

Not open for PLAR

Course Designer(s)

Education Council/Curriculum Committee Representative

Dean/Director

Registrar