UNIVERSITY COLLEGE of the FRASER VALLEY

COURSE IMPLEMENTATION DATE: September 1993
COURSE REVISED IMPLEMENTATION DATE:
COURSE TO BE REVIEWED: September 1997
(Four years after implementation date) (MONTH YEAR)

OFFICIAL COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.
Shaded headings are subject to change at the discretion of the department and the material will vary - see course syllabus available from instructor

FACULTY/DEPARTMENT: **NATURAL SCIENCES**

PHYSICS 112		**4**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

ELECTRICITY AND MAGNETISM
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

This is the second half of Physics 111 and the course is designed for students who are planning to study engineering and science. Topics covered in this course include: fields (electric and magnetic), Guass' Law, electric potential, capacitors, Kirchhoff's Laws, electric circuits (RC and RL), energy stored in electric and magnetic fields, sources of magnetic fields, induction, self inductance, mutual inductance, induced EMFs, time varying field, electromagnetic waves, energy and momentum in EM waves, and Maxwell's equations. Problems that use calculus techniques will be emphasized throughout this course.

PREREQUISITES: **PHYS 111, PHYS 101 with grade of B+ or better, or permission of the instructor.**
COREQUISITES: **MATH 111 must precede; MATH 112 must precede or be taken concurrently.**

SYNONYMOUS COURSE(S)
(a) Replaces: _____ *(Course #)*
(b) Cannot take: _____ *(Course #)* for further credit.

SERVICE COURSE TO: _____ *(Department/Program)* _____ *(Department/Program)*

TOTAL HOURS PER TERM: **105**

STRUCTURE OF HOURS:

Lectures:	**60**	Hrs
Seminar:		Hrs
Laboratory:	**30**	Hrs
Field Experience:		Hrs
Student Directed Learning:	**12**	Hrs
Other (Specify): Exams (done in lab periods)	**3**	Hrs

TRAINING DAY-BASED INSTRUCTION
LENGTH OF COURSE: _____
HOURS PER DAY: _____

MAXIMUM ENROLLMENT: _____
EXPECTED FREQUENCY OF COURSE OFFERINGS: _____

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)	☒ Yes	☐ No
WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)	☐ Yes	☐ No
TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:	☐ Yes	☐ No

AUTHORIZATION SIGNATURES:

Course Designer(s): George McGuire
Chairperson: *(Curriculum Committee)*
Department Head:
Dean: J.D. Tunstall, Ph.D.
PAC Approval in Principle Date:
PAC Final Approval Date: September 1, 1993

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

Students who enroll in this course have completed Physics 111 and Math 111 (Calculus) or their equivalents. The course is intended for students who are planning to study engineering, science, and life sciences. Students will be able to:

1. Understand the fundamental laws of electricity, and magnetism, and learn how to apply the theory to solve related problems.

2. Apply physics to everyday situations and phenomena in engineering, science, and life sciences.

3. Use and investigate modern apparatus, perform fundamental laboratory experiments, and interpret data obtained.

4. Develop a feeling for the order of magnitude of physical quantities in real experiments.

5. Emphasis will be placed on assigning problems which require the student to use calculus in their solutions.

METHODS:

The course will be presented using lectures and laboratory experiments. Films or other audio-visual aids will be used where appropriate. Problems will be assigned on a regular basis which are to be handed in and marked. Close coordination will be maintained between laboratory and classroom whenever possible. Computer-assisted learning programs will be used to increase the students' understanding of the concepts being studied.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR (Please check:) ☐ Yes ☐ No

METHODS OF OBTAINING PLAR:

TEXTBOOKS, REFERENCES, MATERIALS:

[Textbook selection varies by instructor. An example of texts for this course might be:]

TEXTS: Halliday/Resnick/Walker, Fundamentals of Physics, 4th Edition Extended, John Wiley & Sons, Toronto, 1993

REFERENCES:

1. F. Beuche, Introduction to Physics for Scientists and Engineers, 3rd Edition, McGraw-Hill, 1980
2. F. Sears & M. Zemansky, University Physics, 5th Edition, Addison Wesley, 1979
3. R. Serway, Physics for Scientists and Engineers, Holt, Rinehart and Winston, 1983

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

[An example of student evaluation for this course might be:]

Assignments	20%
Mid-term	25%
Laboratory Work	15%
Final Exam	40%

COURSE CONTENT:

[Course content varies by instructor. An example of course content might be:]

a) Coulomb's Law, electric field, potential, capacitance, Gauss' Law
b) electric current, electromotive force, Ohm's Law, Joule's Law, Kirchhoff's Laws, RC time constant
c) magentic field, currents, force on a moving charge
d) sources of magnetic field, Ampere's Law, production of B fields, B of long straight wire
e) magnetic induction, induction, induced emf, Faraday's Law, Lenz's Law, mutual inductance, energy in a magnetic field

f) Maxwell's Equations, E and B waves, energy in E/m waves
g) introduction to time varying electric and magnetic fields

LABORATORY EXPERIMENTS:

1. DC Circuits
2. Output Impedance of a Signal Generator
3. Cathode-Ray Oscilloscope
4. Self-designed Lab (Measurement of the velocity of sound)
5. Capacitance
6. Measurement of the Strength of Magnetic Fields
7. Mass of an Electron
8. Flux and Flux Density
9. Self-Inductance