UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DEPARTMENT: NATURAL SCIENCES **DATE:** 1999-4-22

PHYSICS 083	PRE-COLLEGE	3
NAME & NUMBER OF COURSE	DESCRIPTIVE TITLE	UCFV CREDIT

CATALOGUE DESCRIPTION:

This course is designed as an introductory and survey course for students wishing to upgrade their academic qualifications. No prior knowledge of physics is needed or supposed, but it would be advisable for a student to have passed Algebra 11 or an equivalent course, before enrolling in Physics 083.

The purpose of this course is to permit the students to upgrade their prerequisites for some future course or career, to check if a career in some branch of science might be feasible, or just for general interest.

The students should, in the classroom and in the laboratory, learn and gain insight into the basic concepts of physics. The student will be introduced to and expected to acquire skills in: problem solving techniques, laboratory design and writing, data handling and graphing, graphing analysis, formal lab write-up procedures, and real world applications of the concepts being studied.

COURSE PREREQUISITES: Algebra 11 or permission of the instructor.

COURSE COREQUISITES:

HOURS PER TERM FOR EACH STUDENT				STUDENT DIRECTED LEARNING - HRS
	LECTURE	45	HRS	OTHER - specify:
	LABORATORY	45	HRS	TOTAL 90 HRS
	SEMINAR		HRS	

UCFV CREDIT TRANSFER :	UCFV CREDIT NON-TRANSFER	9	NON-CREDIT	9

TRANSFER STATUS (Equivalent, Unassigned, Other Details)

UBC

SFU

UVIC

GEORGE MCGUIRE	K. Wayne Welsh
COURSE DESIGNER	DEAN OF SCIENCE & TECHNOLOGY

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COURSES FOR WHICH THIS IS A PREREQUISITE:	**RELATED COURSES**

ASSIGNMENTS:

Students will be expected to hand in one problem assignment each week. The problems will be graded, the marks recorded, and a final percentage of the term mark will be earned from this work. Each assignment will consist of 10 problems.

TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)

TEXTS: Fundamentals of Physics, D.C. Heath, 1993

OBJECTIVES:

After successfully finishing this course the students should be able to:

1. Discuss the basic ideas of physics
2. Apply the principle of physics to explain their physical environment
3. Solve problems using the ideas of physics
4. Gather and analyze data
5. Apply the concepts learned in the class to other subjects and questions
6. Become acquainted with the scientific methods of physics
7. More realistically assess their chance for a successful career in a science related field, or some branch of the technologies.

TEACHING METHODS:

1. The course will be presented using a variety of techniques: classroom lectures; laboratory experiments; activities; computer programs using simulations, CAL, CAI, and other interactive audio-visual computer programs; films; and demonstrations.
2. Close coordination will be maintained between the theoretical and laboratory work.
3. Assignments will be used to evaluate the rate of learning and the depth of the student's comprehension.
4. At least half of the classroom time will be spent on laboratory related activities.
5. The experiments will be used to interact with the students on a more personal and intimate level. This time can be used to give individual help.
6. The periods are 3.0 hours long and one break of twenty minutes is given after the instructional time. In this way, students will begin their labs at different intervals and this makes individual help much easier to obtain.

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STUDENT EVALUATION PROCEDURE:

1. Assignments 20%
2. Experiments and Activities 10%
3. Quizzes 10%
4. Midterm Exam 20%
5. Final Exam 40%

Suggested order and the topics to be covered in Physics 083 if a Physics 093 is added to the curriculum.

COURSE CONTENT

Major concepts: Mechanics and Optics

A. Part 1: Kinematics and Dynamics

1. Introduction
   a. Measurement
   b. Unit systems
   c. Mathematics with powers of ten
   d. Prefixes

2. Collecting Data, Analysis of Data, and Graphing
   a. Common Graph shapes and their analysis
   b. Presenting data tables
   c. The making of some easy kinematic graphs
   d. Slopes

3. Kinematics
   a. Analysis of position (x) vs. time (t) graphs
   b. Analysis of speed (v) vs time (t) graphs
   c. Develop the kinematic equations
   d. Using the three standard kinematic equations

4. Vectors (Graphical Method Only)
   a. Drawing and Labelling
   b. Addition
   c. Subtraction
   d. Relative velocities
   e. Subtraction
   f. Circular motion (graphical)

5. Dynamics and Kinematics
   a. Newton's Laws
   b. Translational Motion with applied forces
   c. Centripetal Force

6. Conservation Laws (1 Dimension only)
   a. Energy and Work
   b. Momentum

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B. Part 2: Optics

7. Light
   a. Properties
   b. Historical Significance

8. Reflection and Image Formation
   a. Laws of Reflection
   b. Plane Mirrors
   c. Parabolic Mirrors

9. Refraction and Image Formation
   a. Snell's Law
   b. Convex Lenses
   c. Concave Lenses
   d. Colour

10. Diffraction and Interference (optional)
    a. Adding Waves
    b. Two slit diffraction
    c. Single slit diffraction
    d. Parallel Plate Interference

11. Models of Light (optional)
    a. Particle Model
    b. Wave Model