UNIVERSITY COLLEGE of the FRASER VALLEY

COURSE IMPLEMENTATION DATE:
COURSE REVISED IMPLEMENTATION DATE: September 1997
COURSE TO BE REVIEWED: September 2001
(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 111		**4**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

MECHANICS
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

Students enrolled in this course have a fair background in both physics and mathematics from high school, so the course is intended for students who are planning to study engineering, science, and life science. Topics covered in this course include Newtonian mechanics, simple harmonic motion, and laboratory experiments in the field of mechanics. The object is to understand the fundamental laws of mechanics and learn how to apply the theory to solve related problems. The object of the laboratory experiments is to develop a feeling for the order of magnitude of physical quantities in real experiments. The course will be presented using lectures and laboratory experiments. Problems that use calculus techniques will be emphasized.

PREREQUISITES: **BC PHYS 12 recommended, but PHYS 11 if a calculus course is being taken concurrently, or Physics 100**
COREQUISITES: **Mathematics 111 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 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: Tim Cooper
Dean: J.D. Tunstall, Ph.D.
PAC Approval in Principle Date:
PAC Final Approval Date: November 27, 1996

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

Students enrolled in this course have a fair background in both physics and mathematics from high school, so 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 mechanics and learn how to apply the theory to solve related problems.
2. Apply physics to everyday situations and phenomena in life sciences and engineering.
3. Perform fundamental laboratory experiments, and interpret the data obtained.
4. Develop a feeling for the order of magnitude of physical quantities in real experiments.

METHODS:

This 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. Problems that require the use of calculus will be emphasized. Close coordination will be maintained between laboratory and classroom work. Computer-assisted learning programs will be used to increase the 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, Extended 3rd Edition, 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) Introduction to Course: relationship of lecture, tutorials, and laboratories; units and dimensional analysis

b) Vectors: vector and scalar quantities, addition, resultant of several vectors, unit vector, dot and cross product

c) Kinematics of a Particle: speed and velocity, relative velocity, average velocity, acceleration, rectilinear motion with constant acceleration, projectiles

d) Dynamics of a Particle: Newton's laws of motion and applications, friction and motion on an incline

e) Momentum: definition, linear momentum, conservation of momentum, impulse

f) Work, Energy, and Power: work, kinetic energy, gravitational potential energy, elastic potential energy, equivalence of mass and energy, power

g) Conservation of Energy: collisions, types of collisions, conservation of total energy, mechanical energy

h) Rotational Kinematics: angular quantities, angular speed and velocity, angular acceleration, tangential quantities, radial acceleration, centripetal force

i) Rotational Dynamics: kinematics of pure rotation, centre of mass, torque and rotational inertia, angular momentum, conservation of angular momentum

j) Gravitation: law of gravitation, gravitational force and weight, satellite motion, Kepler's laws

k) Periodic Motion: Hooke's law, simple harmonic motion, period, displacement, velocity and acceleration for SHM, pendulum and spring motion

LABORATORY EXPERIMENTS:

1. Error Analysis and Data Presentation

2. Graphical Analysis

3. Graphical Analysis

4. Acceleration Due to Gravity (Various Techniques)

5. Projectile Motion

6. Conservation of Momentum

7. Conservation of Energy

8. Centripetal Force

9. Moment of Inertia