UNIVERSITY OF THE FRASER VALLEY

OFFICIAL COURSE OUTLINE (page 1)

COURSE IMPLEMENTATION DATE:	Fall 1993
COURSE REVISED IMPLEMENTATION DATE:	September 2009
COURSE TO BE REVIEWED:	November 2012
(four years after UPAC approval)	*(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 – see course syllabus available from instructor

PHYS 111	Physics	5
COURSE NAME/NUMBER	FACULTY/DEPARTMENT	UCFV CREDITS

Mechanics

COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

This course is intended for students who are planning to study engineering science, or life sciences. Topics covered include: vectors, kinematics, dynamics, work and energy, collisions, rotational kinematics, rotational dynamics, simple harmonic motion, and gravitation. The object is to understand the fundamental laws of mechanics, to learn how to apply the theory to solve related problems, and to develop a feeling for the order of magnitude of physical quantities in real experiments.

NOTE: Students cannot take PHYS 100 or PHYS 101 for further credit.

PREREQUISITES:	**Physics 11 or PHYS 083 or PHYS 100; Physics 12 recommended.**
COREQUISITES:	
PRE or COREQUISITES:	**MATH 111 (Calculus). Note: Students with BC Calculus 12, IB Math 12, or AP Calculus 12 A or B should contact instructor or department head for permission to register.**

SYNONYMOUS COURSE(S):

(a) Replaces:

(b) Cross-listed with:

(c) Cannot take: **PHYS 100 or PHYS 101** for further credit.

SERVICE COURSE TO: *(department/program)*

Bachelor of Science

TOTAL HOURS PER TERM: **105**

STRUCTURE OF HOURS:

Lectures:	**75**	Hrs
Seminar:		Hrs
Laboratory:	**30**	Hrs
Field experience:		Hrs
Student directed learning:		Hrs
Other (specify):		Hrs

TRAINING DAY-BASED INSTRUCTION:

Length of course:

Hours per day:

OTHER:

Maximum enrolment: **36**

Expected frequency of course offerings: Annually

(every semester, annually, every other year, etc.)

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

Course designer(s):	G.McGuire; revised T.Cooper		
Department Head:	T. Cooper; revised P. Mulhern	Date approved:	**October 16, 2008**
Supporting area consultation (UPACA1)		Date of meeting:	**September 26, 2008**
Curriculum Committee chair:	T. Cooper; G. Schlitt	Date approved:	**October 3, 2008**
Dean/Associate VP:	W. Gordon	Date approved:	**November 3, 2008**
Undergraduate Program Advisory Committee (UPAC) approval		Date of meeting:	**November 21, 2008**

LEARNING OUTCOMES:

This course is designed for students to use a calculus-based approach to solve physics problems as they apply to science, engineering, and the life sciences. Upon successful completion of this course, students will:

1. Understand the fundamental laws of mechanics and how to apply the theory to solve related problems.
2. Be able to apply physics principles to everyday situations and phenomena in life sciences and engineering.
3. Be able to perform fundamental laboratory experiments, and interpret the data obtained.
4. Have developed a feeling for the order of magnitude of physical quantities in real experiments.

METHODS: *(Guest lecturers, presentations, online instruction, field trips, etc.)*

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.

METHODS OF OBTAINING PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

☐ Examination(s) ☐ Portfolio assessment ☐ Interview(s)

☒ Other (specify): Course challenge plus evidence of having appropriate laboratory skills

☐ PLAR cannot be awarded for this course for the following reason(s):

TEXTBOOKS, REFERENCES, MATERIALS: *[Textbook selection varies by instructor. An example of texts might be:]*

Halliday/Resnick/Walker, Fundamentals of Physics, Extended 6th Edition, John Wiley & Sons, Toronto, 2000.

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, 1993.

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:]*

Introduction to course: relationship of lecture, tutorials, and laboratories; units and dimensional analysis

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

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

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

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

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

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

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

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

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

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