ORIGINAL COURSE IMPLEMENTATION DATE: December 1996

REVISED COURSE IMPLEMENTATION DATE: January 2018

COURSE TO BE REVIEWED: (six years after UEC approval) April 2023

Course outline form version: 09/15/14

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: PHYS 093	**Number of Credits:** 4 Course credit policy (105)
Course Full Title: Preparatory University Physics II **Course Short Title (if title exceeds 30 characters):**	
Faculty: Faculty of Access and Continuing Education	**Department (or program if no department):** Upgrading and University Preparation

Calendar Description:

This university preparatory course, which is equivalent to B.C's high school Physics 12 course, covers mechanics, electrostatics, electromagnetism, and waves and optics.

Prerequisites (or NONE):	One of Applications of Mathematics 11, Principles of Mathematics 11, Pre-Calculus 11, Foundations of Mathematics 11, MATH 084, or MATH 085 and one of Physics 11, PHYS 083, or PHYS 100.
Corequisites (if applicable, or NONE):	None
Pre/corequisites (if applicable, or NONE):	None

Equivalent Courses (cannot be taken for additional credit)

Former course code/number: **N/A**

Cross-listed with: **N/A**

Equivalent course(s): **N/A**

Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.

Transfer Credit

Transfer credit already exists: ☐ Yes ☒ No

Transfer credit requested (OReg to submit to BCCAT):
☐ Yes ☒ No (if yes, fill in transfer credit form)

Resubmit revised outline for articulation: ☐ Yes ☒ No

To find out how this course transfers, see **bctransferguide.ca**.

Total Hours: 90

Typical structure of instructional hours:

Lecture hours	60
Seminars/tutorials/workshops (in-class)	9
Laboratory hours (in class)	21
Field experience hours	
Experiential (practicum, internship, etc.)	
Online learning activities	
Other contact hours:	
Total	**90**

Special Topics

Will the course be offered with different topics?
☐ Yes ☒ No

If yes, different lettered courses may be taken for credit:
☐ No ☐ Yes, repeat(s) ☐ Yes, no limit

Note: The specific topic will be recorded when offered.

Maximum enrolment (for information only): 24

Expected frequency of course offerings (every semester, annually, every other year, etc.): Annually

Department / Program Head or Director: Greg St. Hilaire	**Date approved:**	February 2017
Faculty Council approval	**Date approved:**	March 10, 2017
Campus-Wide Consultation (CWC)	**Date of posting:**	n/a
Dean/Associate VP: Sue Brigden	**Date approved:**	March 10, 2017
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	April 21, 2017

Learning Outcomes

Upon successful completion of this course, students will be able to:

A. Kinematics in Two Dimensions
- Use the language and concepts of kinematics to describe motion in two dimensions
- Resolve, add and subtract vectors
- Analyze and solve kinematical problems in two dimensions

B. Dynamics in Two Dimensions
- Use the language and concepts of dynamics to describe forces, energy and momentum
- Analyze and solve problems involving dynamics in two dimensions using free body diagrams
  - Two-dimensional equilibrium – translational and rotational
  - Momentum conservation in two dimensions: elastic and inelastic collisions
  - The Work-Energy theorem and energy conservation
  - Uniform circular motion

C. Electrostatics
- Use the language and concepts of physics to describe electrostatic phenomena
- Analyze and solve electrostatic force and electric field problems in two dimensions
- Analyze and solve electric potential and electric potential energy problems

D. Electromagnetism
- Use the language and concepts of physics to describe electromagnetic phenomena
- Analyze and solve problems involving magnetic forces and magnetic fields in two dimensions
- Analyze and solve problems involving electromagnetic induction – Faraday's Law and Lenz's law
- Describe devices that operate using electromagnetic induction

E. Waves and Optics
- Use the language and concepts of physics to describe wave phenomena
- Define and distinguish between amplitude, wavelength, frequency, wave speed and period
- Analyze and solve problems involving wave phenomena – refraction, reflection, total internal reflection
- Describe various wave phenomena and the conditions which produce them
- Construct ray diagrams for optical systems involving mirrors and lenses

Laboratories:

There will be one laboratory from each topic and a **minimum** of seven laboratories. Successful students will be able to:
- Collect data through observation:
  - Record a measurement to the appropriate level of precision
  - Recognize that all measured values have an uncertainty
- Construct graphs:
  - Choose appropriate scales
  - Determine line of best fit
  - Label correctly
- Draw conclusions from observations and data:
  - Identify and discuss sources of error
  - Calculate and interpret the slope of a line
  - Relate conclusion to objectives
- Calculate experimental error:
  - Determine % error and % difference where appropriate
- Complete formal lab reports

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)
- The course will be presented using a variety of techniques: classroom lectures; laboratory experiments; activities; films; and demonstrations.
- Close coordination will be maintained between the theoretical and laboratory work.
- Weekly assignments will be used to evaluate the rate of learning and the depth of the student's comprehension.
- The labs will integrated into the class schedule.
- Regular class sessions will also consist of lab related demonstrations and activities.
- The experiments will be used to interact with the students on a more personal level. This time can be used to give individual help.

Grading system: Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials **(if more space is required, download Supplemental Texts and Resource Materials form)**

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	Wilson, Buffa, Lou	College Physics	☐	Pearson	2009
2.	Urone, Hinrichs	College Physics	☐	Openstax	2016
3.			☐		
4.			☐		
5.			☐		

Required Additional Supplies and Materials **(software, hardware, tools, specialized clothing, etc.)**

Scientific calculator

Typical Evaluation Methods and Weighting

Final exam:	30%	Assignments:	10%	Midterm exam:	20%	Practicum:	%
Quizzes/tests:	20%	Lab work:	20%	Field experience:	%	Shop work:	%
Other:	%	Other:	%	Other:	%	Total:	100%

Details **(if necessary):**

Typical Course Content and Topics

A. Kinematics in Two Dimensions
B. Dynamics in Two Dimensions
C. Electrostatics
D. Electromagnetism
E. Waves and Optics