CAMOSUN COLLEGE
School of Arts & Science
Department of Physics & Astronomy

PHYS-105-001
General College Physics 2
2020 Summer

COURSE OUTLINE

The course description is available on the web @ http://camosun.ca/learn/calendar/current/web/phys.html

Ω *Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.*

1. Instructor Information

(a) Instructor	Edgar Nelson		
(b) Office hours	MTWThF 1:30 – 3:30 pm		
(c) Location	Online Through D2L – Blackboard Collaborate Ultra		
(d) Phone	250 370 4435	**Alternative:**	250 884 6266 (text)
(e) E-mail	nelson@camosun.bc.ca OR edgar.nelson28@online.camosun.ca		
(f) Website	D2L (online.camosun.ca)		

2. Intended Learning Outcomes

Upon completion of this course a student will be able to:

1. Examine common physical systems subject to periodic motion and study the propagation of waves on strings and in air columns.
    a. Apply Hooke's Law and elastic potential energy to problems involving mass-spring systems
    b. Define the terms period, frequency and angular frequency and evaluate these quantities for mass-spring systems and simple pendulums.
    c. State the principal of superposition and describe the properties of waves undergoing constructive and destructive interference.
    d. Compare and contrast wave propagation on strings and in air columns including wave speed dependence on medium characteristics.
    e. Solve problems involving the Doppler effect and beats
    f. State the conditions for standing waves and apply these conditions to solve technical problems of vibrating strings and air columns, including fundamental modes and harmonics.
2. Investigate laws of geometric optics and use them to solve technical problems involving refraction, reflection, and image formation (in mirrors and lenses).
    a. State laws of reflection and refraction and apply laws to calculate paths of light rays at interfaces between materials.
    b. Solve technical problems involving dispersion and total internal reflection as special applications of refraction.
    c. Solve technical problems involving image formation with spherical mirrors, lenses and simple optical devices (cameras, the eye, simple magnifiers, microscopes and telescopes), including ray diagrams.
3. Apply concepts of dynamics, work and energy to analyze the behavior of charge particles in electric fields.
    a. Calculate electric fields, forces, potential and potential energy for point charges and simple charge distributions.
    b. Solve technical problems involving the motion of charge particles moving in uniform electric fields.

    c. Solve technical problems involving energy storage in capacitors and combinations of capacitors.
4. Use principles of electrical energy transfer to solve problems involving multi-branch Direct Current
    a. Apply the concept of resistivity to calculate the resistance of a resistor with specified geometry
    b. Use Ohm's Law to determine the current flow through a resistor.
    c. Calculate the power output of electrical devices.
    d. Identify the characteristics of current, resistance and voltage in series and parallel circuits and apply these concepts to the analysis of multi-branch circuits involving networks of resistors and batteries
    e. Outline the effect of internal resistance in batteries and appropriately account for its effects in circuit analysis.
    f. Solve multi-branch electric circuit problems using Kirchoff's Laws.
    g. Set up simple DC circuits and demonstrate the use of a multimeter to measure resistance, current and voltage.
5. Investigate the source of magnetic fields, forces on charges in magnetic fields and applications of magnetism to electromagnetic induction.
    a. Describe the origin of magnetic fields and calculate the magnetic field produced by long wires and solenoids
    b. Calculate the forces acting on charged particles and wire loops in uniform magnetic fields.
    c. Describe the concept of magnetic flux, induced emf and back emf and relate these concepts to the function of electric motors and generators.
    d. Solve technical problems involving Faraday's Law of Induction, Lenz's Law and motional emf.
6. Explore key experiments that led to the development of modern quantum theory.
    a. Describe the photoelectric effect experiment and the photon model of light.
    b. Solve technical problems involving energy carried by photons and the photoelectric effect.
    c. Apply Bohr's model of the atom to solve technical problems involving energy transitions in the hydrogen atom.
7. Analyze, interpret, and report on experimental results in the context of experimental objectives.
    a. Observe, record, organize and display data in tables, and record sources of error and determine the uncertainty in results
    b. Plot and analyze linear graphs (determine area, slope, intercept, including uncertainties)
    c. Convey findings in scientific reports written in an acceptable, traditional discipline-specific format

3. Required Materials

(a) Physics: Principles and Applications (Giancoli) Pearson 7th edition (hard copy or e-text from the publisher)
(b) Mastering Physics MPNELSON8405804 (student access ends June 30 2020)

4. Course Content and Schedule

Face to Face format:
LEC MWF 1:30 – 3:20 pm F 322
LEC T Th 1:30 – 2:20 pm F322
LAB T Th 2:30 – 4:20 pm F322

Online format (synchronous/asynchronous contact)
LEC and Q & A MTWThF 1:30 – 2:30 pm BBCU session
LAB Video Demonstration and Q & A T Th 2:30 – 3:20 pm BBCU session
Informal meeting (synchronous contact) via social media

5. Basis of Student Assessment (Weighting)

(a)	Homework	20%
(b)	Weekly Quizzes	20%
(c)	Midterms	20%
(d)	Lab Reports	20%
(e)	Final Exam	20%
		100%

PHYSICS DEPARTMENT GUIDELINES REGARDING TESTING AND GRADING:

- The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar, “students are expected to write tests and final exams at the scheduled time and place.” Exceptions will only be considered due to emergency circumstances as outlined in the calendar. Holidays or scheduled flights are not considered to be emergencies.

- Students must write quizzes, tests, midterm tests, etc., on the date and time assigned by the instructor. Missed exams normally receive a zero grade. Instructors are not required to provide make-up tests. At their discretion, instructors may waive a test in exceptional circumstances such as medical issues or a documented illness.

- Any outstanding homework or labs must be submitted prior to the last day of classes, and will be graded according to the late policy outlined by the instructor.

- Refer to your instructor’s information page for any additional policies regarding testing and grade calculation.

PHYSICS DEPARTMENT GUIDELINES REGARDING LABS:

- Students must obtain an overall grade of 50% or higher in the laboratory component of the course order to obtain credit for the course.

- Attendance is mandatory & you may be required to “sign in” at the beginning of each lab period. A lab may be waived or made up at a later time only in the case of documented illness or other extenuating circumstances. If you will be absent from a lab period due to illness it is your responsibility to notify your instructor.

- Unless otherwise stated by your instructor late penalties are as follows: For overdue labs (or assignments), a late penalty of 1 mark per day (10%) will be assessed for the first five days following the due date. After this date a complete report is still required and earns a maximum mark of 50%.

- At the discretion of the instructor, a student who is repeating this Physics course with a laboratory grade of 70% or higher may apply for lab exemption.

- Students will complete a minimum of 9 laboratory experiments including 3 formal reports (with full uncertainty calculations) and at least at least one lab using technology to perform data analysis.

6. Grading System

[X] Standard Grading System (GPA)

[ ] Competency Based Grading System

7. Recommended Materials to Assist Students to Succeed Throughout the Course

8. College Supports, Services and Policies

Immediate, Urgent, or Emergency Support
If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ http://camosun.ca/about/mental-health/emergency.html or http://camosun.ca/services/sexual-violence/get-support.html#urgent

College Services
Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at http://camosun.ca/

College Policies
Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at http://camosun.ca/about/policies/. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

A. GRADING SYSTEMS http://camosun.ca/about/policies/index.html

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.

DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at http://camosun.ca/about/policies/index.html for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	*Incomplete*: A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	*In progress*: A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	*Compulsory Withdrawal*: A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.