



## COURSE OUTLINE

The course description is online @ <http://camosun.ca/learn/calendar/current/web/phys.html>

Ω Please note: the College electronically stores this outline for five (5) years only.  
It is **strongly recommended** you keep a copy of this outline with your academic records.  
You will need this outline for any future application/s for transfer credit/s to other colleges/universities.

### 1. Instructor Information

(a)	Instructor:	Ed Nelson		
(b)	Office Hours:	MT 1:30 – 2:20, W 11:30 -12:20, ThF 10:30 – 11:20		
(c)	Location:	TECH 218		
(d)	Phone:	250 370 4435	Alternative Phone:	
(e)	Email:	<a href="mailto:nelson@camosun.bc.ca">nelson@camosun.bc.ca</a>		
(f)	Website:	<a href="http://online.camosun.bc.ca">online.camosun.bc.ca</a>		

### 2. Intended Learning Outcomes

(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

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

1. Solve technical problems associated with:
  - Impulse, the concept of conservation of momentum of isolated systems, including elastic and inelastic collisions, and angular momentum.
  - The Simple Harmonic Motion of a mass and spring system and the simple pendulum, including equations of motion, energy, and graphical representations.
  - Waves in various media (sound and light), including types of waves, wave functions, wave speed, and interference of waves.
  - Fundamental thermal physics, including thermometry conversions, specific heat, latent heat, and thermal expansion.
  - Static electricity (the Coulomb force, electric force field, electric potential and potential difference).
  - Current electricity (Ohm's Law, resistors in series, parallel and combination circuits).
  - The effect of magnetic fields on moving point charges and on current-carrying wires.
2. Assemble experimental apparatus using written instructions.
3. Observe, record, organize and display data in tables, graphs or charts.
4. Analyze linear graphs (determine area, slope, intercept, etc.).
5. Observe and record sources of error and estimate the range of uncertainty in results.
6. Interpret meaning of experimental results in the context of the experimental objectives.
7. Write scientific reports in an acceptable, traditional format.

### 3. Required Materials

- (a) "College Physics", Knight/Jones/Field, 2<sup>nd</sup> edition (Pearson)
- (b) PHYS 154/191/192 Lab Manual, scientific calculator, graph paper, drawing set

### 4. Course Content and Schedule

LEC MTWThF 12:30 – 1:20 CBA 110  
LAB Th 1:30 – 3:20 TECH 222

### 5. Basis of Student Assessment (Weighting)

- (a) Weekly Assignments 5%
- (b) Weekly Quizzes 5%
- (c) Midterms 30% (best 3 out of 4)
- (d) Labs (MANDATORY) 10%
- (e) Final Exam 50%

**6. Grading System**

*(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College for approval.)*

**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	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

**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 E-1.5 at [camosun.ca](http://camosun.ca) for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> 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	<i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. <i>(For these courses a final grade will be assigned to either the 3<sup>rd</sup> course attempt or at the point of course completion.)</i>
CW	<i>Compulsory Withdrawal:</i> 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.

**7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course**

**LEARNING SUPPORT AND SERVICES FOR STUDENTS**

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services, or the College web site at [camosun.ca](http://camosun.ca).

**STUDENT CONDUCT POLICY**

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy.

## OUTLINE:

### 1. **Impulse and Momentum**

- 1.1 Impulse – momentum theorem
- 1.2 Conservation of linear momentum
- 1.3 Collisions
  - 1.3.1 One-dimensional collisions
  - 1.3.2 Two-dimensional collisions
- 1.4 Angular momentum

### 2. **Simple Harmonic Motion**

- 2.1 Physics of a spring
  - 2.1.1 Hooke's law
  - 2.1.2 Springs in series and parallel
  - 2.1.3 Potential energy
- 2.2 Simple harmonic motion
  - 2.2.1 Period, frequency, and amplitude
  - 2.2.2 Equations for displacement, velocity and acceleration in terms of time
  - 2.2.3 Graphs of displacement, velocity and acceleration as functions of time
  - 2.2.4 Maximum velocity and acceleration
- 2.3 Simple pendulum

### 3. **Waves**

- 3.1 Properties of waves
  - 3.1.1 Types of waves – transverse/longitudinal
  - 3.1.2 Speed, period, wavelength and amplitude of waves
  - 3.1.3 Speed of wave on a string
  - 3.1.4 The wave function for transverse waves
  - 3.1.5 Wave speed and particle speed
- 3.2 Sound waves
  - 3.2.1 Properties
  - 3.2.2 Speed of sound in solids, liquids, and gases and temperature dependence
  - 3.2.3 The wave function for longitudinal waves
- 3.3 Principle of linear superposition
  - 3.3.1 Constructive and destructive interference
  - 3.3.2 Standing waves – transverse and longitudinal
  - 3.3.3 The standing wave function

### 4. **Thermal Properties of Matter**

- 4.1 Temperature scales
- 4.2 Thermometers
- 4.3 Thermal expansion
  - 4.3.1 Linear expansion - Thermal stress
  - 4.3.2 Volume expansion
- 4.4 Thermal energy
  - 4.4.1 Specific heat
  - 4.4.2 Latent heat

#### 4.4.3 Calorimetry

### 5. **Electricity**

#### 5.1 Electrostatics

##### 5.1.1 Charges as constituents of matter

###### 5.1.1.1 Conductors and insulators and semiconductors

###### 5.1.1.2 Charging processes – charge by induction

##### 5.1.2 Coulomb's law

##### 5.1.3 Electric fields

##### 5.1.4 Electric potential energy, potential and potential difference

### 6. **Current Electricity**

#### 6.1 Electric current

#### 6.2 Ohm's Law

#### 6.3 Resistivity, resistances in series and parallel

#### 6.4 Power

#### 6.5 Simple D. C. circuits

#### 6.6 Kirchhoff's Rules

### 7. **Electromagnetism**

#### 7.1 Magnets and the magnetic field

#### 7.2 Magnetic fields of currents – long straight wire, loop and coil

#### 7.3 Force on a moving charge

#### 7.4 Force on a current in a magnetic field

#### 7.5 Electromagnetic induction and Faraday's Law