



## COURSE OUTLINE

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

- 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. Course Instructor Information

Instructor: Christopher Avis  
Office Hours: T, W, Th, F: 2:30-3:30 PM, or by appt.  
Location: Tech 239  
Phone: 250-370-4406 / 250-370-3510  
Email: [avisc@camosun.bc.ca](mailto:avisc@camosun.bc.ca)  
Website: D2L: (online.camosun.ca)

### Lab Instructor Information

Instructor: Wilf Nienaber  
Location: Tech 218  
Phone: 250-370-4435  
Email: [nienaber@camosun.bc.ca](mailto:nienaber@camosun.bc.ca)

### 2. Intended Learning Outcomes

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

1. Define the scientific method and give examples of its application. Define and give examples of precision and accuracy.
2. Round measurements to the correct number of significant figures. Express numbers using scientific notation.
3. Use the SI system of units to express measurements. Identify and use SI base units, prefixes, and derived units. Perform unit conversions within the SI system. Use the Imperial and U.S. Customary system of units and perform conversions to and from the S.I. system.
4. Construct graphs using a Cartesian coordinate system. Plot data and label the graph correctly, including a title and axes labels. Analyze linear graphs, including drawing a best-fit line, calculating the slope and y-intercept, and writing the equation of the graph. Analyze non-linear graphs, change variables to produce a linear graph, and write the equation of that graph.
5. Define the following kinematic quantities: displacement, velocity and acceleration, distance and speed. Identify vector and scalar quantities. Define and calculate average and instantaneous velocities and speeds. Plot and read kinematic graphs. Use the kinematic equations to solve one-dimensional problems involving uniformly accelerated motion, including freefall.
6. State Newton's Laws and answer related conceptual problems. Construct free-body diagrams. Describe the concepts of net force, mass and weight. Solve one-dimensional dynamics problems involving normal forces, friction, tension, and applied forces. Calculate forces for objects in equilibrium.
7. Define the terms work, kinetic energy, potential energy and power. Use the work-energy theorem or the law of conservation of energy to solve problems. Calculate the power and efficiency of mechanical processes.
8. Assemble simple experimental apparatus using written instructions.
9. Observe, record, organize and display data in tables, graphs or charts.
10. Analyze linear graphs (determine area, slope, intercept, etc.).
11. Interpret meaning of experimental results in the context of the experimental objectives.

### 3. Required Materials

- (a) Texts: Physics 101/150 Course Materials Pack
- (b) Other: Physics 101/150 Laboratory Manual  
Graph paper, ruler, scientific calculator (no graphing calculators)

#### 4. Course Content and Schedule

<b>Lecture times:</b>	Monday:	12:30-1:20	Tech 222
	Tuesday:	12:30-1:20	Tech 222
	Wednesday:	12:30-1:20	Tech 222
	Friday:	12:30-1:20	Tech 173
<b>Seminar Times:</b>	Thursday:	11:30-12:20	Tech 222 (Group A)
		12:20-1:20	Tech 222 (Group B)
<b>Lab Times:</b>	Tuesday:	8:30-10:30	Tech 222 (Group A/B alternate weeks)

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

Students must be successful ( $\geq 60\%$ ) in both the theory and laboratory assignments to pass the course. The percentages used in determining the final letter grade are as follows:

- |                 |                       |
|-----------------|-----------------------|
| (a) Homework:   | 10 %                  |
| (b) Quizzes:    | 5 %                   |
| (c) Midterms:   | 35 %                  |
| (d) Labs:       | Successful Completion |
| (e) Final Exam: | 50 %                  |

Please note the following class policies:

1. Homework will be assigned at the beginning of each week and will be due the Tuesday of the week after it has been assigned. Exercises handed out during the seminars may also count towards your homework mark. Late homework will be subject to a 10 % per day mark deduction.
2. Quizzes will consist of a series of short multiple choice questions drawn from the banks of questions posted on the class website (D2L). They will encompass the material covered in a given week and will be done in the final 10 minutes of each week's seminars.

#### 6. Grading System

##### 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>d</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. The policy is available in each School Administration Office, at Student Services, and the College web site in the Policy Section.

### DEPARTMENT POLICIES REGARDING TESTING:

1. **The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar on page 39, "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.**
2. **Instructors are not required to provide make-up tests. At their discretion, instructors may waive a test or provide a make-up test only in the event of documented illness or other extenuating circumstances.**
3. **Refer to your instructor's information page for any additional policies regarding testing and grade calculation.**

### DEPARTMENT POLICIES REGARDING LABS:

1. **All assigned laboratory exercises and reports must be completed in order to obtain credit for this course. Attendance is required for all lab exercises at the scheduled times. A lab may be made up at a later time only in the case of extenuating circumstances such as a documented illness where documentation is provided by the student. If a lab is missed without excuse, the lab exercise must still be done and completed by the student in order to obtain credit for the course.**
2. **At the discretion of the instructor, a student who is repeating this Physics course may apply for lab exemption.**

## STUDY TIME

It is recommended that between 5 and 10 hours per week (or more for students with a weak background) be spent studying for this course outside of class time.

OUTLINE:

**1. Measurement & Units**

- 1.1 Concepts of physics
- 1.2 Accuracy and precision
- 1.3 Significant figures
- 1.4 Scientific notation
- 1.5 Systeme Internationale (SI)
  - 1.5.1 Base units
  - 1.5.2 Prefixes
  - 1.5.3 Derived units
- 1.6 Conversion of units
- 1.7 Problem solving

**2. Graphical Analysis**

- 2.1 Graph construction
  - 2.1.1 Plotting data
  - 2.1.2 Fitting curves to data
- 2.2 Analyzing linear graphs
  - 2.2.1 Determination of slope and intercept
  - 2.2.2 The linear equation
- 2.3 Analyzing non-linear graphs
  - 2.3.1 Recognition of power graphs
  - 2.3.2 Changing variables to produce linear graphs
  - 2.3.3 Writing equations for non-linear graphs

**3. Kinematics in One Dimension**

- 3.1 Kinematic quantities
  - 3.1.1 Vector and scalar quantities
  - 3.1.2 Position, distance and displacement
  - 3.1.3 Average speed and velocity
  - 3.1.4 Acceleration
- 3.2 Kinematic graphs
  - 3.2.1 Position versus time
  - 3.2.2 Displacement versus time
  - 3.2.3 Velocity versus time
- 3.3 Equations of uniformly accelerated motion
  - 3.3.1 Solving kinematic problems
  - 3.3.2 Acceleration due to gravity
  - 3.3.3 Vertical motion near the Earth

**4. Dynamics in One Dimension**

- 4.1 Concept of force
- 4.2 Newton's first law of motion
  - 4.2.1 Concept of inertia
- 4.3 Newton's second law of motion
  - 4.3.1 Dependence of acceleration on net force
  - 4.3.2 Dependence of acceleration on mass
  - 4.3.3 Dependence of net force on mass
- 4.4 Newton's third law of motion
  - 4.4.1 Interpretation of examples of the law

**5. Work, Energy and Power**

- 5.1 Work
  - 5.1.1 Definition
  - 5.1.2 Calculating work done by a force
  - 5.1.3 Positive and negative work
- 5.2 Types of Mechanical Energy
  - 5.2.1 Kinetic energy
  - 5.2.2 Gravitational potential energy
  - 5.2.3 Elastic potential energy
- 5.3 Work-Energy Theorem
- 5.4 Conservation of Mechanical Energy
- 5.5 Power and Efficiency