



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:	Christopher Avis		
(b)	Office Hours:	Monday, Tuesday, Thursday: 11:30 – 12:20, or by appointment		
(c)	Location:	Fisher 346C		
(d)	Phone:	250-370-3513	Alternative Phone:	
(e)	Email:	avisc@camosun.bc.ca		
(f)	Website:	D2L (online.camosun.ca) or: climate.uvic.ca/people/caavis		

2. Intended Learning Outcomes

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

1. Demonstrate skill in the use of S.I. base and derived units.
2. Draw graphs (by hand), determining slopes of linear graphs, linearization of non-linear data, and writing an equation to represent a linear graph.
3. Solve technical problems involving one-dimensional kinematics for a single particle with constant acceleration.
4. Solve technical problems involving the dynamics of a single particle in one dimension (force, weight, Newton's Laws of Motion).
5. Solve technical problems involving kinetic energy, gravitational potential energy, elastic potential energy, conservation of mechanical energy, and mechanical power.
6. Solve technical problems involving simple DC electric circuits, Ohm's Law, electric power, and resistors in series and parallel combination.
7. Solve technical problems involving nuclear energy (mass-energy equivalence, binding energy).
8. Assemble simple experimental apparatus using written instructions.
9. Observe, record, organize and display experimental 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 Course Materials Pack (*optional)
- (b) Other: Physics 101 Laboratory Manual
Graph paper, ruler, scientific calculator (no graphing calculators)

4. Course Content and Schedule

Lecture times:	Monday, Tuesday, Thursday:	12:30-2:20	Fisher 334
	Wednesday, Friday:	11:30-12:20	Fisher 316
Lab times:	Wednesday, Friday:	12:30-2:20	Fisher 316

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) Labs: 10 %
- (d) Tests: 25 %
- (e) Final Exam: 50 %

Please note the following class policies:

- Homework for the week will be assigned on the first day of each week with the intention that you work on it throughout the week. Homework will be **due by the end of the day one week after it has been assigned**
- Labs for a particular week will be **due by the end of the day on the Tuesday of the week following the lab**. (So, in the first week you will do two labs; both of those are due on the Tuesday the week after, and so on...). You must satisfactorily complete all labs to pass the course.
- Late labs and homework will be subject to a 5% per day late mark deduction.
- You must be present and take your own lab data for each lab.
- Tests will cover the material up to the end of class one week before the test. There are three tests scheduled as follows:
Friday, May 18th Friday, June 1st Friday, June 17th
- You must write the test at the scheduled time; no make-up or supplementary tests will be given.
- Quizzes will be delivered at the end of class on Friday of each week that there is not a test. They will be drawn from multiple choice questions posted to the class website.

Exceptions to the above policies will be made only in exceptional circumstances (such as illnesses, medical emergencies, etc...) and documentation must be provided in these instances.

PHYSICS 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.

PHYSICS DEPARTMENT POLICIES REGARDING LABS:

1. All assigned laboratory exercises and reports must be completed and handed in prior to the date of the final exam with an overall grade of 60% in order to obtain credit for the course. 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.
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 you spend between 10 and 20 hours per week (or more for students with a weak background) studying for this course outside of class time.

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 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. (For these courses a final grade will be assigned to either the 3 rd course attempt or at the point of course completion.)
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.

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.

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

6. Electrical Energy

- 6.1 Laws of Electrostatics
 - 6.1.1 Atomic structure
 - 6.1.2 Conductors and insulators
- 6.2 Electric circuits
 - 6.2.1 Definitions of current, voltage and resistance
 - 6.2.2 Basic circuit elements
 - 6.2.3 Ohm's law
 - 6.2.4 Electrical energy and power
 - 6.2.5 Characteristics of series circuits
 - 6.2.6 Characteristics of parallel circuits

7. Nuclear Energy

- 7.1 The nucleus
 - 7.1.1 Characteristics of the atom
- 7.2 Mass-Energy
 - 7.2.1 Equivalence of mass and energy
 - 7.2.2 Mass defect in nucleus
 - 7.2.3 Binding energy
- 7.3 Nuclear energy
 - 7.3.1 Fission and fusion
 - 7.3.2 Chain reactions
 - 7.3.3 Safety concerns