



**School of Arts & Science
PHYSICS DEPARTMENT**

**PHYS 101-Section X02
Introduction to Physics
Semester/Year Winter 2015**

COURSE OUTLINE

The Approved Course Description is available on the web @
<http://camosun.ca/learn/calendar/current/web/phys.html>

Ω Please note: this outline will be electronically stored for five (5) years only.
It is strongly recommended students keep this outline for your records.

1. Instructor Information

Instructor: Christopher Avis

Location: Fisher 346C

Email: avisc@camosun.bc.ca

Office Hours: TBA

Phone: 250-370-3513

Website: D2L (online.camosun.ca)

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. Demonstrate skill in drawing 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 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 book (Optional)
- (b) Other Physics 101 Laboratory Manual (Mandatory)
Graph paper (must be either 10 lines/inch or millimeter graph paper)
Ruler, scientific calculator

4. Course Content and Schedule

Monday: Lecture: 11:30 AM – 12:20 PM, Fisher 302
Tuesday: Lecture: 11:30 AM – 12:20 PM, Fisher 334
Wednesday: Lecture: 11:30 AM – 12:20 PM, Fisher 206
Thursday: Lab: 11:30 AM – 1:20 PM, Fisher 316
Friday: Lecture: 11:30 AM – 12:20 PM, Fisher 334

5. Basis of Student Assessment (Weighting)

The student must be successful ($\geq 60\%$) in both the theory and laboratory assignments to pass the course. The percentages used for the final grading are:

(a) Homework	10%
(b) Quizzes	5 %
(c) Labs	10 %
(d) Tests	25 %
(e) Final Exam	50 %

- Homework and labs assigned a given week will be due by the end of the day on the Tuesday of the following week.
- Quizzes will be delivered at the end of class on the Friday of each week. They will be drawn from multiple choice questions posted online on D2L
- Tests have been scheduled for the following dates:
Tuesday, Jan. 20th; Wednesday, Feb. 11th; Tuesday, Mar. 3rd;
Wednesday, Mar. 18th; Tuesday, Mar. 31st

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

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.
2. 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.
3. 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%.
4. At the discretion of the instructor, a student who is repeating this Physics course may apply for lab exemption.

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

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.

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 on the College web site in the Policy Section. www.camosun.bc.ca/divisions/pres/policy/2-education/2-5.html

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