



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

PHYS-104-004
General College Physics 1
Winter 2018

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	Ed Nelson
(b) Office hours	MW 1:30 – 2:30; T 2:30 – 3:30; Th F 12:30 – 1:30
(c) Location	TECH 218
(d) Phone	250 370 4435 Alternative:
(e) E-mail	nelson@camosun.bc.ca
(f) Website	D2L (online.camosun.ca)

2. Intended Learning Outcomes

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

1. Solve technical problems involving one-dimensional kinematics for a single particle undergoing constant acceleration along horizontal and inclined surfaces, and in free fall.
2. Solve technical problems involving the dynamics of a single particle in one dimension, the vector nature of forces, the net force on an object, free-body diagrams for single and two interacting objects, gravitational forces, and inertia.
3. Solve technical problems involving kinetic energy, gravitational potential energy, elastic potential energy, conservation of mechanical energy, and mechanical power, in one dimension.
4. Solve technical problems involving conversions between common temperature scales, specific heat capacity, latent heats, calorimetry, and heat transfer by radiation, thermal conduction and convection.
5. Solve technical problems involving nuclear energy (mass-energy equivalence, binding energy), demonstrate knowledge of nuclear fission, fusion, and fuel disposal problems.
6. Solve elementary technical problems involving graphical and trigonometric vector algebra in two dimensions, two-dimensional kinematics (motion), dynamics (forces), work and power.
7. Solve technical problems involving projectile motion, circular motion with constant speed, gravitational forces and planetary motion.
8. Solve technical problems involving hydrostatics (Archimedes' principle, Pascal's principle) and simple fluids in motion (Equation of continuity, Bernoulli's equation).
9. Assemble experimental apparatus using written instructions.
10. Observe, record, organize and display data in tables, graphs or charts.
11. Analyze linear graphs (determine area, slope, intercept, etc.).
12. Observe and record sources of error and estimate the range of uncertainty in results.
13. Interpret meaning of experimental results in the context of the experimental objectives.
14. Write scientific reports in an acceptable, traditional format.

3. Required Materials

- (a) Texts
"Physics: Principles with Applications", 7th edition, Douglas C. Giancoli, Pearson 2014
- (b) Other
PHYS 104 Lab Manual
Graph paper (package)
Basic Scientific Calculator; drawing set

4. Course Content and Schedule

LECTURE MWThF 10:30 – 11:20 CBA 116
LAB Th 8:30 – 10:20 TECH 222

5. Basis of Student Assessment (Weighting)

- | | |
|-------------------|-----|
| (a) Assignments | 5% |
| (b) Quizzes | 5% |
| (c) Midterm Exams | 25% |
| (d) Final Exam | 45% |
| (e) Lab Reports | 20% |

6. Grading System

- Standard Grading System (GPA)
- Competency Based Grading System

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.

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

N/A

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	<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 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	<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.

OUTLINE:

- 1. Measurement and Units – REVIEW (Ch. 1.1 – 1.7)**
- 2. Kinematics in one dimension - REVIEW (Ch. 2)**
 - 2.1 Displacement
 - 2.2 Average and instantaneous velocity
 - 2.3 Average and instantaneous acceleration
 - 2.4 Equations of uniformly-accelerated motion
 - 2.5 Application to falling bodies
 - 2.6 *OPTIONAL: Review of kinematic graphs (2.8)*
- 3. Dynamics in one dimension - REVIEW (Ch. 4.1 - 4.6)**
 - 3.1 Introduction to Newton's Laws of Motion
 - 3.2 Mass and Weight
 - 3.3 Types of forces (gravitational, contact, tension; friction (def'n in 4.8))
 - 3.4 Free body diagrams. Concept of net force
- 4. Kinematics and Dynamics Vectors in two dimensions (Ch. 3.1 – 3.6) and (Ch. 4.7, 4.8)**
 - 4.1 Graphical representation of vector algebra
 - 4.2 Vector algebra by trigonometry
 - 4.3 Kinematics in two dimensions
 - 4.4 Projectile motion (*OPTIONAL; Max. height and Range eq'ns.*)
 - 4.5 Dynamics in two dimensions; simultaneous forces, inclines (*OPTIONAL: Connected objects.*)
 - 4.6 Review of Work and Energy in two dimensions and with dissipative forces.
- 5. Uniform circular motion and gravitation (Ch. 5.1 – 5.3, 5.6 – 5.9)**
 - 5.1 Kinematics and dynamics of uniform circular motion

- 5.2 Newton's Universal law of gravitation
- 5.3 Application to circular planetary motion; satellites.
- 5.4 *OPTIONAL: Kepler's laws (5.9)*

6. **Work, energy and power (Ch. 6.1, 6.3 - 6.10, omit inclines)**

- 6.1 Work done by a constant force. Net work
- 6.2 Kinetic energy. The Work-Energy Principle
- 6.3 Potential energy (gravitational, spring)
- 6.4 Conservative and Non-conservative forces
- 6.5 Conservation of mechanical energy
- 6.6 Energy conservation with dissipative forces
- 6.7 Power and efficiency

7. **Thermal energy (Ch. 13.2, 13.4) and (Ch. 14)**

- 7.1 Temperature and thermometers
- 7.2 Thermal expansion
- 7.3 Heat as a form of energy; specific heat
- 7.4 Change of state and latent heat; calorimetry
- 7.5 Heat transfer: conduction, convection and radiation
- 7.6 *OPTIONAL: Heat Transfer Applications.*

8. **Nuclear energy (Ch. 30.1 – 30.8) and (Ch. 31.1 – 31.4)**

- 8.1 Structure and properties of nucleus
- 8.2 Binding energy
- 8.3 α , β , γ decay processes
- 8.4 *OPTIONAL: Radioactivity, Concept of half-life (30.3, 30.8 – qualitative)*
- 8.5 Nuclear Energy; The chain reaction; Applications
- 8.6 Nuclear waste; disposal and reprocessing.
- 8.7 Fusion energy; Applications (energy-production in stars)
- 8.8 *OPTIONAL: Radiation damage in matter (31.4)*

9. **Fluids (Ch. 10.1 – 10.10)**

- 9.1 Pressure; fluid statics and density
- 9.2 Pascal's Principle
- 9.3 Archimede's Principle and buoyancy
- 9.4 Fluids in motion; Equation of continuity
- 9.5 *OPTIONAL: Bernoulli's Principle and applications. (10.9, 10.10)*