



School of Arts & Science
PHYSICS DEPARTMENT
PHYS 104-002
General College Physics 1
2010W

COURSE OUTLINE

The Approved Course Description is available on the web @ _____

⚡ 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

| | | | |
|-----|---------------|--|---|
| (a) | Instructor: | Alf Wilson | |
| (b) | Office Hours: | TBD | |
| (c) | Location: | F346C | |
| (d) | Phone: | 370-3513 | please leave email NOT voicemail |
| (e) | Email: | alf@dralf.ca or wilsona@camosun.bc.ca | |
| (f) | Website: | www.dralf.ca | |

2. Intended Learning Outcomes

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

Upon completion of this course the 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).

3. Required Materials

- (a) Texts Physics, Principles with Applications, 6th edition, Douglas C. Giancoli
- (b) Other Physics 104/105 Laboratory Manual
Graph paper (must be either 10 lines/inch or millimeter graph paper)
Bound lab notebook for use with all labs (>50 pages, not spiral bound)

4. Course Content and Schedule

2 hr lab, 4 hr lecture per week, unit tests, in class group assignments and final exam
Dates will be announced as the semester proceeds. Attendance is required.
See topic outline below

5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

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

| | |
|----------------------|-----|
| Term Tests | 35% |
| Lab Work | 15% |
| Final Exam (3 hours) | 50% |

Midterm tests may be discounted from the grading distribution (see above) if all term work, including term tests, labs, and assignments, has been completed and is 60% or higher. In this case, the final grade for the course may be based on a combination of the final exam (90%) and the lab mark (10%).

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.

6. Grading System

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO 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 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 on the College web site in the Policy Section.

OUTLINE of topics

1. **Measurement and Units – REVIEW (Ch. 1.1 – 1.7)**
2. **Kinematics and Vectors 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 Review of kinematic graphs (2.8)
3. **Vectors and Kinematics in two dimensions (Ch. 3.1 – 3.6)**
 - 3.1 Graphical representation of vector algebra
 - 3.2 Vector algebra by trigonometry (components)
 - 3.3 Kinematics in two dimensions
 - 3.4 Projectile motion (**Do NOT use:** *Max. height and Range equations.*)
4. **Dynamics Vectors in two dimensions REVIEW (Ch. 4.1 - 4.6) new: (Ch. 4.7, 4.8)**
 - 4.1 Introduction to Newton's Laws of Motion
 - 4.2 Mass and Weight
 - 4.3 Types of forces (gravitational, contact, tension; friction (def'n in 4.8))
 - 4.4 Free body diagrams. Concept of net force
 - 4.5 Dynamics in two dimensions; simultaneous forces, inclines (*OPTIONAL: Connected objects.*)
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 Nonconservative 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)*