



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

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|-----|---------------|---|--------------------|--|
| (a) | Instructor: | Ed Nelson | | |
| (b) | Office Hours: | 3:30 - 4:30 pm MTThF and 10:30 – 11:20 am W | | |
| (c) | Location: | T218 | | |
| (d) | Phone: | 250 370 4435 | Alternative Phone: | |
| (e) | Email: | nelson@camosun.bc.ca | | |
| (f) | Website: | D2L online.camosun.ca | | |

2. Intended Learning Outcomes

(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

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

1. Solve technical problems involving distance, displacement, speed, velocity and acceleration.
2. Solve problems involving the application of Newton's Laws to two or more bodies moving in two dimensions.
3. Calculate, from first principles, conditions for equilibrium of rigid bodies subject to various forces.
4. Solve technical problems involving torque and rotational motion.
5. Solve technical problems involving work, energy, and power.
6. Solve technical problems requiring the application of particle vibration and wave physics.
7. Solve technical problems involving light reflection, refraction, critical angle and total internal reflection applications.
8. Assemble 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. Observe and record sources of error and estimate the range of uncertainty in results.
12. Interpret meaning of experimental results in the context of the experimental objectives.
13. Write scientific reports in an acceptable, traditional format.

3. Required Materials

- (a) "College Physics", Knight/Jones/Field, 3rd Edition (Pearson)
- (b) PHYS 154/191/192 Lab Manual, Scientific Calculator, Graph Paper, Drawing Set

4. Course Content and Schedule

LEC MWTh 11:30 – 12:20 (M-T174, W-T173, Th-T110) and Th 10:30 – 11:20 (Th T110)
SEM "A" F 8:30 – 9:20am T-222 "B" 9:30 – 10:20am T-222
LAB T 8:30 – 10:30 T222

5. Basis of Student Assessment (Weighting)

- (a) Weekly Assignments 5%
- (b) Weekly Quizzes 5%
- (c) Midterms 30% (Best 3 out of 4)
- (d) Labs (MANDATORY) 10%
- (e) Final Exam 50%

6. Grading System

(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College 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. <i>(For these courses a final grade will be assigned to either the 3rd 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.

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.

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OUTLINE:

1. **Vectors**

- 1.1 Components of vectors
- 1.2 Vector addition and subtraction
- 1.3 Kinematic examples
 - 1.3.1 Displacement, velocity, acceleration
 - 1.3.2 Relative motion

2. **Dynamics – Newton’s Laws**

- 2.1 Newton’s second law
 - 2.1.1 Forces – tension, springs, friction, gravity
 - 2.1.2 Free-body diagrams
 - 2.1.3 Two-dimensional problems

3. **Equilibrium**

- 3.1 Concurrent coplanar forces – algebraic 2-D problems
- 3.2 Non-concurrent forces

4. **Work and Energy**

- 4.1 Concept of work
- 4.2 Mechanical energy
 - 4.2.1 Kinetic energy
 - 4.2.2 Potential energy – gravitational and elastic
- 4.3 Conservation of energy
- 4.4 Power

5. **Uniform Circular Motion**

- 5.1 Centripetal acceleration
- 5.2 Centripetal force

6. **Rotary Motion**

- 6.1 Equations of uniform rotary motion
- 6.2 Torque
- 6.3 Moment of inertia
- 6.4 Rotational dynamics
- 6.5 Rotational energy
- 6.6 Rotational power

7. **Vibrations**

- 7.1 Periodic motion
 - 7.1.1 Period, frequency and amplitude
- 7.2 Simple harmonic motion
 - 7.2.1 Definition
 - 7.2.2 Circular motion and SHM
 - 7.2.3 Angular velocity and frequency
 - 7.2.4 Acceleration
- 7.3 Vibratory energy

8. **Waves**

- 8.1 Wave types
- 8.2 Wave characteristics
 - 8.2.1 Speed, wavelength, frequency, phase
- 8.3 Transmission between media
- 8.4 Wave equation
 - 8.4.1 Phase difference
- 8.5 Wave energy
 - 8.5.1 Intensity, intensity ratio, inverse square law
- 8.6 Interference
 - 8.6.1 Superposition theorem
 - 8.6.2 Beats
- 8.7 Standing waves and resonance
 - 8.7.1 Vibrating strings, vibrating air columns
- 8.8 Vibrating rods
- 8.9 Speed of sound
 - 8.9.1 Temperature effects
- 8.10 *Doppler effect – Optional material*

9. **Light**

- 9.1 Reflection
- 9.2 Refraction
- 9.3 Total internal reflection
- 9.4 Optical fibers
 - 9.4.1 Modes of propagation and dispersion
 - 9.4.2 *FOTS – Optional material*