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

PHYS-104-003
General College Physics 1
Winter 2019

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

Instructor:	Nancy McLean
Office Hours:	Mon., Tues., Wed., Thurs: 1:30 – 2:20 pm or by appointment
Location:	F346B
Phone:	370 - 3515
Email:	McLeanN@camosun.bc.ca
Website Info:	D2L

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 <u>Physics, Principles with Applications</u>, *7th edition*, Douglas C. Giancoli
(b) Other Physics 104/105 Laboratory Manual
  Graph paper (must be either 10 lines/inch or millimeter graph paper)

4. Course Content and Schedule

Class Times:	Monday	3:30 – 4:20 pm	F338
	Tues.,Wed., Thurs.	3:30 – 4:20 pm	F316
Lab Times:	Friday	10:30 – 12:20 pm	F316

5. Basis of Student Assessment (Weighting)
The student must be successful in both the theory and laboratory assignments to pass the course. The approximate percentages used for the final grading are:

Best 3 out of 4 Tests	30%
Homework	5%
Lab Work	15%
Final Exam (3 hours)	50%

<u>PHYSICS DEPARTMENT GUIDELINES REGARDING TESTING AND GRADING:</u>

- The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar, "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.

- 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.

- Any outstanding homework or labs must be submitted prior to the last day of classes, and will be graded according to the late policy outlined by the instructor.

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

<u>PHYSICS DEPARTMENT GUIDELINES REGARDING LABS:</u>

- <u>Students must obtain an overall grade of 50% or higher in the laboratory component of the course order to obtain credit for the course.</u>

- 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.

- 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%.

- At the discretion of the instructor, a student who is repeating this Physics course with a laboratory grade of 70% or higher may apply for lab exemption.

- Students will complete a minimum of 9 laboratory experiments including 3 formal reports (with full uncertainty calculations) and at least at least one lab using technology to perform data analysis.

6. Grading System

| X | Standard Grading System (GPA) |

| | Competency Based Grading System |

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

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.

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	*Incomplete*: 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	*In progress*: 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	*Compulsory Withdrawal*: 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.

<u>OUTLINE:</u>

1. **<u>Measurement and Units – REVIEW (Ch. 1.1 – 1.7)</u>**

2. **<u>Kinematics in one dimension - REVIEW (Ch. 2)</u>**

    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. **<u>Kinematics and Vectors in two dimensions (Ch. 3.1 – 3.6*)*</u>**

    3.1 Graphical representation of vector algebra
    3.2 Vector algebra by trigonometry
    3.3 Kinematics in two dimensions
    3.4 Projectile motion
    3.5 *OPTIONAL; Max. height and Range eq'ns*

4. **<u>Dynamics (Ch. 4.1 - 4.8)</u>**

    4.1 Introduction to Newton's Laws of Motion
    4.2 Mass and Weight
    4.3 Types of forces (gravitational, contact, tension; friction)
    4.4 Free body diagrams. Concept of net force
    4.5 Dynamics in two dimensions; simultaneous forces, inclines
    4.6 *OPTIONAL: Connected objects.*

5. **<u>Uniform circular motion and gravitation (Ch. 5.1 – 5.3, 5.6 – 5.9)</u>**

    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. **<u>Work, energy and power (Ch. 6.1, 6.3 - 6.10)</u>**

    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 Work and Energy in two dimensions and with dissipative forces.
    6.6 Conservation of mechanical energy
    6.7 Energy conservation with dissipative forces
    6.8 Power and efficiency

7. **<u>Thermal energy (Ch. 13.2, 13.4) and (Ch. 14)</u>**

    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. **<u>Fluids (Ch. 10.1 – 10.10)</u>**

    8.1 Pressure; fluid statics and density
    8.2 Pascal's Principle
    8.3 Archimedes' Principle and buoyancy
    8.4 Fluids in motion; Equation of continuity
    8.5 *OPTIONAL: Bernoulli's Principle and applications. (10.9, 10.10)*

9. **<u>Nuclear energy (Ch. 30.1 – 30.8) and (Ch. 31.1 – 31.4)</u>**

    9.1 Structure and properties of nucleus
    9.2 Binding energy
    9.3 α, β, γ decay processes
    9.4 *OPTIONAL: Radioactivity, Concept of half-life (30.3, 30.8 – qualitative)*
    9.5 Nuclear Energy; The chain reaction; Applications
    9.6 Nuclear waste; disposal and reprocessing.
    9.7 Fusion energy; Applications (energy-production in stars)
    9.8 *OPTIONAL: Radiation damage in matter (31.4)*