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

PHYS-101-001
Introduction to Physics
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.*

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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. Demonstrate skill in the use of S.I. base and derived units.
2. Draw graphs (by hand), determine slopes of linear graphs, linearize non-linear data, and write 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 using Newton's Laws of Motion.
5. Perform vector analysis using scaled diagrams with applications to displacement and force.
6. Define the terms work, kinetic energy, gravitational potential energy and power.
7. Solve technical problems using the work-kinetic energy theorem and conservation of mechanical energy.
8. Solve technical problems involving simple DC electric circuits, Ohm's Law, and electric power.
9. Define and describe the following properties of waves: period, frequency, wave speed and amplitude.
10. Define the properties of light, including the electromagnetic spectrum.
11. State and apply the Law of Reflection and the Law of Refraction.
12. Assemble simple experimental apparatus using written instructions.
13. Observe, record, organize and display experimental data in tables, graphs or charts.
14. Analyze linear graphs (determine area, slope, intercept, etc.).
15. Interpret experimental results in the context of the experimental objectives.

3. Required Materials

(a) Texts Physics 101 Course Materials book
(b) Other Physics 101 Laboratory Manual
Graph paper (must be either 10 lines/inch or millimeter graph paper)

4. Course Content and Schedule

Class Times:	Mon., Wed., Thurs.	4:30 – 5:20 pm	F322
	Tuesday	4:30 – 5:20 pm	F316
Lab Times:	Thursday	10:30 – 12:20 am	F316

5. Basis of Student Assessment (Weighting)

The student must be successful (≥ 50%) in both the theory and laboratory assignments to pass the course. The approximate percentages used for the final grading are:

Quizzes	35%
Homework	5%
Lab Work	10%
Final Exam (3 hours)	50%

PHYSICS DEPARTMENT GUIDELINES REGARDING TESTING AND GRADING:

- 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.

PHYSICS DEPARTMENT GUIDELINES REGARDING LABS:

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

- 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 10 labs of which at least one will be completed as a formal report and one will involve manipulation and plotting of data using technology.

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.

OUTLINE:

1. **Measurement (Chapter 1)**
   - 1.1. Système international d'unités, SI (International System of Units) (Ch 1.1)
     - 1.1.1. Base Units
     - 1.1.2. Prefixes
     - 1.1.3. Derived Units
   - 1.2. Dimensional Analysis for unit conversion (Ch 1.1)
   - 1.3. Significant Figures (Ch 1.1)
   - 1.4. Precision and accuracy (Ch 1.2)
   - *1.5. Scientific Notation (additional material)*

2. **Graphical Analysis (Chapter 1)**
   - 2.1. Constructing graphs of linear data
     - 2.1.1. Plotting data (Ch 1.3)
     - 2.1.2. Best-fit line (Ch 1.3)
   - 2.2. Analyzing linear graphs (Ch 1.3)
     - 2.2.1. Determination of slope and intercept (Ch 1.3)
     - 2.2.2. The linear equation (Ch 1.3)
   - 2.3. Analyzing non-linear graphs
     - 2.3.1. Recognition of power graphs
     - *2.3.2. Changing variables to produce linear graphs (laboratory)*
     - *2.3.3. Writing equations for non-linear graphs (laboratory)*

3. **Kinematics in One Dimension (Chapter 2 and 3)**
   - 3.1. Motion diagrams (Ch 2.1)
   - 3.2. Position, distance, displacement (Ch 2.2)
   - 3.3. Vector and scalar quantities (Ch 2.2)
   - 3.4. Graphs of kinematic quantities
     - 3.4.1. Position versus time (Ch 2.3)
     - 3.4.2. Displacement versus time (Ch 2.4)
   - 3.5. Speed and velocity (Ch 2.4)
   - 3.6. Accelerated Motion
     - 3.6.1. Definition of acceleration (Ch 3.1)
     - 3.6.2. Graphs of velocity versus time (Ch 3.2)
     - 3.6.3. Kinematic equations of motion with constant acceleration (Ch 3.2)
     - 3.6.4. Acceleration due to Earth's gravity (Ch 3.3)
     - 3.6.5. Vertical motion near the Earth (Ch 3.3)

4. **Dynamics in One Dimension (Chapter 4)**
   - 4.1. Force and accelerated motion (Ch 4.1)
   - 4.2. Newton's first law of motion (Ch 4.1)
     - 4.2.1. Concept of inertia (Ch 4.1)
   - 4.3. Newton's second law of motion (Ch 4.1)
     - 4.3.1. Applications of Newton's second law of motion (Ch 4.2)
   - 4.4. Newton's third law of motion (Ch 4.3)
     - 4.4.1. Interaction forces (Ch 4.3)
     - 4.4.2. Ropes and strings (Ch 4.3)
     - 4.4.3. Normal forces (Ch 4.3)

5. **Vectors in Two Dimensions (Chapter 5)**
   - 5.1. Scaled diagrams for displacements and forces (Ch 5.1)
   - 5.2. Vector components in scaled diagrams (Ch 5.1)

6. Work, Energy and Power (Chapter 10 and Chapter 11)

6.1. Work done by a force (Ch 10.1)
6.2. Definition of mechanical power (Ch 10.1)
6.3. Types of mechanical energy (Ch 11.1)
  6.3.1. Kinetic energy (Ch 11.1)
  6.3.2. Gravitational potential energy (Ch 11.1)
  6.3.3. Elastic potential energy (Ch 11.1)
6.4. Work-Energy theorem (Ch 11.2)
6.5. Conservation of mechanical energy (Ch 11.2)

7. Waves (Chapter 14)

7.1. Types of mechanical waves
  7.1.1. Periodic Motion (Ch 14.1)
  7.1.2. Transverse waves (Ch 14.2)
  7.1.3. Longitudinal waves (Ch 14.2)
7.2. Properties of mechanical waves
  7.2.1. Amplitude (Ch 14.2)
  7.2.2. Wave speed (Ch 14.2)
  7.2.3. Wavelength (Ch 14.2)
  7.2.4. Frequency (Ch 14.2)
  7.2.5. Period (Ch 14.2)
  7.2.6. Wave Superposition (Ch 14.3)

8. Light (Chapter 16, 17 and 18)

8.1. Properties and characteristics (Ch 16.1)
  8.1.1. Ray model (Ch 16.1)
  8.1.2. Luminous sources and illumination (Ch 16.1)
  8.1.3. Opaque, transparent, and translucent materials (Ch 16.1)
8.2. Speed of light (Ch 16.1)
8.3. Wave model of light and the electromagnetic spectrum (Ch 16.2)
8.4. Law of Reflection (Ch 17.1)
  8.4.1. Specular and diffuse reflection (Ch 17.1)
  8.4.2. Images in plane mirrors (Ch 17.1)
  8.4.3. Ray trace diagrams for plane mirrors (Ch 17.1)
8.5. Law of Refraction (Ch 18.1)
  8.5.1. Snell's Law (Ch 18.1) Total internal reflection (Ch 18.1)
  8.5.2. Dispersion (Ch 18.1)
  8.5.3. Ray trace diagrams for converging lens (Ch 18.2)

9. Direct Current Circuits (Chapter 20 and Chapter 22)

9.1. Definitions (Ch 20.1)
  9.1.1. Properties of charge (Ch 20.1)
  9.1.2. Electric current (Ch 22.1)
  9.1.3. Voltage (Ch 22.1)
  9.1.4. Resistance (Ch 22.1)
9.2. Ohm's Law (Ch 22.1)
9.3. Circuit Diagrams (Ch 22.1)
9.4. Electrical energy and power (Ch 22.2)
9.5. Resistors in Series (laboratory) (Ch 23.1)
9.6. Resistors in Parallel (laboratory) (Ch 23.1)