PHYS 1107 (003/004) - Introductory General Physics I

Fall 2023

Instructor:	Will Gunton	**Time:**	W/F 10:30 AM – 12:20 PM
Email:	guntonw@douglascollege.ca	**Location:**	S0640 (NW - South Bldg.)

Course Description

This course is an algebra-based physics course focused on mechanics and waves. Topics covered in this course include linear kinematics and dynamics, energy, momentum, rotational motion, simple harmonic motion, mechanical waves, and sound. This course includes a weekly lab.

Required Books

College Physics by Open Stax (Douglas College Custom Edition)
PHYS 1107 Laboratory Experiments Manual*

The lab manual and textbook can accessed for free from the course Blackboard space.

Course Webpage

https://douglascollege.blackboard.com
(Blackboard - Login Required)

Instructor Office and Office Hours

Room S3934 (New Westminster Campus)
Office Hours: Tue: 3-4 | Wed: 1-2 | Thur: 5-6
You are also welcome to stop by my office and see if I am around outside of these hours. I often will be!

Prerequisites

B.C. Foundations of Math 12 (C or higher) or B.C. Pre-Calculus 12 (C or higher) or MATH 1105 and either Physics 11 (C or higher) or PHYS 1104

Important Dates

First day of classes ..... Tuesday September 5
Last day to drop course without receiving a 'W' on record ..... Monday September 18
National Day for Truth and Reconciliation - College Closed ..... Monday October 2
Thanksgiving Day - College Closed ..... Monday October 9
Test One ..... Wednesday October 11
Last day to drop course with 'W' on record ..... Monday November 6
Remembrance Day - College Closed ..... Monday November 13
Test Two ..... Wednesday November 15
Last day of classes ..... Wednesday December 6
Exam Period ..... Friday December 8 - Sunday December 17

Please do not make travel arrangements during the exam period until the date of the exam is set.

Grading Scheme

Details on each assessment can be found in the *Assessment Details* section starting on page 3.
There is no extra-credit available in this course.

Final Exam 30%
Two Tests 30%
Labs 20%
Homework (Online) 10%
Homework (Written) 5%
Pre-Reading Quizzes (Online) 5%

Course Guidelines

This course and the classes are structured to allow you to actively engage and take ownership of the material as we cover it in class. To this end, we will incorporate many in-class questions and discussion within the class setting. Please bring a scientific/graphing calculator, paper, and writing instruments to class. The assessments (outlined starting on page 3) are structured so that you have multiple opportunities to work with the course material, and so that you and I can receive frequent feedback on our progress. There are no participation marks in this class. However, I hope that you actively participate in the course by attending class, engaging with the in-class activities, and asking a lot of questions. This is the best way to succeed in the course, and it makes the lectures more fun.

Every topic that we cover in this course has an associated set of learning goals, which you can find posted on Blackboard. These specific learning goals are an excellent checklist for what you are expected to know after we cover a topic, and making sure you can address each learning goal is an excellent way to help focus your efforts when reviewing material or preparing for the tests and exam in this course. You will get the most out of the learning goals if you review them before class so you know what we will cover. After class, go through the learning goals that we covered and make sure you can address each one. If you have questions, ask them right away.

Summary of Weekly Due Dates

This is a summary of what is due in a typical week during the course. Details on each assessment can be found in the *Assessment Details* section starting on page 3.

- Pre-Reading: **Tuesday at 11:59 PM**
- Pre-Lab Quiz: **Wednesday at 11:59 PM**
- Lab: **Thursday at the end the lab** (completed during the scheduled lab time)
- Written Homework: **Friday at start of class**
- Online Homework: **Sunday at 11:59 PM**

You can see the due date for all upcoming assignments on the home page of the course Blackboard site.

Assessment Details

All the content for each part of the course can be found on Blackboard in the relevant content area. You can access these content areas using the menu on the left hand side of our Blackboard site.

- **Tests**

  There will be two tests during the semester (see dates under "Important Dates" above). The test with the higher mark will count for 20% of the final grade, and the test with the lower mark will count for 10% of the final grade. In the event of circumstances beyond your control, the weighting of the test will be moved to the final exam. In these situations, you must inform the instructor as soon as possible (ideally before the test) and documentation may be required. For each test, you will be provided with the formula sheet and any necessary metric prefixes (these can also be found on Blackboard in the "Tests and Exam" content area). You can also to bring in one 3-inch by 5-inch cue card with anything you want handwritten on one side.

  The tests in this course will be *two-stage tests*. The first stage is the standard individual test, where you will write the test on your own. After this is completed, you will be assigned random groups of 3-4 people where you will work together to answer a portion of the same exam. The individual portion will count for 85% of your final test mark and the group portion will count for 15% of the final test mark. However, your mark cannot go down due to the group portion. If you score better on the individual portion than the group portion, your entire test mark will be from the individual portion.

  Why are we going these two-stage tests? The purpose of this course is to learn physics, and tests are often the time where you are the most engaged and familiar with the material. Collaborating with your peers to discuss and solve the test problems will give you immediate and targeted feedback, and help you understand the reasoning why certain answer are correct or incorrect. This allows the test itself to be another learning opportunity.

- **Labs**

  The labs for this course take place on Thursday from 8:30 AM - 11:20 AM (Section 003) and Thursday from 12:30 PM - 3:20 PM (Section 004) in S0630. You must attend the lab section that you are registered in. It is important that you come to lab prepared for each experiment. To help you prepare, each lab will have a short quiz based on the material from the lab manual. This quiz will be available all day on Wednesday (the day before the scheduled lab day), and is due at 11:59 PM on Wednesday . You will have 30 minutes to complete this quiz once you start. Lab reports are due at the end of each lab period, and **there are no make-up labs.** A missed lab counts as a grade of 0 for that lab. If a lab is missed due to circumstances beyond your control, you will be exempted from that lab. In some cases, a written note must be provided and you should inform the lab instructor (if possible) **before** the start of the lab.

  Please see the lab content area on Blackboard for more details on the lab portion of the course. Specific questions about lab content or grading should be directed to the lab instructor.

- **Pre-Reading Quizzes**

  In order to get the most out of each class, you should have some focused exposure to the material before the class starts. This allows you to see and think about definitions, vocabulary and some simple examples at your own pace. **There will be a short online quiz due each Tuesday at 11:59 PM** that will be based off of specific sections in the textbook. The specific readings and quiz will be posted to Blackboard by Wednesday of the preceding week. You will have unlimited attempts to answer the quiz questions. Please note that I do not expect you will teach yourself all the material, nor understand it all from the textbook alone. The pre-reading and quiz is the first step in learning the material.

- **Homework**

  The homework assignments are designed to allow you to practice and apply the concepts and problem solving strategies we have worked on in class. The homework assignments are split into two components:

  Online Homework: Weekly online homework assignments **will be due every Sunday at 11:59 PM**. The assignments will be posted to the Blackboard site by Thursday 10 days prior to the due date. The assignments will generally cover material from the week they are posted. The assignments are to be completed online using Blackboard. You will have eight attempts to answer the questions.

  Written Homework: Each week you will be assigned one question for which you will need to submit a written solution. These weekly written homework assignments **will be due every Friday at the start of class**. The assigned question will be handed out in class on Friday and posted to Blackboard. Your solution will be marked both on correctness, clarity of your work, and how you arrived at the answer. The purpose of these written assignments is to give you practice (and receive feedback on) writing clear solutions to problems. Writing clear solutions to problems is vital to organizing your thoughts, and solving new problems that you will encounter in this class.

  Solutions to the homework assignments will be posted to Blackboard after the due date has passed.

Late Policy

The online system will stop accepting submissions at 11:59 PM on the indicated due date, so you must ensure you have completed and submitted your work before this time. Late work for online assignments is not accepted. Written homework that is not handed in at the start of class on the day it is due may lose 20%. Written homework will not be accepted after the end of the class the day it is due. However, your lowest mark from the pre-readings and homework assignments (one written and one online) will be dropped.

Technical issues or issues that arise at the last minute are not an acceptable excuse for late or incomplete work. Do not leave the homework or pre-readings to the last minute or the day they are due. All assignments are posted well in advance of the due date, and you can see the due date for all upcoming assignments on the home page of the Blackboard site in the "To Do" module. It is your responsibility to be aware of the due dates for assessments in this course and start work on them early.

Academic Integrity on the Homework

You are welcome (and encouraged) to work with your classmates to solve homework problems. However, the homework (or answers) you submit must be based on your own work and not a copy of any other solution. For the written homework, you should write up the final version of the homework on your own and in your own words. If you have any questions, please ask me *before* engaging in the activity. You can find more details on the Douglas College academic integrity policy on page 6.

Learning Outcomes

Upon completion of the course, successful students will be able to:

- determine the correct SI units for physical quantities through dimensional analysis;
- use vector components to solve problems that involve forces or motion in 2D;
- apply vector scaling, addition, and/or subtraction to determine the direction and magnitude of vector quantities associated with motion (for example, displacement, velocity, and acceleration);
- interpret graphs of position, velocity, and acceleration as functions of time;
- solve 1D kinematics problems with a constant acceleration;
- solve 2D kinematics problems with a constant acceleration and projectile motion problems by applying the principle of independence of motion along two perpendicular directions;
- define normal force, static friction force, kinetic friction force, tension force, spring force, and gravitational force;
- summarize the forces acting on an object by drawing a free body diagram;
- apply Newton's laws to solve problems in 1D and 2D that involve forces acting on objects;
- define and determine the centripetal force acting on an object moving along a curved path;
- solve problems that involve objects undergoing uniform circular motion;
- define and calculate the torque due to a force and the net torque on an object;
- calculate the work done by conservative and non-conservative forces;
- apply the law of conservation of energy and/or the work-energy theorem to solve problems that involve forces acting on objects;
- distinguish between elastic collisions, inelastic collisions, and completely inelastic collisions;
- apply the law of conservation of momentum to solve problems that involve inelastic collisions (or explosions) in 1D and 2D;
- solve elastic collision problems in 1D where one of the colliding objects is initially at rest;
- solve rotational kinematics problems for motion with a constant angular acceleration;
- define moment of inertia and explain how the moment of inertia depends on the mass distribution within an object;
- solve problems that involve forces and torques acting on objects that can translate and rotate (for example, rolling objects or massive pulleys) using the rotational analogue of Newton's second law and/or conservation of energy;
- define simple harmonic motion (SHM) and explain why a mass-spring system undergoes SHM;
- apply the motion equations for SHM and/or conservation of energy to solve problems that involve SHM;
- use the mathematical equation for a traveling wave to determine the wave speed and direction of the wave's propagation;
- solve problems that involve the interference of traveling waves (for example, standing waves and beats);
- calculate the frequency or wavelength of sound heard by an observer due to the Doppler effect;
- state and discuss the precision and accuracy of measurements;
- determine the uncertainty on a quantity calculated from measured values by propagating uncertainty through a calculation;
- present data using computer generated plots and determine physical quantities using a linear regression;
- discuss and analyze the results of an experiment to provide appropriate context for the outcome;
- communicate details of an experiment (for example, the objective, data, calculations, discussion, and conclusion) in a written report;

Every topic that we cover in this course also has an associated set of learning goals. You can find these posted on Blackboard. The complete curriculum guidelines for this course can be found at:
https://www.douglascollege.ca/course/phys-1107

Student Responsibilities

It is the student's responsibility to be aware of policies, procedures, and deadlines, which are in effect at Douglas College. This information is printed in this Calendar, in the Registration Guide, and in other publications. Questions regarding these matters may be directed to the Office of the Registrar or the Student Services Centre. A complete version of the policies and procedures at Douglas College can be found at: https://www.douglascollege.ca/about-douglas/governance/policies.

It is also the student's responsibility to attend classes regularly, to keep work up-to-date, and to complete assignments as required. Students can be asked to leave a course if attendance is not regular. Students should ensure that they are available during the entire time set aside at the end of the term for formal examinations. Instructors are not obliged to schedule an alternate examination time to accommodate the student.

Academic Integrity

Douglas College defines academic integrity as "the fundamental ethics of scholarship and knowledge creation and transmission, including the principles of honesty, respect for truth and knowledge, fairness and responsibility." Acts that are in breach of academic integrity include (but are not limited to): cheating, misuse or misrepresentation of sources, plagiarism, taking unauthorized presentation of the work of another student, and assisting or attempting to assist another person to commit any breach of academic integrity. Breaching academic integrity is a serious offense. Penalties for the violation of the academic integrity policy include (but are not limited to): a grade of zero on the assignment or test, a failing grade assigned in the course, and expulsion from the college.

Learning about academic integrity is part of your post-secondary education and a part of this course. If you are unsure of what may be a breach of academic integrity, please ask! This course strongly encourages collaboration between students and the instructor. It is perfectly acceptable to work on homework problems with other students. However, it is not acceptable to directly copy answers from another student. It is your responsibility to read and understand the Douglas College academic integrity policy. This policy is posted in the "Start Here" area of the course Blackboard site.

Douglas College Values

We believe:

- that students are our primary focus.
- in fostering a dynamic, accessible and supportive teaching and learning environment that prizes excellence and innovation. We value creative and critical thinking and the will to challenge and be challenged.
- in honoring the contribution and worth of all individuals. We welcome diversity with its rich complexity and believe that all voices need to be heard.
- that it is our duty to be thoughtful and caring stewards of the personal, physical and fiscal resources entrusted to us. We practice social, environmental and community responsibility.
- that intellectual growth and exploration inspire well-rounded, responsible and contributing citizens. We invite everyone into the excitement and curiosity of learning.
- in the power of dreams and in the power of education to make them come true.

I expect you and I to hold each other to these values inside and outside of class.

Accessibility Services

Douglas College is committed to creating a learning environment that meets the needs of all learners. If you anticipate or experience disability-related issues or barriers in this course, please meet with me. Together we can plan how best to support your learning and coordinate your accommodations. You are also encouraged to contact Accessibility Services at stuserv@douglascollege.ca or `www.douglascollege.ca/accessibility`.

Grading Policy

The full Douglas College grading policy can be found here.

From the policy statement: "Douglas College recognizes the need for a system of recording and reporting student grades that is commonly used and respected among institutions. As a result, learning experiences offered under the authority of Douglas College for the purpose of credit courses are subject to a standard letter grade and percentage-value equivalent system of assessment and reporting."

The Douglas College grading system is:

Letter Grades

Note: The letter grades and corresponding percentages listed below, effective as of September 2023, are used in the evaluation of coursework in credit courses. For previous percentages contact Enrolment Services.

Grade	Numerical Value	Achievement Level	Description & Notes
A+	4.33	90% to 100%	**Outstanding Achievement**
A	4.00	85% to 89%	
A-	3.67	80% to 84%	
B+	3.33	77% to 79%	**Good Achievement**
B	3.00	73% to 76%	
B-	2.67	70% to 72%	
C+	2.33	65% to 69%	**Satisfactory Achievement**
C	2.00	60% to 64%	
C-	1.67	55% to 59%	**Marginal Achievement**
D	1.00	50% to 54%	**Minimal Achievement** Student may not use the course as a prerequisite for another course
F	0.00	49% and below	**Unsatisfactory Achievement**
UN	0.00		**Unofficial Withdrawal** Student complete less than 70% of the total evaluation of the course, or missed more than 30% of the classes where the Instructor's Course Outline specifies that attendance is a course requirement.

Note: An asterisk (*) indicates Challenge Credit (e.g. *B indicates the grade of "B" was achieved by means of a challenge examination, which is not calculated in GPA.)

Course Schedule

The lecture schedule below is approximate, and subject to change. Please see the learning goals and the posted pre-readings for the relevant sections from the textbook.

Week of:	Wednesday	Friday	Lab Experiment*
Sept. 4	First Day (Introduction)	Math Tools Terminology	*No Lab*
Sept. 11	Graphing Motion Kinematics Equations	1D Kinematics	Essential Skills
Sept. 18	2D Kinematics Projectile Motion	Forces and Newton's Laws	Graphing Straight Line Motion
Sept. 25	Forces and Newton's Laws	Forces and Newton's Laws	Accelerated Motion
Oct. 2	Circular Motion	Gravity Torque Introduction	Projectile Motion
Oct. 9	**TEST ONE**	Torque and Equilibrium	Friction
Oct. 16	Work and Energy	Work and Energy	Orbital Motion
Oct. 23	Momentum and Collisions	Momentum and Collisions	Static Equilibrium
Oct. 30	Rotational Kinematics	Rotational Dynamics and Energy	Conservation of Energy
Nov. 6	Rotational Dynamics and Energy	Angular Momentum	Linear Momentum
Nov. 13	**TEST TWO**	Simple Harmonic Motion	Moment Of Inertia
Nov. 20	Simple Harmonic Motion	Traveling and Standing Waves	Hooke's Law and SHM
Nov. 27	Interference	Sound Doppler Effect	Standing Waves
Dec. 4	Review Class	*No Class*	*No Lab*

*The labs for this course take place on Thursday from 8:30 AM - 11:20 AM (Section 003) and Thursday from 12:30 PM - 3:20 PM (Section 004) in S0630.