PHYS 110 – Introductory Physics I
Course Outline: Sept 2022 – Dec 2022

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Please email us directly rather than using any LMS messaging function.
Include PHYS 110 in the email subject and tell us your student number.

Lectures:

A01	ELL 167	TWF 10:30-11:20	Dr Laidlaw
A02	ELL 168	TWF 11:30-12:20	Dr Laidlaw
A03	BWC B150	TWF 1:30-2:20	Dr Martin
A04	Online	Asynchronous	Dr Laidlaw

The in-person sections will be taught using a primarily "flipped" modality. Previously recorded lecture videos will be available to all students; you are expected to watch them. The in-person sessions will be an opportunity for the instructors to elaborate on the theory, applications, demonstrations, and examples as they consider appropriate.

Labs: In-person lab sessions will be held starting on Sept 9.
You must attend your lab section; there is marked work starting Sept 9.
All students will complete their labs in person.

Prerequisite: MATH 100, 109, or 102 (MATH 102 is not recommended)
To register in this class, you must have credit for, or be concurrently registered at UVic in a calculus class (MATH 100, 102, or 109).
We expect that you have mastered equivalent material to BC Physics 12.

Required Texts:
A textbook, lab manual, and other course resources by Dr Keeler, Dr Laidlaw, and Dr Martin will be available electronically.
To access these resources and the assignments you must purchase the text.
The purchase is done through the bookstore, and can be done online.

Other Required Supplies:
To fulfill the requirements of this course you will need to ensure you have a computer, a working webcam, and a stable internet connection with enough bandwidth to support using applications such as Zoom.

In this course we will give an overview of, and teach the basic principles of, a number of areas of physics. You will learn to analyze physical systems and to identify the principles by which they operate. You will also learn to apply and interpret mathematical tools such as vectors, calculus, and symbolic manipulation to predict and understand the behavior of these systems. In the process we will stimulate your curiosity about the physical world and help you develop analytical thinking skills that you can apply in your future studies.

Calendar Description: Newton's laws; particle dynamics and curvilinear motion; force and momentum; kinetic and potential energy; circular and rotational motion; gravitational and electric forces.

About this class's modality and illness-related uncertainties:

The modality of instruction in this course is primarily face-to-face for sections A01, A02, and A03, and online with some face-to-face for section A04.
There are some course elements that can only be completed in-person: (1) the labs, (2) the midterm assessments, and (3) the final exam.

At the same time we recognize that there are still elevated probabilities of people falling ill and that there is a strong expectation that, out of consideration for the safety of others, people will not attend if they are exhibiting symptoms of respiratory illnesses. The way we are going to try and mitigate these obvious issues are by having policies which do not force you to attend when ill, and by requiring you to be cautious in the setting of all class activities.

The instructors commit that:

- If there is an unexpected and major change of circumstances we will modify the course requirements in the same spirit as the original course structure and communicate any changes clearly and promptly. In particular, all exams are anticipated to be in person unless it is impossible to do so.
- The course website and offering will be structured so that even if you fall ill you will be able to access the core course content through pre-recorded content.
- The grading scheme and expectations will be flexible enough to accommodate transitory illnesses, primarily through grading provisions to omit or replace evaluated components.

We need you to do the following:

- We require that you follow all relevant provincial, university and faculty health directives.
- We require that you not attend any in-person course component if you are ill; students exhibiting any cold or flu-like symptoms will be asked to leave.
- We recommend that you consider wearing a mask in all lecture, lab, and in-person exam settings, and that you make all reasonable effort to get vaccinated in a timely manner if you are not already vaccinated.

The course is designed to accommodate brief illnesses or isolation by providing content online and by the provision to omit some missed work from grading. These provisions are detailed below.

Grading

While we do not grade on a curve, in the past, courses like this have typically had roughly the following grade distribution:

A-range: 20%; B-range: 40%; C/D-range: 30%; F: 10%

There will be four evaluated components, these are described below.

Final Exam:

The final exam will be worth 50% or 60% depending on the weighting of the midterms.

There will be an in-person final exam during the December exam period for all students. This exam will be similar in format to the midterms, and it will be comprehensive. The final exam is a required course element; students who do not write the final exam will be assigned the grade "0% N" unless they are otherwise debarred from writing the final exam.

A deferred exam to accommodate students who are ill or have other issues is tentatively scheduled for Saturday Jan 14.

The instructors will determine a minimum threshold on the final exam for passing, and a minimum threshold to be assigned a grade higher than "D". These thresholds will not be higher than 40% and 50% respectively, and they will be based on the difficulty of the exam administered and its modality. Since the deferred exam will be different from the regular exam the thresholds may be different.

Midterms:

The midterms will be worth 20% or 10% as described below:

There will be two midterms on Sat Oct 15 and Sat Nov 19. Both midterms will run 2:00pm – 3:30pm. Their locations will be announced. Each will be worth 10%. One midterm score will be replaced by the final exam score if that results in a higher overall score. This means that if you miss one midterm because of illness it is replaced by the final exam. If you miss a midterm because of illness you will need to contact us promptly.

Exceptional Cases: Students who miss both midterms because of illness will write a comprehensive midterm worth 10% on Dec 3 at a time to be determined. Others may apply for permission to write this midterm; permission will be granted for compelling reasons only.

The instructors will use their judgement about the difficulty of the exams and their modality to assess the performance of students. What this means is a score of 10/20 on different exams may not be treated exactly the same way because the exams were different. This is necessary to accurately reflect the meaning of the letter grades.

Assignments:

The assignments are worth 10% as described below:

Regular weekly assignments: Roughly every week an assignment will come available. It will normally be due on the following Friday. These assignments follow exactly the pace of the course. We anticipate most students will be able to complete them in 3-4 hours. The best 10 of 11 assignments will be averaged to form your assignment mark, and up to an additional three assignments may be replaced by your overall average on the "Teaching Assignments"

Teaching Assignments: Roughly every week a "teaching assignment" will come available. All teaching assignments will be due on Friday in last week of class. They take a variable amount of time to do, but are structured to assist your studying. We will calculate your average on all teaching assignments and will use that to replace up to 3 assignments in the calculation of your assignment mark. This means that you have the opportunity to make up a quiz or assignment that you miss because of illness, conflict of commitment, or other issue.

All assignments will be administered through the Webwork system.
The purpose of the assignments is to encourage and assess your continuing engagement with the course material. Since this continuing engagement is an essential process in the course, and as there are some alternatives in the grading scheme, we will not consider modifications of the due dates.
Students who work on the assignments regularly and use them as a tool to identify and practice the processes we teach in this course are, in our experience, much more likely to do well in the course.

Asynchronous online quizzes: Approximately every two weeks an asynchronously offered "quiz" will become available. If you have studied for these as you would for a midterm you should be able to do them in one hour. They will be time-limited to a maximum of two hours. These are not marked, but are being offered because some students appreciate the opportunity for "exam-like" practice.

Labs:

The labs are worth 20% as described below:

You will be responsible for 6 lab submissions. Your grade in the labs will be based on the best 5 of 6 lab submissions.

Your labs start with an introductory session in the period Sept 9 – Sept 15. At this session you will get instructions about your future lab schedule, further information about the expectations for the labs, and you will perform a simple exercise.

For the remainder of the labs you will normally undertake the in-person lab activities in pairs and take data during the lab period. You will submit your lab work on the BrightSpace website. To be eligible for marking your work must include documentation of your data and also be substantially distinct from the work of other students; you may not submit the same work as your lab partner, and you may not submit work you or another person has done in a previous term. Submitting the same work as another student is addressed by the grading criteria to provide an education opportunity about academic integrity, however incidents may also be addressed under the academic integrity policy.

If you are ill at the time of an in-person lab you may not attend. Your lab instructors have permission to refuse entry to any student who appears to be sick. It is your responsibility to contact the course instructors promptly if you miss a lab because of illness; if you do not contact us we will presume you missed for another reason.

- If you do not attend one lab because of illness you are accommodated by the grade being calculated omitting one of the labs.
- If you do not attend two or more labs because of illness you may be offered the opportunity to make up <u>one</u> lab in-person at the end of the term. The instructors will contact you about this in late November.
- If you miss three or more labs because of illness it will not be possible to fully accommodate you. You may be eligible to apply to withdraw from the course as long-duration illness has prevented you from fully participating.

Lab exemptions: To be eligible for a lab exemption you must have completed the labs in the Sept 2020 term or later. You must have submitted all, or all but one, of the labs and attained a score of 70% or higher on our grading rubric. If you fit into this category you may apply prior to Sept 15 to submit a summative lab exercise which will count as your lab score.

<u>It is a University regulation that to pass the course you must pass the labs. Any student with unsatisfactory standing in the labs will not be able to write the final exam and will be assigned the grade "0% F".</u>

We have structured this grading scheme to be flexible against the higher-than-normal background of illness and absence that we anticipate.
If you fall ill and miss a course component we need you to contact us promptly.
For most cases, the grading scheme's provision to omit one or more of each component will be all the accommodation we need to give.

Academic Integrity

The instructors take Academic Integrity in this course extremely seriously.
You can find UVic's Policy on Academic Integrity in the Calendar; here is a link.

In overview, your responsibilities are:

- For the final exam you must complete all work on your own without help from another person or from outside sources.
- For the midterms you must complete all work on your own without help from another person or from outside sources.
- For the labs you must submit your own original work. You may seek help or advice from an instructor or another student. You may not copy or paraphrase from another student. You may not permit your work to be copied or paraphrased by another student.
- For the assignments you must undertake the work yourself. You may seek advice or help from an instructor, other students, a tutor, or other person, but you are responsible for understanding and undertaking the work you submitted.
- Note that it is an academic integrity violation and a violation of UVic policies about information technology to post material from this class to any online "homework help" site.

The instructors are taking several active and passive measures to monitor the course to maintain the integrity of the course.

In the unlikely event that an exam must take place online it will be remotely supervised. You will be required to log in to Zoom through your UVic account and turn on your webcam showing yourself and the area surrounding you as you work. If you do not participate in the remote proctoring your grade for that course element will be set to 0.

The online assignments (and exams if applicable) will require you to provide numerical answers to questions. The questions will be marked based on whether the numerical answer is close to the correct numerical answer. The numbers in the questions you must answer will be randomized. If an exam must be held online you will be required to submit your rough work. In assessing this work, instructors may require a student to support answers submitted. Examples of the kind of support that may be required include written solutions leading to the submitted answer, or the requirement to verbally explain the reasoning to the same, or substantially similar, problems.

If the instructors have a reasonable apprehension that an academic integrity violation has occurred they will forward it to their Chair as outlined in the Policy on Academic Integrity.

Studies being done on this course

#1 - Assignments

Assignment completion rates and behaviour in this course will be the subject of a study conducted by Mark Laidlaw and Richard Keeler. The purpose of this research is to

- Measure the percentage of students who complete the assigned homework
- Quantify the relationship between homework completion habits and assigned final grades.
- Assess the viability of different methods of automated assessment

The data collected include your score on individual assignments and the times at which you accessed and answered individual assignment items.

The anticipated benefit is to demonstrate whether assignments can be administered through UVic's CourseSpaces system, and to identify assignment completion habits correlated with success so they can be taught to future class sections. The data used in the study will be anonymous. The use of your data will not affect your mark in any way; no analysis will be done before grades are finalized.

Your data will be processed as follows: Using the student number, final grades will be associated with scores on each assignment and the times the assignment items were accessed. All identifying features such as student number are then removed from the data.

If you have questions about the methods and goals of the research, about how your data will be used, or about the use of your data, please contact Mark Laidlaw by email at laidlaw@uvic.ca. You may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca).

#2 – Exams

Exam results in this course will be the subject of a study conducted by Mark Laidlaw. The object of the study is to characterize the difficulty of exam questions. The anticipated benefits of the study are to help standardize course grades from year to year, and to improve question design. The data used in the study will be anonymous and will be statistical in nature (for example: 53% of students who got a "B" answered question 20 correctly). The use of your exam data will not affect your mark in any way, as no analysis will be done before grades are finalized. You will receive a follow-up email with more details after the completion of the course. If you have questions about the methods and goals of the research, or about how your data will be used, please contact Mark Laidlaw by email at laidlaw@uvic.ca.

You may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca).

Lectures and Assignments	Videos Available (Start – End)	Assignment due
Vectors	Sept 7 – Sept 19	Sept 16
Translational Equilibrium	Sept 14 – Sept 26	Sept 23
Rotational Equilibrium	Sept 21 – Oct 3	Sept 30
Velocity and Acceleration	Sept 28 – Oct 10	Oct 7
Second Law	Oct 5 – Oct 17	Oct 14
Fundamental Forces	Oct 12 – Oct 24	Oct 21
Momentum	Oct 19 – Oct 30	Oct 28
Angular Momentum	Oct 26 – Nov 7	Nov 4
Work and Energy	Nov 2 – Nov 21	Nov 18
Conservation	Nov 16 – Nov 28	Nov 22
DC circuits	Nov 23 – Dec 5	Dec 2

Online Quiz	Dates Available	Topic	Topic
Quiz 1	Sept 26 – Sept 30	Vectors	Trans. Equilibrium
Quiz 2	Oct 10 – Oct 14	Rot. Equilibrium	Velocity and accel.
Quiz 3	Oct 24 – Oct 28	Second Law	Fund. Forces
Quiz 4	Nov 14 – Nov 18	Momentum	Ang. Momentum
Quiz 5	Nov 28 – Dec 2	Work and Energy	Conservation

In Person Labs	Dates	Report due	Dates	Report due
Lab 0 Measurement	Sept 9 – 15	Sept 20		
Lab 1 Comparisons	Sept 16 – 22 Odd labs	Sept 27	Sept 23 – 29 Even labs	Oct 5
Lab 2 Quality Control	Oct 3 – 7 Odd labs	Oct 13	Oct 11 – 17 Even labs	Oct 21
Lab 3 Graphical Analysis	Oct 18 – 24 Odd labs	Oct 28	Oct 25 – Oct 30 Even labs	Nov 4
Lab 4 Predictions	Nov 1 – 7 Odd labs	Nov 15	Nov 14 – 18 Even labs	Nov 23
Lab 5 Histograms	Nov 21 – 25 Odd labs	Nov 30	Nov 28 – Dec 2 Even labs	Dec 6

If necessary lab order may be modified due to equipment availability.

Midterm 1: Oct 15 Vectors, Translational Equilibrium, Rotational Equilibrium, Velocity and Acceleration.
Midterm 2: Nov 19 Second Law, Fundamental Forces, Momentum, Angular Momentum
Alternative Midterm: Dec 3. Same topics as Midterm 1 and Midterm 2.