PHYS 111 – Introductory Physics II
Course Outline: May 2023 – Aug 2023

Instructors: Dr M Laidlaw laidlaw@uvic.ca
Please email me directly from your preferred (uvic) email. Include PHYS 111 in the email subject and tell me your student number.

Lectures:

A01	ECS 116	TWF 1:30-2:20	Dr Laidlaw
A02	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 May 8.
You must attend your lab section; there is marked work starting May 8.
All students will complete their labs in person.

Prerequisite: PHYS 110.
To register in this class you must also have credit for, or be concurrently registered at UVic in a calculus class (MATH 100, 102, or 109).
We will teach this course assuming you are taking MATH 101.

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.
As some of the course work, including labs, must be done online it is essential that you arrange access prior to May 12.

Other Required Supplies:
To fulfill the requirements of this course you will need to ensure you have a computer. In the unlikely event of mandated online exams you will need 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: Heat engines; harmonic motion; wave motion; geometric and wave optics; modern physics.

Modality and Assessment Design:

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

This course's evaluation is structured through the lens of "universal design". The instructors have assessed the essential learning goals of the course and made a determination about how and where flexibility can be offered and articulated it clearly for everybody. The provisions (detailed below) which allows some omission or substitution of work are intended as a full and reasonable accommodation for issues such as illness, conflict of commitment, unexpected adverse circumstances, or episodic productivity issues. They are intended and will be used as a "first resort" for all cases, and in nearly all cases will be all the provision necessary.

The following provisions apply to all students:

- If you miss one or two midterms for any reason their weight will be transferred to the final exam.
- Up to two of four midterms can have their score replaced by the score on the final exam if it is higher. Missed midterms count as 0 for this calculation.
- Your lab score will be based on the best 5 (of 6) lab submissions.
- If you miss two or three labs because of illness or conflict of commitment you will be offered a single makeup lab at the end of the term.
- Up to three assignment marks can be replaced by the mark on the corresponding "teaching assignment", and after that replacement has been done your assignment score will be based on the best 10 (of 11) assignment submissions.
- You are expected to do all course work. If you elect to miss some work and subsequently fall ill, have a conflict, or similar circumstances you will not be given special accommodation.

If you anticipate missing an in-person course element because of illness or conflict of commitment you must email the instructor promptly so I can record the information.

If there is an unexpected and major change of circumstances the instructor 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.

We request and require that you not attend any in-person course component if you are ill.

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, which will be added in the proportion outlined here to produce a score. This score will be used as the basis for deciding your final grade.

Final Exam:

The final exam will be worth 50%, 55%, or 60% depending on the weighting of the midterms.

There will be an in-person final exam during the August 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 Tuesday Sept 5.

I will use my judgement determine a minimum threshold on the final exam that must be exceeded for students to pass, and another threshold that must be exceeded for student to earn a grade higher than "D". These thresholds will not be higher than 40% and 50% respectively; they will be based on my assessment of the difficulty of the exam administered.

Midterms:

The midterms will be worth 10%, 15%, or 20% as described below:

There will be four in-class midterms on Wed May 31, Wed June 21, Wed July 5, and Fri July 28. Each will be worth 5%. Up to two midterm scores will be replaced by the final exam score if that results in a higher overall score. This means that if you miss one or two midterms because of illness they are replaced by the final exam. If you miss a midterm because of illness you will need to contact me promptly.

I will use my judgement about the difficulty of the exams and their modality to assess the performance of students. Part of the feedback I will offer is my initial sense of the test score ranges corresponding to A, B, passing, and failing performance.

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; up to three assignments may be replaced by the corresponding "Teaching Assignments"

Teaching Assignments: Roughly every week a "teaching assignment" will come available. All teaching assignments will be due on the last day of lecture. They take a variable amount of time to do, but are structured to assist your studying. They may replace up to 3 assignments in the calculation of your assignment mark. This means that you have the opportunity to make up a 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.

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, with unsubmitted labs counted as 0. Submission of a minimum of 4 labs is a required course element. Students who do not attend and submit at least 4 labs will be assigned the grade "0% N" and debarred from writing the final exam. Only labs submitted through Brightspace prior to the deadline and in the proper format will be marked.

Your labs start with an introductory session in the period May 8 – May 12. At this session you will get instructions about your future lab schedule, further information about the expectations for the labs. The first lab exercise will require analysis of data provided online through the WebWork system.

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.

If you are ill at the time of an in-person lab you may not attend. It is your responsibility to contact the course instructors promptly if you miss a lab because of illness, conflict of commitment, or unexpected significant circumstances; if you do not contact us we will presume and act you missed for another reason.

- If you do not attend one lab because of these reasons you are accommodated by the grade being calculated omitting one of the labs.
- If you do not attend two or more labs because of these reasons you may be offered the opportunity to make up one lab in-person on July 24. If appropriate, I will contact you about this the preceding week.
- If you miss three or more labs for any reason 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.

Please note we expect you to undertake all labs. The goal of these provisions is to ensure that you will have had the opportunity to complete at least five labs.

Lab exemptions: Some students are eligible to apply for exemption from the lab portion of the course. The eligibility requirements are:

- Have a recorded final grade in the course from Sept 2020 or later.
- Submitted all, or all but one, of the labs in that attempt.
- Was assigned an average score of 70% or higher on the labs.

Applications must be made prior to May 11.
If you apply and are eligible you will be given a lab test to complete due at the same time as lab 1, and your score on this will form your lab grade. If after completing the lab test you elect to complete the rest of the labs this test will replace your grade for lab 1.
Students who intend to apply for exemption are recommended to attend lab 2.

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".

Once your course score is calculated I will use my judgement to choose an appropriate letter grade, and hence percentage to assign. Some instructors exercise their judgement about grading by omitting questions, changing grading rubrics, changing the total for tests, or similar actions. I exercise the same discretion by choosing the correspondence between score and assigned letter grade considering many factors including my assessment of the difficulty of the exam, how well scores correspond to the narrative descriptions of grades, and the letter grade assigned for similar achievement in previous offerings of the course.
Fully engaged students typically earn at least 80% of the available marks for labs and assignments. Students who pass typically score at least 40% on the exams. B-level performers typically score at least 60% on the exams. A-level performers typically score at least 80% on the exams.

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 quizzes 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 midterms 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	Assignment due
Harmonic Motion	May 3 – May 12	May 12
Coupled Oscillations/Waves	May 8 – May 19	May 19
Standing Waves	May 15 – May 26	May 26
Wave applications	May 22 – June 2	June 2
Collective Variables	May 29 – June 9	June 9
Calorimetry	June 5 – June 16	June 16
First Law	June 12 – June 23	June 23
Second Law	June 19 – June 30	June 30
Geometric Optics	June 26 – July 14	July 14
Relativity	July 10 – July 21	July 21
Modern Physics	July 17 – July 28	July 28

Please note that the lecture videos will cease to be available on the dates described above. You are expected to watch them and take notes as part of your ongoing engagement with the course. Your course notes and the text materials will be your primary sources for review material.

In Person Labs	Dates	Report due
Lab 1 Review Test	May 8 – May 12	May 18
Lab 2 Graphical Analysis	May 15 – May 19	May 25
Lab 3 Modelling Resonance	May 29 – June 2	June 8
Lab 4 Power Dependence	June 12 – June 16	June 22
Lab 5 Assumptions and Approximations	June 26 – June 30	July 6
Lab 6 Exponential Linearization	July 10 – July 14	July 20

Midterm 1: May 31: Harmonic Motion, Coupled Oscillations/Waves, Standing Waves
Midterm 2: June 21: Wave applications, Collective Variables, Calorimetry
Midterm 3: July 5: First Law, Second Law
Midterm 4: July 28: Geometric Optics, Relativity, Modern Physics