

Physics 2110A (Fall 2026) Course Outline

1. Course Information

Course Information

Physics 2110A, Fall 2026		
Lectures:	MWF 9:30-10:30,	PAB 106
Lab/Tutorials:	T 15:30-17:30,	SSC 2028

List of Prerequisites

Physics 1201A/B or Physics 1401A/B or Physics 1501A/B or the former Physics 1301A/B, each with a minimum mark of 60%, or the former Physics 1028A/B with a minimum mark of 80%; Physics 1202A/B or Physics 1402A/B or Physics 1502A/B or the former Physics 1302A/B, each with a minimum mark of 60%, or the former Physics 1029A/B with a minimum mark of 80%; a minimum mark of 60% in each of (Calculus 1000A/B or Calculus 1500A/B or Numerical and Mathematical Methods 1412A/B or the former Applied Mathematics 1412A/B) and (Calculus 1301A/B or Calculus 1501A/B or Numerical and Mathematical Methods 1414A/B or the former Applied Mathematics 1414A/B), or in the former Applied Mathematics 1413. Integrated Science 1001X with a minimum mark of 60% can be used in place of Physics 1202A/B and Calculus 1301A/B. Pre-or Corequisite(s): Mathematics 1600A/B or Mathematics 1700A/B or Numerical and Mathematical Methods 1411A/B or the former Applied Mathematics 1411A/B

Unless students have either the prerequisites for this course or written special permission from the Department of Physics and Astronomy to enroll in it, they may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on their academic record. This decision may not be appealed.

2. Instructor Information

Instructors	Email	Office	Office Hours
Prof. Trichtchenko	otrichtc@uwo.ca	PAB 208	TBD
TA TBD			

Students must use their Western (@uwo.ca) email addresses when contacting their instructors. Please allow **at least** 24 hours for a response Monday to Friday and 48 hours during the weekends.

3. Course Syllabus, Schedule, Delivery Mode

Course description:

A unified treatment of oscillatory and wave motion, with examples from mechanics, electromagnetism, optics and materials science. Topics include simple harmonic motion, forced oscillations and resonance, coupled oscillations, transverse waves on strings and in crystals, longitudinal waves in gases and solids, electromagnetic waves, Fourier methods, nonlinear oscillations and chaos.

Learning outcomes:

By the end of the course, the students will be able to

1. Understand the difference between free, damped and forced motion.
2. Understand the difference between oscillations and waves.
3. Understand the differences and similarities between standing and travelling waves.
4. Relate physical concepts to mathematical descriptions using concepts from linear algebra, complex analysis and differential equations.
5. Solve the relevant equations of motion for simple, damped and forced oscillators and interpret their physical meaning.
6. Perform simple calculations using Python and Jupyter notebooks.
7. Represent solutions to equations of motion both numerically and graphically in Python.

Course Delivery:

Course meetings are in-person and will involve three weekly lectures and one weekly lab/tutorial.

The weekly lab/tutorial period is an essential part of the course: part of your course grade will be based on your completion of the tutorials/labs. As part of the lab/tutorials you will learn how to use Python to do calculations and plot solutions graphically. Some of the homework assignments will also require the use of Python. The tutorial periods will also provide you with an opportunity to discuss homework assignments with the course instructor and teaching assistant. These sessions will not be recorded.

Topic outline:

The general order of topics is as follows (see OWL for a week-by-week breakdown):

1. Review of simple harmonic motion
2. Damped oscillations
3. Forced oscillations and resonance
4. Coupled oscillations
5. Travelling and standing waves
6. Fourier series and normal modes
7. Wave properties: interference, diffraction, dispersion

Whenever possible, we will relate the topics to mechanical waves, electromagnetic waves, waves in quantum mechanics and finally waves in fluids. In addition to learning about oscillations and waves, part of the aim of this course is that you become familiar with some important mathematical tools that are important in all areas of physics. You will thus encounter complex numbers, matrices, integrals, and Fourier transforms, to name a few.

Key Sessional Dates:

Classes begin: September 9, 2026

Fall Reading Week: October 10 – 18, 2026

Classes end: December 9, 2026

Exam period: December 11 – 22, 2026

4. Course Materials

Textbook and Other Learning Materials

Required textbook: Vibrations and Waves by George C. King (Wylie, Chichester, 2009). Additional reading material will be made available as needed.

Labs: Will use Jupyter notebooks and Python 3 freely available from

<https://www.anaconda.com/products/individual>

or you can use <https://colab.google/> if you can't download the Anaconda version.

Costs of Textbooks and Other Learning Materials/Activities

The link to the textbook available from Western's bookstore is

https://bookstore.uwo.ca/textbook-search?campus=UWO&term=W2026A&courses%5B0%5D=001_UW/PHY2110A

Students are welcome to purchase second-hand or earlier editions of this textbook.

All course material will be posted to OWL Brightspace: <https://westernu.brightspace.com/>

Students are responsible for checking the course OWL Brightspace site regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL Brightspace site, they can seek support on the [OWL Brightspace Help](#) page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Technical Requirements

- a laptop computer running any of Windows, Linux or MacOS and with an Anaconda Python installation will best facilitate lab/tutorial participation, but is not mandatory.
- a non-programmable calculator for exams

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

Assignments (best 3 out of 4)	6%	
Laboratories (best 6 out of 8)	10%	(to be done in labs, submitted by end of labs)
Midterm Test 1	20%	(October 20, 2026)
Midterm Test 2	20%	(November 17, 2026)
Final Exam	44%	

<u>Assessment Type</u>	<u>Weight</u>	<u>Date</u>	<u>Topics</u>
Homework assignments (marked only for completion, best 3 of 4)	6%	Approx. biweekly, due dates and submission through OWL/Gradescope	Lectures prior to assignment
Labs (marked only for completion, best 6 of 8) must be completed in lab	10%	Approx. weekly, due dates and submission through OWL/Gradescope in lab	Lectures prior to lab
Midterm 1	20%	Tuesday, Oct. 20, 2026	Simple, damped and forced harmonic oscillator
Midterm 2	20%	Tuesday, Nov. 17	Coupled oscillators, travelling and standing waves
Final Exam	44%	TBD, December exam period	cumulative

The Department of Physics and Astronomy may, in exceptional cases, adjust the final course marks in order to conform to Departmental policy.

Assignments are to be submitted through Gradescope and marked for effort and completion - if the uploaded answers cannot be read or the right answer is not indicated or easily found, these answers will not be assigned points. Please make sure your assignment is complete and legible before finishing your upload to Gradescope. You may work on the homework together, but please submit individual answers and do not plagiarise from each other or Internet sources. You may include the names of the people you worked with. Use of generative AI to solve problems on homework assignments (e.g., ChatGPT, Copilot, Gemini) is not permitted and if it is used, it will be assigned a mark of 0.

Completed Jupyter notebooks from lab/tutorial sessions are to be submitted through Gradescope in the lab and to be marked for effort and completion. These must be in .ipynb format. If the format is not correct, it will be given a mark of 0. Please make sure your lab is complete and legible before finishing your upload to Gradescope. You may work together, but please submit individual answers and do not plagiarise from each other or Internet sources. You may include the names of the people you worked with. Use of generative AI for programming (e.g., ChatGPT, Copilot, Gemini) is not permitted and if it is used, it will be assigned a mark of 0.

Information about Missed Coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs*, posted on the Academic Calendar:
https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person. The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage: https://registrar.uwo.ca/academics/academic_considerations/
 All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

Midterms and Tests

This course has 2 midterm test(s)/term test(s) and a **cumulative** final exam. There is no makeup test for a missed midterm. If a student misses a midterm, its weight will shift automatically to their final exam grade. If their final exam grade is higher than their midterm grade, their final exam grade will replace the midterm's weight in their overall grade. They do not need to request Academic Consideration for a missed midterm; the reweighing will be done automatically.

The only exception is an early sitting, offered solely for a university-sanctioned schedule conflict (e.g., conflict of two midterms, Varsity competitions) or a religious accommodation that prevents a student from writing the midterm at its scheduled time. If a student requires this accommodation, they must notify their instructor in writing no later than one week before the test. No other circumstance, including illness, qualifies for an early sitting or makeup; these are addressed through the automatic reweighing described above.

Labs

This course has 8 labs. Students are expected to complete 6 of 8 to receive full credit for this component. If they miss up to 2 of these, they do not need to request Academic Consideration; the missing item(s) will not count against them, and their grade for this component will be calculated from their best 6 of 8 submissions.

If a student completes fewer than 6 of the total, the missing items will be recorded as a zero and included in their grade for this component. They are encouraged to submit all work, even if incomplete, since a partial mark is always better than a zero. If their final exam grade is higher than their grade on this component, their final exam grade will replace it.

Labs must be done and submitted in lab. These are marked for effort and completion.

Assignments

This course has 4 assignments. Students are expected to complete 3 of 4 to receive full credit for this component. If they miss up to 1 of these, they do not need to request Academic Consideration; the missing item will not count against them, and their grade for this component will be calculated from their best 3 of 4 submissions.

If a student completes fewer than 3 of the total, the missing items will be recorded as a zero and included in their grade for this component. They are encouraged to submit all work, even if incomplete, since a partial mark is always better than a zero. If their final exam grade is higher than their grade on this component, their final exam grade will replace it.

These are marked for effort and completion.

Deadlines: The 48-Hour No-Late-Penalty Period

All take-home assignments with a stated due date include an automatic 48-hour period after the deadline during which students may still submit without a late penalty. For example, if an assignment is due on November 5, they may submit it until November 7 without penalty. After this 48-hour period, no further submissions will be accepted, and students do not need to request Academic Consideration for a missed deadline; their grade for this component will be calculated as described above.

Special Examination

Per university policy, Academic Consideration requests with supporting documentation are required for the final examinations scheduled during official examination periods by the Registrar's Office.

If the student has been approved by the Academic Advising Office to write a Special Examination (SPC) and the final exam is their only outstanding course component, an SPC will be assigned to them and scheduled by the instructor per university policy.

If the student misses their SPC exam and is approved for Academic Consideration, they will be withdrawn from the course without academic penalty. If they experienced extenuating circumstances such as prolonged illness, they may appeal to the Associate Dean (Academic), on a case-by-case basis, for the opportunity to write the final exam the next time the course is offered. An outstanding SPC will reduce their course load for the term in which the exam is deferred, as outlined in the [Definitions of Types of Examinations](#) policy.

If the student misses their SPC exam and Academic Consideration is not approved, or was not requested, they will receive a grade of zero on the exam.

6. Additional Statements

6.1 Religious Accommodation

When a recognized religious holiday either requires a student to be absent from the University, or requires or prohibits an activity that makes it impossible for them to complete an academic requirement scheduled that day, they are entitled to accommodation. No student will be penalized for an absence for religious reasons, and an alternative means of satisfying the requirement will be arranged. This accommodation is provided in accordance with the University's policy on Accommodation for Religious Holidays:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

The student should submit their requests through the Student Absence Portal (SAP), identifying the conflict and the specific course component(s) affected (e.g., test, midterm, exam).

Midterms and Tests: If a religious observance conflicts with a midterm test, they must submit their request no later than **one week** before the test. Their instructor will arrange an early sitting of the test. As set out above, no makeup test is offered for any other reason; this early sitting is available specifically for this accommodation.

Final Examinations: If a religious observance conflicts with the final exam, the student must submit their request no later than **two weeks** before the exam. Their instructor will arrange a Special Examination to take place no later than one month after the end of the examination period.

Students are responsible for finding out what was covered in any class they miss due to a religious observance, and for taking the appropriate steps to keep up with the course.

If a suitable arrangement cannot be reached between a student and their instructor, they should consult the Undergraduate Chair of the department offering the course, and if necessary, the Associate Dean (Academic) of the Faculty of Science.

For a list of recognized religious observances, please visit the calendars posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca> (About Us – Resources – Additional Resources – Calendars).

6.2 Academic Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

6.3 General Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

Use of @uwo.ca email: In accordance with policy, https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf, the centrally administered e-mail account provided to students will be considered the individual's official university email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as “appeals”)

Policy on Request for Relief from Academic Decision:

https://uwo.ca/univsec/pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

Procedures on Request for Relief from Academic Decision (Graduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic Offences:

https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Procedures on Scholastic Offences (Graduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the **possession** of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, hidden cameras and wireless earbuds.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at a student's desk, on their person, or within reach during an assessment will be treated as a scholastic offence, **even if the device is not in use**.

Effective September 2026, the typical penalty for this offence is a failing grade in the course AND a 12-month prohibition on retaking the course.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is their responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is the student's responsibility to seek clarification before using any AI tools in academic work.

6.5 Support Services

Academic Advising. Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, exam conflicts, and many other academic-related matters: <https://www.uwo.ca/sci/advising/>.

Mental Health Support. Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Gender-Based and Sexual Violence. Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If a student has experienced GBSV (either recently or in the past), they can find information about support services for survivors, including emergency contacts, at:

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Accessibility for Coursework. A student may contact the course instructor if they require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to them. If they have any questions regarding accommodations, they may also contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html

Learning Development and Success. Learning-skills counsellors at Learning Development and Success (<https://learning.uwo.ca>) are ready to help students improve their learning skills. The facility offers strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Student Councils.

Student-run support services are offered by the University Students' Council (<https://westernusc.ca>) and the Science Students' Council (<https://www.westernssc.ca>).