Physics 2101A (Fall 2025) Course Outline

Version: September 8, 2025

1. Course Information

Course Information
Physics 2101A: Intermediate Physics, Fall 2025

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.

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or written special permission from the Department of of Physics and Astronomy to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record.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

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Dr. Lisa Schielicke (Course Coordinator)	lschieli@uwo.ca		(519) 661-2111 x87770	
TA: Sean Snider	ssnide2@uwo.ca			

Students must use their Western (@uwo.ca) email addresses when contacting their instructors. Just drop by during office hours in case of questions regarding the course, approach me after or before classes or schedule a meeting via email.

3. Course Syllabus, Schedule, Delivery Mode

Course Description: Topics covered: Thermal properties of matter, laws of thermodynamics, geometric optics, propagation of light, electromagnetic waves, Maxwell's equations, electromagnetic induction and relativity.

Topic outline: The course is divided into three parts. Each part is followed by a midterm, or final exam. Lectures 1-12 (before Midterm 1) focus on the topic of Thermodynamics; Midterm 1 will be based on these first 11 lectures. Lectures 13-22 (before Midterm 2) focus on the topic of Optics; Midterm 2 will be based on content from Lectures 13-21. Lectures 22-34 (after Midterm 2) focus on the topics of electromagnetic waves, Maxwell's equations, electromagnetic induction and relativity; the Final Exam will be cumulative (entire course) with a heavier weight on content from Lectures 22-34. More details regarding exam format, style, etc. will be given in class and uploaded to the Course Information folder on OWL before the first midterm. The general order of topics is as follows (see OWL for a week-by-week breakdown):

1. Thermodynamics (Week 1-4)
2. Optics (Week 5-8)
3. Electromagnetic waves, Maxwell’s equations, Inductance (Week 9-11)
4. Special Relativity (Week 12)

Learning outcomes: By the end of the course, the students will be able to

- Describe and apply the core concepts of thermodynamics, including temperature, heat, work, energy, entropy, and the first and second laws of thermodynamics, within physical systems.
- Analyze thermodynamic processes and cycles mathematically, including idealized heat engines.
- Describe basic properties and principles of light, including wave and geometric optics phenomena such as reflection, refraction, interference, and diffraction, using principles like Huygens and Fermat.
- Solve geometric optics problems involving image formation by mirrors and lenses.
- Understand the nature and mathematical description of electromagnetic waves as predicted by Maxwell’s equations.
- Explain electric and magnetic field concepts and describe electromagnetic induction using Maxwell’s equations.
- Understand and explain the core concepts of special relativity including time dilation, length contraction, and the relativistic connection between electric and magnetic fields.

Course Delivery: Course meetings are in-person and will involve three weekly lectures and one weekly tutorial. The tutorials are an essential part of the course which will provide you with an opportunity to discuss assignments, work on calculations and examples and deepen your understanding of the course topics together with the course instructor and teaching assistant.

Relevant Key Sessional Dates:

Classes begin: September 4, 2025; January 5, 2026
Midterm 1: October 3, 2025, 11:30-13:00
Midterm 2: October 31, 2025, 11:30-13:00
Fall Reading Week: November 3 – 9, 2025
Classes end: December 9, 2025; April 9, 2026
Exam period: December 11 – 22, 2025

4. Course Materials

Textbook and Other Learning Materials: Openstax - University Physics. Volume 2 and 3, or a similar first year textbook: contact me if you have questions about your text. Links to the books are provided below:

https://openstax.org/details/books/university-physics-volume-2
https://openstax.org/details/books/university-physics-volume-3

Technical Requirements:
Students will need a non-graphing, non-wifi calculator for the exams.

Costs of Textbooks and Other Learning Materials/Activities:
The Openstax books are open educational resources that can be used in a digital version without any costs. A printed version of each volume can be ordered from the the openstax website (https://openstax.org/subjects/science) for $40 (USD, black and white print) or $50 (USD, color print), additional costs (tax, delivery) may apply.
Calculators such as the Casio fx-82ES PLUS or similar can be bought in the Bookstore or online for approximately $30 (CAD).

During the course, we might use Personal Response Systems such as iClickers. These can be accessed via electronic devices such as mobile phones, tablets or laptops. If these systems are used, the collected data will not be used to assess the student.

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

Students are responsible for checking the course OWL site (https://westernu.brightspace.com/) 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 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.

5. Methods of Evaluation

Assignments

- **Nine Assignments:** A maximum of nine assignments will be posted to OWL, featuring questions which must be answered by writing on paper (or writing tablet). These answers must then be scanned and submitted to OWL in a single .pdf file before or during the 48 hour no-late-penalty window. Assignments submitted after this window will be given a grade of 0%, because full solutions are posted at the end of the assignment submission window. Assignments grades are given on a pass/fail basis, 1% of your overall grade per assignment.
- **Assignment Resubmissions:** After each written assignment, written resubmissions must also be submitted to OWL, by Monday at 11:59pm following the assignment deadline. Full solutions to each problem will be posted to help with your resubmission. In the resubmission, you are

required to resubmit only any problems you answered incorrectly on the initial submission. If you answered all correctly in the first submission, you must upload a .pdf that states: No Corrections, somewhere on the page. Resubmission deadlines also have a 48 hour no late penalty window. There will be a place to upload late submissions for consideration on Gradescope. Like the assignments, each resubmission is worth 0.5% of your overall grade.

Note: For the total maximum 12% given on assignments + resubmissions, your lowest 1.5% will be dropped. Therefore, if you miss one assignment and one resubmission or three resubmissions, you can still receive 100% for the assignment grade (if all others are passed). See Course Schedule, Deadlines and Requirements document on OWL for more details. There will be no make-up assignments.

Exams

- **Two Midterms and a Final Exam:** Two 22% Midterm Exams will occur on Oct 3 and Oct 31; see Course Schedule for more details. A 44% Final Exam will be scheduled later in the course.
- **Makeup Exams:** There will be no makeup Midterm Exams in this course. If you receive permission from academic counseling to miss a midterm, this 22% will be split evenly over the other midterm and Final Exam. If you receive permission from academic counseling to miss both midterms, then the entire 44% midterm grade will be added to the Final Exam. The Final Exam must be taken: there will be one makeup Final Exam.

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

9 Assignments and Resubmissions	12%	Due: Tuesdays 18:00	Only the best 12/13.5 count for your final grade
Midterm #1	22%	Friday, October 3 11:30-13:00	Covering all thermodynamic topics up to and including Monday, September 29
Midterm #2	22%	Friday, October 31 11:30-13:00	Covering all optics topics up to and including Monday, September 29
Final Exam	44%	TBA	Cumulative

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

Student Absences: If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

- **Assessments worth less than 10% of the overall course grade:** Assignments: no accommodations or make-up, the best 12 out of a total possible 13.5 percentage points will count towards the course grade

- **Assessments worth 10% or more of the overall course grade:** For assessments totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible.

Use of Generative AI Tools

There is no university-wide policy governing the use of generative AI tools in coursework or assessments. The use of generative AI tools (e.g., ChatGPT, Copilot, Gemini) is prohibited for assessments worth more than 10%. For all other assessments, the use of such tools needs to be stated

clearly. Students need to provide chat protocols that document the correspondence with the AI tool and need to write a reflection on the usefulness of the tool.

General 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://www.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.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Examinations scheduled during official examination periods (Defined by policy)

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under Special Examinations), especially for those who miss multiple final exams within one examination period.

Coursework with Assessment Flexibility
By policy, instructors may deny Academic Consideration requests for the following assessments with built-in flexibility:

Deadline with a No-Late-Penalty Period
Assignments+Resubmissions. Students are expected to submit each of the assignments and resubmissions by the deadline listed. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to 48 hours past the deadline without a late penalty. Should students submit their assessment beyond 48 hours past the deadline, a late penalty of 50% per day will be applied. Academic Consideration requests

may be granted only for extenuating circumstances that started before the deadline and lasted longer than the No-Late-Penalty Period (48 hours).

6. Additional Statements

6.1 Religious Accommodation

When conflicts arise with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible, but not later than two weeks prior to the writing of the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays - https://www.edi.uwo.ca

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, and wireless earbuds or headphones.

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

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your 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 your responsibility to seek clarification before using any AI tools in academic work.

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

https://remoteproctoring.uwo.ca.

6.5 Support Services

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/counselling/.

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.

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 you have experienced

GBSV (either recently or in the past), you will 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.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

Learning-skills counsellors at Learning Development and Success (https://learning.uwo.ca) are ready to help you improve your learning skills. They offer presentations on 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.

Additional student-run support services are offered by the USC, https://westernusc.ca/services/.