

PHYSICS 3151A - CLASSICAL MECHANICS

Course Outline - Fall 2026

1. Course Information

Course	Physics 3151A - Classical Mechanics I
Weight	0.5
Academic Term	Fall 2026
Delivery Mode	In person
Lecture Schedule	Monday, Wednesday, Friday, 11:30 AM-12:30 PM
Location	PAB 34

Prerequisite(s): ([Physics 1202A/B](#) or [Physics 1402A/B](#) or [Physics 1502A/B](#) or the former Physics 1029A/B or the former Physics 1302A/B), or [Integrated Science 1001X](#); [Calculus 2303A/B](#) or or [Mathematics 2500A/B](#) or [Numerical and Mathematical Methods 2276A/B](#) or [Numerical and Mathematical Methods 2277A/B](#) or the former Applied Mathematics 2276A/B or the former Applied Mathematics 2277A/B or the former Calculus 2503A/B; [Applied Mathematics 2402A/B](#) or [Numerical and Mathematical Methods 2270A/B](#) or the former Applied Mathematics 2270A/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or written special permission from the Department of Physics and Astronomy to enroll in it, they may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on their academic record.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

Instructor	Email	Office	Phone	Office Hours
Dr. Andrea Soddu	asoddu@uwo.ca	PAB 122	(519) 661-2111 x82669	Friday 2:00pm – 3:00pm

Students must use their Western (@uwo.ca) email addresses when contacting the instructor.

Office-hour format and availability of additional help resources: The scheduled Friday office hour (2:00pm–3:00pm) is held in person in PAB 122. Additional meetings may be arranged by email and may be held in person or via Zoom, subject to instructor availability.

3. Course Syllabus, Schedule, Delivery Mode

Course Description

This course provides students with the tools to tackle more complex problems than those covered in introductory mechanics. D'Alembert's principle, principle of least action, Lagrange's equations, Hamilton's equations, Poisson brackets, canonical transformations, central forces, rigid bodies, oscillations. Optional topics include special relativity, Hamilton-Jacobi theory, constrained systems, and field theory.

Course-Level Learning Outcomes

- Formulate and solve advanced mechanics problems using Newtonian, Lagrangian, and Hamiltonian methods.

- Apply conservation laws and variational principles to mechanical systems.
- Describe rigid-body dynamics and coupled oscillations using appropriate mathematical methods.
- Use generalized coordinates, canonical variables, Poisson brackets, canonical transformations, and Hamilton-Jacobi methods in analytical mechanics.
- Connect continuous symmetries with conservation laws through Noether's theorem.

Schedule and Delivery Mode

Lectures are delivered in person on Monday, Wednesday, and Friday from 11:30 AM to 12:30 PM in PAB 34.

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

Primary textbook: S. T. Thornton and J. B. Marion, Classical Dynamics of Particles and Systems, 5th edition (Brooks/Cole).

Students may use a hard copy of this textbook or another appropriate classical mechanics textbook during the open-book midterm and final examination.

Approximate cost: Affordable new/used copies are typically available for approximately C\$45–100.

Recommended Supplementary Texts

- Grant R. Fowles and George L. Cassiday, Analytical Mechanics, 7th edition.
- L. N. Hand and J. D. Finch, Analytical Mechanics (Cambridge University Press).
- H. Goldstein, J. Safko and C. Poole, Classical Mechanics, 3rd edition (Addison-Wesley).
- V. I. Arnold, Mathematical Methods of Classical Mechanics, 2nd edition (Springer), for advanced reading.

The supplementary texts listed above are provided for additional reading only. Students are not expected to purchase them.

OWL Brightspace

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

Students require regular access to a computer and stable internet connection for OWL Brightspace. No additional hardware or paid software is required.

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

Assessment	Weight	Date / Notes
Midterm Exam	35%	2 hours, in person. Date: October 23, 2026 Time: 7:00pm - 9:00pm
Final Exam	45%	3 hours, in person, scheduled by the Registrar; cumulative.
Assignments (best 3 of 4)	20%	Distributed through OWL Brightspace; paper copies submitted in class.

Assessment Details

Midterm Exam (35%): The midterm will cover course content presented up to that point.

Final Exam (45%): The final exam will be comprehensive, covering material discussed throughout the course.

Assignments (20%): Four assignments will be distributed during the course. They will involve derivations and analytical and/or numerical work. Although collaboration is permitted, each student must submit their own independently written and fully justified solutions.

Use of Generative AI in Assessments: Generative AI tools are not permitted for assignments, the midterm examination, or the final examination unless their use is explicitly authorized by the instructor for a specific assessment. Any permitted use and its conditions will be communicated in advance. See Section 6.4 for the course policy on generative AI tools.

The midterm and the final exam are open-book and open-notes. No electronic devices are permitted during in-person assessments except a non-programmable calculator, as expressly permitted by the instructor.

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

Essential Learning Requirements

There are no additional essential learning requirements for this course.

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.

Midterm Test

This course has one midterm test and a cumulative final exam. There is no makeup test for a missed midterm. If a student misses the 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 reweighting described above.

Assignments

This course has four assignments, of which the best three will normally determine the 20% assignment component. The flexibility to miss one assignment without penalty is built into the grading scheme, and Academic Consideration is not required for that one missed assignment. If fewer than three assignments are completed, any additional missed assignment(s) will receive a grade of zero and will be included in calculating the assignment-component grade. If the final exam grade is higher than the resulting assignment-component grade, the full 20% assignment weight will be reweighted to the final exam.

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, it may be submitted 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, requests for Academic Consideration for an absence from a final examination scheduled during the official examination period must be submitted through the Student Absence Portal (SAP), with supporting documentation as required by the University.

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 creates a scheduling conflict with a class, test, midterm, final examination, assignment deadline, or other academic requirement, or requires or prohibits an activity that makes completion of the requirement impossible at the scheduled time, the student is entitled to accommodation. No student will be penalized for an absence or scheduling conflict 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

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

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>).