Western Science

Department of Mathematics

Math 4123A/9023A Fall 2026 Course Outline

1. Course Information

Course Information

- *Course Name:* Mathematics 4123A/9023A (RINGS AND MODULES)
- *Academic Term:* Fall 2026 (FW26)

List of Prerequisites

Math 3020A/B.

Unless you have either the prerequisites for this course or written special permission from the Department of Mathematics to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record.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

Instructor	Email	Office	Office Hours
Nicole Lemire	nlemire@uwo.ca		

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

3. Course Syllabus, Schedule, Delivery Mode

Course Syllabus:
As time permits, the main topics will include:

Rings:

- Fractions and Localizations
- Chinese Remainder Theorem
- Unique Factorization Domains
- Euclidean Domains
- Principal Ideal Domains
- Algebraic Integers
- Polynomials and Formal Power Series
- Factorization in Polynomial Rings

Modules:

- Generation of Modules, Direct Products and Sums, Free Modules
- Tensor Products
- Exact Sequences
- Injective and Projective Modules
- Zorn's Lemma
- Chain Conditions
- Modules over PIDs

Course-level learning outcomes:

- Students will be able to identify, formulate and solve problems about rings and modules, including proof writing.
- Students will be able to present mathematical information, including proofs, in correct mathematical English.
- Students will be able to present and explain their solutions to problems in an organized manner to the class.
- In particular, students will demonstrate these competencies in each of the main topics presented in the course syllabus.

Lecture Style and Delivery Mode:
Classes will be in person and we will follow Chapters 7-10 and 12 of the recommended textbook. Students will prepare for class by reading suggested material. In class, we will discuss the definitions, results and proofs and work through examples and exercises. Class attendance and participation will be required.

What is Expected of Students:
Students will be expected to attend all classes and to prepare for class by reading the textbook and course notes. During class, it will be expected that students regularly answer questions and participate in class discussion. Students are expected to do all of the assigned work. It is up to the student to seek out help when needed. Students are expected to keep up with the material of the course by reading and learning definitions, theorems and results and by doing additional practice problems. They should review all learning materials in a timely manner, follow class announcements, do as many recommended problems as possible, and write all examinations. Students should write out complete solutions for recommended problems without looking at solutions. A fundamental component of the course is to **prove** mathematical theorems.

Key Sessional Dates:

Classes begin:	September 9, 2026
Last Day to drop a course without showing WDN:	September 17, 2026
National Day for Truth and Reconciliation:	September 30, 2025
Fall Reading Week:	October 10 - 18, 2026
Last Day to drop a course without academic penalty:	November 30, 2026
Classes end:	December 9, 2025
Study Day:	December 10, 2025
Exam period:	December 11 – 22, 2026

4. Course Materials

Cost of Course Materials
Approximate Cost: $0. No purchase is required. There is no required textbook and course notes will be posted on the OWL website.

Although we will not follow it strictly, the recommended reference is Abstract Algebra, Third Edition, by David S. Dummit, and Richard M. Foote, published by John Wiley and Sons, Inc. The course material corresponds to material in Chapters 7-10 and 12 of the text.

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.

Other online platforms/apps used in the course:
Other than the OWL Brightspace website, discussed above, we will use the following website:
Gradescope.ca: To access graded quizzes and midterm.

Technical Requirements
In addition to pencil, paper and eraser, you need to have access to:

- Computer or laptop able to run a recent version of web browser such as Chrome, Safari or Firefox.
- Stable high-speed internet connection.
- Document scanner device or app.

Further Course Policies
- All in-person or online interactions with peers, as well as communication with TAs or Professors for this course should be conducted in a professional and respectful manner. Failure to do so will result in academic discipline.

- Recording lectures without the explicit consent of the Professor or TA is grounds for academic discipline.
- Course content created by a faculty member is considered the faculty member's intellectual property; it should not be distributed, shared in any public domain, or sold by a student or other third party without prior written consent of the faculty member.

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

In-class Quizzes (best 4 out of 6):	20%
Participation:	10%
Midterm Test:	30%
Final Exam:	40%

The final examination is cumulative and will cover the full course content. If a student's Final exam performance exceeds their midterm performance, the weight of the midterm will be shifted to the final.

Quizzes:
There will be 6 quizzes with tentative dates:
- September 21
- October 5
- October 19
- November 9
- November 23
- December 7

Any changes to these tentative dates will be announced on OWL.
Questions will be similar to recommended homework problems, posted on OWL.

Participation: Students will be expected to attend and participate in class. The participation grade will be based on attendance and level of participation, which will be based on questions asked and answered by students in class.

Midterm Test
The midterm test will contain problems from the course content covered in the first seven weeks of the term. The tentative date for the midterm will be:
Wednesday, October 28, 4:30-7:30pm.

Note that the date and time of the midterm will be finalized after they are reviewed by Exam Central. The midterm will be an in-person exam which will take place on campus. The locations of the midterm exam will be posted closer to the dates of this exam.

Final Exam
The final exam will cover all the course material with more focus on the last part of the course. It will be a three-hour long exam and will take place in-person during the final exam period: December 11-22, 2026. It will be scheduled by the Registrar's office.

Use of Generative AI Tools
The use of Generative AI tools (e.g. ChatGPT, Copilot, Gemini) in this course are **prohibited**.

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 1 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.

In Class Quizzes
There will be six in-class quizzes. The quiz component will be calculated using each student's best four quiz scores. This built-in flexibility accommodates up to two missed quizzes. Students should not submit requests for Academic Consideration through the Student Absence Portal for missed quizzes. No makeup quizzes will be offered. If fewer than four quizzes are completed, each missing score needed to make four grades will be recorded as zero.

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.
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> **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.

Use of Software for Assessments

Only in the event of a university-declared emergency requiring some or all of the course to be delivered online: Tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, students are consenting to the use of this software and acknowledge that they will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require them 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

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).