

Mathematics 9023A (Rings and Modules) Course Outline

1. Course Information

Course information

Mathematics 9023A-001, time and location posted on Extranet

List of prerequisites

Mathematics 3020A/B or an equivalent introduction to abstract algebra.

2. Instructor Information

Dr David Riley, Professor, dmriley@uwo.ca, MC 136. Students must use their Western (@uwo.ca) email addresses for all official University correspondence. Office hours (in-person) TBA on OWL.

3. Course Syllabus, Schedule, Delivery Mode

Course syllabus

As time permits, the main topics will include:

Rings:

- Fractions and Localization
- 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 in rings and modules theory, including proof writing.

Students will be able to present mathematical information, including proofs, in correct mathematical English.

In particular, students will demonstrate these competences in each of the main topics as listed in the course syllabus.

Lecture schedule and delivery mode: The in-person weekly course lectures will follow Chapters 7-10 and 12 of the textbook.

What is expected of students: Students should attend all classes, make a serious effort to understand all course material, and do all of the assigned work. The student must assume responsibility for any missed classes. 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 doing additional practice problems. They should review all learning materials in a timely fashion, follow class announcements, complete all assignments, and write all examinations. Solutions of collected homework problems must be written neatly and submitted using GradeScope.ca by the announced deadline. A fundamental component of the course is to **prove** mathematical theorems.

4. Course Materials

Textbook: *Abstract Algebra*, Third Edition, by D.S. Dummitt and R.M. Foote.

OWL: Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) on a regular basis 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](#). Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Technical requirements: All assignments must be submitted online using GradeScope.ca.

5. Methods of Evaluation

Breakdown: five Assignments worth 5% each, one in-person Midterm Exam worth 30%, and one in-person Final Exam worth 45%. The Final Exam will be cumulative.

Tentative due dates for Assignments: September 16, October 1, October 21, November 18, December 2.

Tentative Midterm Exam date: October 31 (in-class).

Policies for Assignments: All assignments must be submitted using GradeScope.ca. No late submissions will be accepted.

Evaluation Scheme for Missed Assessments

No late Assignments will be accepted. If a student misses one or more Assignments during the course, and Academic Consideration has been granted, then the corresponding 5% weight of each missed Assignment will be added to the weight of their Final Exam component.

If you a student misses the Midterm Exam, and Academic Consideration has been granted, then the corresponding 30% weight of their missed Midterm Exam will be added to the weight of their Final Exam.

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).

6. Additional Statements

Religious Accommodation

When conflicts 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 or 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>.

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

Academic Policies

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

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 e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

No electronic devices (computers, calculators, smart phones, smart watches, etc) will be allowed in any exam.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

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

Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, appeals, 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 and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (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. You may also wish to contact Accessible Education at

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

if you have any questions regarding accommodations.

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.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

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