

Mathematics 4123A/9023A-001 Course Outline (2019-20)

Rings and Modules

Instructor: David Riley, Professor

Contact information: dmriley@uwo.ca, MC 136

Class time and location: Tu 9:30-10:30 and Th 9:30-11:30 in MC 108

Office hours: after class or by appointment

Syllabus: The course covers the following topics corresponding to Chapters 7-10 and 12 of the textbook.

Rings:

- Basic Definitions and Examples
- Homomorphisms, Quotients, and Ideals
- Fractions and Localization
- Chinese Remainder Theorem
- Factorization in Commutative Rings
- Euclidean Domains
- Principal Ideal Domains (PIDs)
- Unique Factorization Domains (UFDs)
- Algebraic Integers
- Polynomials and Formal Power Series
- Factorization in Polynomial Rings
- Irreducibility Criteria for Polynomials

Modules:

- Basic Definitions and Examples
- Homomorphisms, Quotients, and Submodules
- Generation of Modules, Direct Sums, and Free Modules
- Direct Products and Tensor Products
- Exact Sequences
- Injective Modules and Projective Modules
- Chain Conditions and Noetherian Rings

Prerequisites: Math 3020A/B or equivalent

Textbook: [*Abstract Algebra*](#), Third Edition, by D.S. Dummitt and R.M. Foote

Website: any additional information will be posted on OWL (<http://owl.uwo.ca>).

Evaluation: Assignments (30%), Midterm Exam (30%), Final Exam (40%)

Assignments: there will be 6 assignments posted on OWL.

Additional expectations for 9023A versus 4123A: the assignments and exams for 9023A will require a deeper understanding of the material covered.

Exam dates: the midterm exam will be held in-class on October 24. The final exam date will be set by the Registrar.

Policies for assignments: All assignments are to be submitted at the beginning of class on their due date. No late assignments will be accepted.

Policies for exams: No electronic devices of any sort are permitted during exams.

Senate policy on prerequisites: Prerequisite checking is the student's responsibility. Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Scholastic offences: 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 sites:

http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf

http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_grad.pdf

Absence/Missed work: If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to your Dean's office *as soon as possible* and contact your instructor *immediately*. It is the student's responsibility to make alternative arrangements with his or her instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office *immediately*. For further information concerning UWO's Policy on Accommodation for Medical Illness please refer to this policy at:

https://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a "Record's Release Form" (located in the Dean's Office) for visits to Student Health Services. The form can be found here:

https://www.uwo.ca/univsec/handbook/appeals/medicalform_15JUN.pdf

Make-up exams and conflicts: If you know ahead of time that you are unable to attend a midterm or final exam, you must let your instructor know at least *two weeks in advance* so alternative arrangements can be made. See also the [University's policy on final exam conflicts](#).

Policy on missed assignments and midterm exam: If accommodation is granted, the corresponding weight of the missed assignment or midterm exam will be added to the weight of your final exam.

Student accessibility services: Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program.

Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are encouraged to register with Student Accessibility Services, a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both SAS and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.

<http://www.sdc.uwo.ca/ssd/>

Support services:

- Office of the Registrar: <http://www.registrar.uwo.ca>
- Student Development Services: <http://www.sdc.uwo.ca>
- Learning Skills Services: <http://www.sdc.uwo.ca/learning>
- USC: <http://westernusc.ca/services>
- Academic Calendar: <http://www.westerncalendar.uwo.ca>
- ITS: <http://www.uwo.ca/its/helpdesk>
- Students who are in emotional/mental distress should refer to Mental Health@Western for a complete list of options about how to obtain help: http://www.health.uwo.ca/mental_health