

Group Theory

Math 3120B - Winter 2023

1 Course Information:

Title: Group Theory

Term: Winter 2023

Times and Location:

Monday, Wednesday, and Friday
11:30-12:30
UCC-65

Prerequisites: Mathematics 3020A/B (recommended); or Mathematics 1600A/B and one of Mathematics 1120A/B, Mathematics 2120A/B, Mathematics 2124A/B, Mathematics 2155F/G, Applied Mathematics 2811A/B.

Unless you have either the requisites 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.

2 Instructor Information

Instructors	Email	Office	Office Hours
Prof. Taylor Brysiewicz	tbrysiew@uwo.ca	MC 114	M: 10:00-11:00, W: 1:00-2:30,

Office hours will be offered as in-person, or optionally via zoom by request.

3 Course Syllabus, Schedule, Delivery Mode

Course Description: An introduction to the theory of groups. Topics covered (time permitting): cyclic, dihedral, symmetric, alternating; subgroups, quotient groups, homomorphisms, cosets, Lagrange's theorem, isomorphism theorems; group actions, class equation, p-groups, Sylow theorems; direct and semidirect products, wreath products, finite abelian groups; Jordan-Hölder theorem, commutator subgroup, solvable and nilpotent groups; free groups, generators and relations.

Learning Outcomes:

- Demonstrate the ability to verify whether a set with a binary operation forms a group.
- Be able to rigorously justify claims about groups by relying on precise definitions and theorem statements.
- Construct examples and non-examples of groups which exhibit a given set of properties.
- State and apply standard theorems about groups (Lagrange's theorem, isomorphism theorems, Cayley's theorem, Sylow theorems, etc)

Federico Ardilla's Axioms:

- Axiom 1. Mathematical potential is distributed equally among different groups, irrespective of geographic, demographic, and economic boundaries.
- Axiom 2. Everyone can have joyful, meaningful, and empowering mathematical experiences.
- Axiom 3. Mathematics is a powerful, malleable tool that can be shaped and used differently by various

communities to serve their needs.

- Axiom 4. Every student deserves to be treated with dignity and respect.

COVID-19 Contingency Plan: In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, affected course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining assessments will also be conducted online as determined by the course instructor.

Key Sessional Dates:

Classes begin: January 9, 2023

Reading Week: February 18 – 26, 2023

Classes end: April 10, 2023

Exam period: April 13 – 30, 2023

4 Course Materials

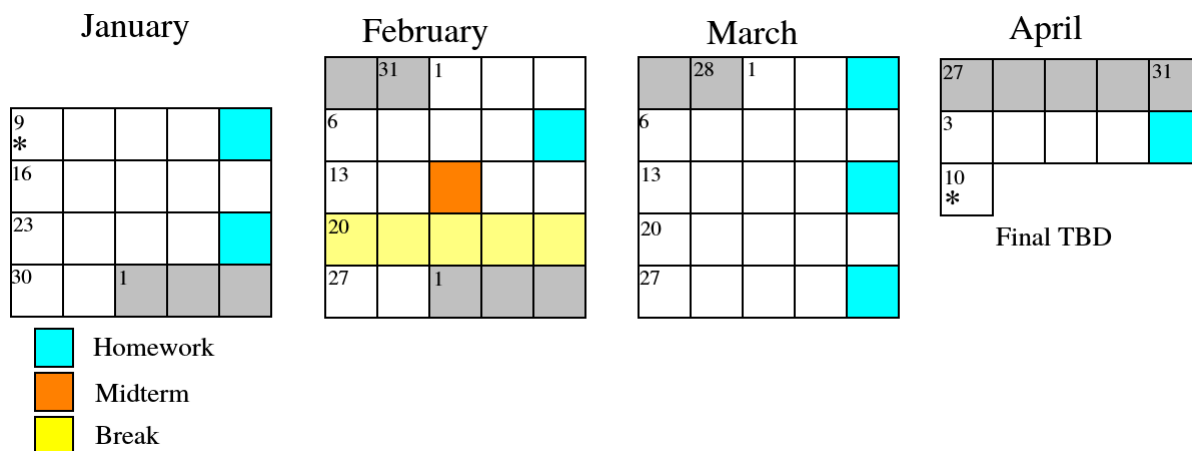
Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. All course material will be posted to OWL: <http://owl.uwo.ca>. If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Textbooks: There is no required text. However, it is strongly recommended that you use a text as a resource and a source of additional practice problems. A standard reference for the material covered in this course is the first six chapters of

Abstract Algebra, 3rd edition, by David S. Dummit and Richard M. Foote

5 Methods of Evaluation

Evaluation Schedule:



Evaluation:

Assignments (6 of 7)	30%	(Due: Jan 13, Jan 27, Feb 10, Mar 3, Mar 17, March 31, Apr 7)
Midterm	30%	(Feb 15)
Final Exam	40%	TBD

Assignments: Assignments will be posted to OWL and turned in by hand in class on the due dates set above. The lowest of the seven grades will be dropped. The remaining six grades will make up $5\% \cdot 6 = 30\%$ of the final grade.

Midterm Exam: The midterm exam will be held in class on February 15.

Final Exam: The final exam will be from **TBD** to **TBD** in room **TBD**. The exam is cumulative.

Makeup Exam Date: **TBD**

6 Student Absences

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

Missed Assignment or Exam: If you miss an assignment or exam due to medical or non-medical reasons, you must contact your faculty's Academic Counselling Office, as soon as possible, to apply for accommodation. If accommodation is granted, the corresponding weight of the missed assignment or midterm exam will be added to the weight of your final exam.

Late Assignments: Late homework assignments are accepted and graded for *half credit* provided that they are turned in by April 3. Half credit means that your final score on the assignment is multiplied by one half to obtain your post-penalty score. Keep in mind that you can always turn in your homework early, and that the lowest homework score is dropped.

Assessments worth more than 10% of the overall course grade By policy, academic considerations for work totalling 10% or more of the final course grade can be granted only by the student's Faculty of Registration (typically by their academic counsellors). In such cases, students should be directed as follows. For work 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. For further information, please consult the University's medical illness policy at

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

The Student Medical Certificate is available at

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

Missed assignments due to excused absences will be resolved via assignment-extensions.

Absences from Final Examination

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam). You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

Note: missed work can only be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is not sufficient on its own.

7 Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>

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/AcademicAccommodation_disabilities.pdf

8 Academic Policies

The website for Registrarial Services is <http://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.

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 site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

In particular, any use of online sources for solutions to assignments is strictly prohibited and will result in a zero on that assignment. All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Remote Proctoring (in event of going remote): Tests and examinations in this course may 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>.

9 Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding or 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 the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time manage-

ment, 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/>.