

## Math 2156B Course Outline

### 1. Course Information

#### Course Information

Math 2156B: Mathematical Structures II, January-April 2025

**List of Prerequisites:** Math 2155F/G

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Advisors) 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

Instructor	Email	Office	Office Hours
Yidi Wang	<a href="mailto:ywan6443@uwo.ca">ywan6443@uwo.ca</a>	Middlesex College 120	TBD

Please use your Western ([@uwo.ca](mailto:@uwo.ca)) email addresses when contacting me and include "Math 2156" in the subject line of your email.

Information about the math help centre and other departmental supports for students can be found here: [https://www.uwo.ca/math/undergraduate/current\\_students/Help%20Centre.html](https://www.uwo.ca/math/undergraduate/current_students/Help%20Centre.html)

### 3. Course Syllabus, Schedule, Delivery Mode

**Lectures:** Lectures are conducted in-person.

**Course description:** This course continues the development of logical reasoning and proofs begun in Mathematics 2155F/G. Topics include elementary number theory (gcd, lcm, Euclidean algorithm, congruences, Chinese remainder theorem) and graph theory (connectedness, complete, regular and bipartite graphs; trees and spanning trees, Eulerian and Hamiltonian graphs, planar graphs; vertex, face and edge colouring; chromatic polynomials).

**Learning outcomes:** After passing this course, the student can read, devise, and write proofs. The student can critique mathematical writing, identifying flaws in reasoning when they exist. The student can convey their ideas in clear, concise English, without leaving gaps for the reader to fill in. The student can correctly state key definitions and results from class and apply them to solve new problems. The

student can apply results and algorithms from class to solve computational problems.

**Key Sessional Dates:**

Classes begin: January 6, 2025

Last day to add or drop a course without showing WDN: January 14, 2025

Reading Week: February 15-23, 2025

Last day to withdraw without academic penalty: March 30, 2025

Last day of classes: April 4, 2025

Study days: April 5-6, 2025

Examination period: April 7-30, 2025

Good Friday and Easter Sunday: April 18, 20, 2025

**Contingency plan:** Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructor.

## 4. Course Materials

This course consists of two parts: elementary number theory and graph theory.

**Part 1 (Week 1-5) Elementary number theory:**

- The primary source is Chapter 1,3,5,6,8 and 13 of *Elementary number theory*, J. Kraft and L. Washington, 7th edition. Free online access from Western library.
- Some topics may not be covered in the exact order as in the textbook. Lecture notes will also be posted to OWL: <https://westernu.brightspace.com/>

**Part 2 (Week 6-12) Graph theory:**

- The primary source is *Combinatorics and Graph Theory*, Harris, Hirst and Mossinghoff, 2nd edition. Free online access from Western library.
- We may occasionally use the following secondary source for certain topics not treated in our primary source: *Graph Theory*, Bondy and Murty. Free online access from Western library.
- Some topics may not be covered in the exact order as in the textbook. Lecture notes will also 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:

- Gradescope: To upload written assignment and to access the graded midterm.

**Technical Requirements:** Computer or laptop access and a stable internet connection.

## 5. Methods of Evaluation

### Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

**Assignments** 30%  
**Midterm Exam 1** 20%  
**Midterm Exam 2** 20%  
**Final Exam** 30%

### Assessment Schedule:

<b>Week 1</b> (Jan 6-12)	
<b>Week 2</b> (Jan 13-19)	Assignment 1 due Jan 17th
<b>Week 3</b> (Jan 20-26)	Assignment 2 due Jan 24th
<b>Week 4</b> (Jan 27-Feb 2)	Assignment 3 due Jan 31th
<b>Week 5</b> (Feb 3-9)	Assignment 4 due Feb 7th
<b>Week 6</b> (Feb 10-16)	<b>Feb 10th: Midterm 1 (In class)</b>
<b>Week 7</b> (Feb 17-23)	<b>Spring Reading Week. No classes.</b> Assignment 5 due Feb 21st
<b>Week 8</b> (Feb 24-Mar 2)	Assignment 6 due Feb 28th
<b>Week 9</b> (Mar 3-9)	Assignment 7 due Mar 7th
<b>Week 10</b> (Mar 10-16)	<b>March 14th: Midterm 2 (In class)</b>
<b>Week 11</b> (Mar 17-23)	Assignment 8 due Mar 21st
<b>Week 12</b> (Mar 24-30)	Assignment 9 due Mar 28th
<b>Week 13</b> (Mar 31-Apr 4)	Assignment 10 due Apr 4th
<b>Exam Period</b> (Apr 7-30)	<b>Final Exam: time and location TBA (scheduled by the university)</b>

**Assignments:** Each assignment is due on Fridays listed above by the end of the day. You have 48hrs no-penalty-period for each assignment (see Flexible Completion section below). After the no-penalty period, no submission will be accepted. The highest 8 assignment scores will be counted into your course grade.

Problems must be completed neatly and contain thorough explanations. You are expected to convey your ideas in a clear and concise way without leaving gaps for the reader to fill in. Answers without explanations will receive no marks, and full credit will not be awarded for work that is messy, vague or incomplete. Collaboration with other students when working on assignments is permissible (encouraged even), but the solutions you submit must be written up in your own words and reflect your own understanding of the problem. Plagiarism is a serious scholastic offence carrying serious consequences.

In addition to the assignments, it is highly advised to frequently complete additional problems appearing in the course notes and textbook(s). Doing so will give you the practice needed to succeed in the course. You should expect some test/exam problems to be based on problems encountered in the course materials and examples worked out in class.

**Final exam:** The final exam is cumulative and 3 hours long. It will be scheduled by the university during the final exam period April 7-30, 2025. You should not make travel arrangements until you know the timing of all of your exams. Calculators and other aids are not permitted.

### **General 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://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration\\_Sep24.pdf](https://www.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/](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.

All Academic Consideration requests normally must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- **Midterm exam 1**
- **Midterm exam 2**
- **Final exam**

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with**

**Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

## **Evaluation Scheme for Missed Assessments**

### **Assignments**

You will receive zero if you miss an assignment. The lowest two assignment scores will be dropped (see Flexible completion section below).

### **Midterm Exam**

A student who obtains an academic consideration to miss a midterm test from their faculty counselling office will be given the opportunity to write a makeup within 1 week. In cases where a student misses the midterm exam and the makeup midterm exam and can provide an academic consideration for both absences, the weight of the midterm will be transferred to the final exam.

### **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). See the Academic Calendar for details (under Special Examinations), especially for those who miss multiple final exams within one examination period.

### **Coursework with Assessment Flexibility**

By policy, instructors may deny Academic Consideration requests for the following assessments with built-in flexibility:

#### **Flexible Completion:**

**Assignments:** This course has 10 assignments and the 8 with the highest marks are counted towards your final grade. Should extenuating circumstances arise, students do not need to request Academic Consideration for the first two missed assignment. Academic consideration requests will be denied for the first missed assignment.

**Deadline with a No-Late-Penalty Period:** Students are expected to submit each of the 6 assignments by the deadline listed. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to 48 hours past the deadline without a late penalty. After the No-Late-Penalty period, assignments will not be accepted and will be considered to be missed.

## **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](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, including calculators phones, tablets, smart watches, laptops, etc., will be permitted on tests and exams.

**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](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](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](mailto: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](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/>.