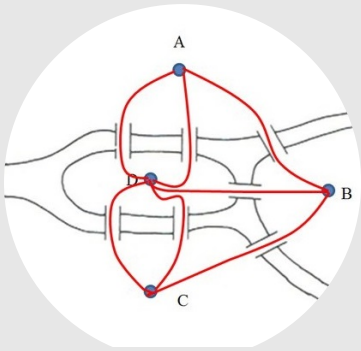




## Discrete Mathematics

### Math 1271 Fall 2024

## Instructor Info —



Dr. Sergio Zapata



szapata1@lakeheadu.ca



Office Location  
External office unit #3 T3-D



Student Hours  
Mon 9:30 am - 10:30 am  
Tues 9:30 am - 10:30 am  
Wed 9:30 am - 10:30 am  
Thur 9:30 am - 10:30 pm

## Course Info —



Class Times  
Tue & Thur 3:30 pm - 5:00 pm



Class Location  
K326

## Lab Info —



Lab Time  
Wednesday 11:00 am - 12:00 pm



Location  
K319

## Welcome!

Welcome to Math 1271. As your instructor, I'm excited to have you in my class this semester and hope to get to know you well during our time together. For many of us, this class may at times feel like a struggle, but know that you are not alone and have a whole community that includes myself and your classmates as resources that can help support your success. Other resources on campus are discussed in more detail later in the syllabus. In our classroom, diversity and individual differences are respected, appreciated, and recognized as a source of strength. Students in this class are responsible for creating an environment where everyone feels welcome to speak up and participate during class and where carefully and respectfully listening to each other is the norm.

## Resources

### Required Text

Rosen, Kenneth H. Discrete mathematics and its applications (8th Edition). You can request a physical copy through the library portal for pickup at the Orilla campus.

### Course Website

This course uses a D2L (Courselink) site, on which grades and important course information will be posted. It is advisable to regularly visit this website to keep yourself updated on any changes and to access any resources related to the course. (The website can be found at [www.mycourselink.lakeheadu.ca](http://www.mycourselink.lakeheadu.ca).)

### Student Hours

If you have any questions or concerns about the course, or if there's something you're curious about or thinking through, please feel free to stop by my office during Student Hours. Sometimes talking things out aloud can help us make progress. If you can't make it during Student Hours, please send me an email to schedule a meeting time that works for you.

## Grading Scheme

|     |                                 |
|-----|---------------------------------|
| 10% | Lab Participation               |
| 18% | MathMatize                      |
| 30% | Midterm Exams, 15% each         |
| 32% | Final Exam                      |
| 10% | Best of Midterms and Final Exam |

### Lab Participation

The primary goal of these sessions is to provide you with opportunities to check your ideas in a supportive classroom environment and offer and receive constructive feedback from your instructor and peers. To earn credit for a lab, you must attend and actively engage in the activities.

### MathMatize

Homework will be assigned every Friday via MathMatize. You will have until 11:59 pm ET on the next Friday to complete that week's assignment. Please note that late assignments will not be accepted, but your lowest assignment mark will be dropped when calculating your final grade.

### Midterms

There will be two in-class Midterm Tests. These are scheduled for October 10th and November 12th. Test #1 will cover Weeks 1-5 and Test #2 will cover Weeks 6-9. There will be no make-up tests. If a midterm test is missed for a legitimate reason, the weight of the test will be added to the final exam.

### Final Exam

The final exam will be a three-hour cumulative exam, which will be scheduled by the registrar during the final examination period.

## Course Description

Discrete Mathematics is a branch of mathematics that focuses on discrete rather than continuous structures. Examples of discrete structures include the integers and graphs in which we can study the distinct elements within the structure rather than the inherent nature of the structure itself. An example of a continuous structure is the real numbers in which we can consider the smoothly changing behaviour of the set via calculus. By studying the objects in a set as separate entities, we are able to investigate arrangements of the objects, relationships, enumeration properties of the set, and more. The table below describes the core topics.

### Learning Objectives

Students who complete this course should be able to

- demonstrate a proficiency in analyzing an argument's form to determine whether the truth of the conclusion follows necessarily from the truth of the premises.
- demonstrate an understanding of the concepts associated with sets, functions, relations, and sequences.
- apply the concept of equivalence relations as used in modular arithmetic and cryptography.
- demonstrate an understanding of the basic concepts associated with a graph.

### Class Schedule

We will adhere to the following schedule of topics to the best of our abilities. It may be subject to minor changes due to unforeseen delays.

| Week                      | Topics                                                                                                                        | Textbook Sections         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Week 1<br>Sept. 2-6       | Propositional logic, Boolean algebra                                                                                          | 1.1, 1.3, 1.6, 12.1       |
| Week 2<br>Sept. 9-13      | Gates and circuits, quantifiers                                                                                               | 12.3, 1.4, 1.5            |
| Week 3<br>Sept. 16-20     | Introduction to sets, set operations, partitions                                                                              | 2.1, 2.2, 9.5             |
| Week 4<br>Sept. 23-27     | Introduction to proofs, direct proofs, proofs by contradiction, proofs by contrapositive                                      | 1.7                       |
| Week 5<br>Sept. 30-Oct. 4 | Functions, Boolean functions, binary relations                                                                                | 2.3, 12.1, 12.2, 9.1, 9.5 |
| Week 6<br>Oct. 7-11       | Sequences and summations, Midterm 1                                                                                           | 2.4                       |
| Week 7<br>Oct. 14-18      | Mathematical induction                                                                                                        | 5.1, 5.2                  |
| Week 8<br>Oct. 21-25      | Study Week                                                                                                                    |                           |
| Week 9<br>Oct. 28-Nov. 1  | Division algorithm, modular arithmetic, prime factorization, Euclid's algorithm, the pigeonhole principle                     | 4.1, 4.3, 6.2             |
| Week 10<br>Nov. 4-8       | Binomial coefficients, introduction to cryptography, number representation, The RSA cryptosystem                              | 6.4, 4.2, 4.6             |
| Week 11<br>Nov. 11-15     | Counting principles, sum and product rules, permutations, counting subsets, Midterm 2                                         | 6.1, 6.3                  |
| Week 12<br>Nov. 18-22     | Counting by complement, permutations with repetitions, counting multisets, assignment problems, inclusion-exclusion principle | 6.5, 6.6                  |

## Course Policies

- Any email sent to the instructor must include a properly descriptive subject line that consists of the course number followed by a very brief phrase that summarizes the subject of your message.
- For privacy reasons, I will not respond to emails from non-lakeheadu.ca addresses.
- Response times may vary depending on the volume of emails received. It is your responsibility to ensure you raise your concerns in a timely manner.
- 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.

## Accommodations

Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as soon as possible. For more information please visit: <http://studentaccessibility.lakeheadu.ca>

## Lakehead-Georgian Policies

### Academic and Student Code of Conduct Policies

- Academic and student policies and procedures for those enrolled in the Lakehead-Georgian programs can be found on the Lakehead-Georgian Student Portal.
- All Lakehead-Georgian programs will follow the Lakehead Regulations as list in the Lakehead University Academic Calendar (<http://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&loaduserredits=False>). The University Regulations include but are not limited to Registration, Examinations, Reappraisals and Academic Appeals, Special Examinations, Academic Misconduct, Withdrawal, and Timely Feedback. Additional Faculty Regulations may also apply. Please review the Academic Calendar at <https://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx>.
- The Lakehead University Student Code of Conduct - Academic Integrity will apply to all Lakehead-Georgian students regardless of campus of study (<https://www.lakeheadu.ca/students/student-life/student-conduct>).
- The Lakehead University Student Code of Conduct - Appeals will apply to all Lakehead-Georgian students regardless of campus of study (<https://www.lakeheadu.ca/students/student-life/student-conduct>).
- The Georgian College Student Code of Conduct will apply to the Lakehead-Georgian students studying at the Barrie campus (<http://www.georgiancollege.ca/student-code-of-conduct>). Additional campus policies of Sexual Violence Procedure and Protocol (<https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/sexual-violence>), Alcohol, Drugs and Tobacco <https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/alcohol-drugs-and-tobacco>, and Information Technology Acceptable Use Procedure <http://www.georgiancollege.ca/wp-content/uploads/2-117IT-acceptable-use.pdf> also apply.
- The Lakehead University Student Code of Conduct – Non-Academic will apply to the Lakehead-Georgian students studying at the Orillia campus (<https://www.lakeheadu.ca/students/student-life/student-conduct>).

### Plagiarism and academic dishonesty

A breach of Academic Integrity is a serious offence. The principle of Academic Integrity, particularly of doing one's own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should view the Student Code of Conduct -Academic Integrity (<https://www.lakeheadu.ca/students/student-life/student-conduct>) for a full description

of academic offences, procedures when Academic Integrity breaches are suspected and sanctions for breaches of Academic Integrity.

## Student Services and Support

**Student Advisors** - <https://georgiancollege.sharepoint.com/sites/student/Student-Services/StudentAdvisors/SitePages/Home.aspx>

- Help students build both academic and personal resilience so that they can flourish at Georgian and beyond.
- Provide individual, group and web-based advising sessions.
- Are housed within the academic areas.
- To book an appointment with your advisor go to the Student Portal (preferred) or call 705-728-1968 Ext. 1307

**Library** - <http://library.georgiancollege.ca/main>

Customer Service

- Off campus access.

Research help

- Help finding books, articles and credible sources.
- Using specialty databases.
- Creating a search strategy.

**Academic Success** - <https://library.georgiancollege.ca/help/contact-academic-success>

**Writing Centre** - [http://library.georgiancollege.ca/writing\\_centre](http://library.georgiancollege.ca/writing_centre)

- Improve your writing.
- Help with citing sources and laying out your paper.

**Math Centre** - [http://library.georgiancollege.ca/math\\_centre](http://library.georgiancollege.ca/math_centre)

- Make sense of math questions.
- Understand concepts and develop skills.

**Tutors** - <http://library.georgiancollege.ca/tutoring>

- Further understand course content.
- Build your study practices.

**Accessibility Services** - <https://www.georgiancollege.ca/student-life/student-services/accessibility-services>

If you are a student experiencing a disability who may require academic accommodations and have not yet registered with Accessibility Services, please contact their office at 705-722-1523, email [studentsuccess@georgiancollege.ca](mailto:studentsuccess@georgiancollege.ca), or visit their offices in B110. You must be registered with Accessibility Services to access academic accommodations. Support for those students whose success at college may be affected by a disability include:

- Ongoing support from our Accessibility Advisors including arranging a confidential psychoeducational assessment where required.
- Training in the use of specialized computer technology. Classroom and test accommodations.

**Testing Services** - <http://www.georgiancollege.ca/student-life/student-services/testing/>

- Accommodated testing.
- Missed/Makeup testing.
- Proctoring services are also available for external and Ontario Learn exams Counselling (<http://www.georgiancollege.ca/student-life/student-services/counselling/>).
- Free, confidential counselling is available to all students.
- Walk in counselling is available on a daily basis Monday to Friday.

**Career Success** - <http://www.georgiancollege.ca/student-life/student-services/co-op-and-career-services/>

- Career assessments and exploring options.
- Job search workshops.
- Labour market information.
- Resume/cover letter help.
- Interview practice.
- Graduate employment information.

## Campus Safety and Security Syllabus Addendum

**Emergency Evacuation** - <https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/fire>

- Evacuate buildings when a fire alarm is activated or an official announcement is given. Review evacuation guidelines (<https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/fire>).
- Students requiring assistance in emergency situations must inform their faculty during the first week of class.
- Familiarize yourself with all fire exit doors of classrooms and buildings you may occupy.
- Do not re-enter a building until instructions are given by the Fire Department or college personnel.

**Lockdown** - <https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/lockdown>

- Lockdown is initiated when there is a potential or actual violent incident on campus that could result in a serious injury or threat to life.
- Students can download the new Safe@Georgian app to stay updated on Campus Safety and Security information including lockdown.
- Familiarize yourself with the College Lockdown procedure (<https://www.georgiancollege.ca/wp-content/uploads/Lockdown.pdf>)
- Lockdown tests occur each semester.

### Resources

- Get Out, Hide, Fight Lockdown Video (<http://youtu.be/JA8cckMbVDk>).
- Lockdown quick reference sheet ([http://www.georgiancollege.ca/wp-content/uploads/COM-15-416\\_LockdownProcedure\\_Signage\\_FVR3\\_print.pdf](http://www.georgiancollege.ca/wp-content/uploads/COM-15-416_LockdownProcedure_Signage_FVR3_print.pdf)).
- Lockdown Model – Get Out, Hide, Fight: Lockdown Tools and Tactics and FAQs.

**Unscheduled Campus Closure** - <https://www.georgiancollege.ca/about-georgian/campus-safety-services/tab/campus-closures>

### Resources

- How to find out if your campus is closed (<http://www.georgiancollege.ca/about-georgian/campus-safety-services/#how-to-find-out-if-your-campus-is-closed>)
- Unscheduled Campus Closure Procedure <https://www.georgiancollege.ca/wp-content/uploads/2-102Unscheduled-college-closure-2018.02.10.pdf>

### Timing of Closures/Notification

| Closure                                                                          | Decision  | Communication/ Notification | Notes                                                                                                |
|----------------------------------------------------------------------------------|-----------|-----------------------------|------------------------------------------------------------------------------------------------------|
| College has made the decision to close a campus or location in the morning       | 6:00 a.m. | By 6:30 a.m.                | If re-opening for noon or evening classes is being considered, this will be mentioned in the message |
| College closed a campus(s) in the morning and expects to re-open by 12:00 noon   | 9:30 a.m. | By 10:00 a.m.               | Only affects classes beginning at 12 noon or later                                                   |
| Closure expected to continue past 12:00 noon                                     | 9:30 a.m. | By 10:00 a.m.               |                                                                                                      |
| College intends to re-open for evening classes which commence at 5 p.m. or later | 2:30 p.m. | By 3:00 p.m.                |                                                                                                      |
| College intends to NOT re-open for evening classes                               | 2:30 p.m. | By 3:00 p.m.                |                                                                                                      |

Notification will be made via:

- Georgian social media (Facebook, Twitter)
- Safe@Georgian app
- Georgian website (homepage)
- Recorded message when you call into Barrie campus at 705-728-1968
- Student or employee portal
- Georgian email account

- Radio and television announcements through local and regional media

**Note.** We only announce the names of campuses that are closed. If your campus is not named in a closure, it's open.