Algoma University
Department of Computer Science and Technology
Mathematics 2056
Discrete Mathematics II
Winter 2025

Instructor: Alireza Baghbanferdows **Tuesday & Thursday 8:30 -10:00**
Office Hours: On request
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Course Outline

ABOUT THE COURSE

DESCRIPTION – COURSE MISSION STATEMENT

This course explores abstract mathematical structures and their applications to real-world problems. Topics include the countability of sets, first-order logic, algebra of relations, graph theory, recurrence relations, and asymptotic notations such as O(f), o(f), and ~(f). Students will study discrete objects, their relationships, and how they can be used to model complex systems. Emphasis is placed on understanding sets, relations, graphs, and trees as foundational tools in discrete mathematics.

Course Prerequisites:
MATH1056, Discrete Mathematics I.

The student should be familiar with:

- Propositional logic and proofs
- Basic mathematical structures: sets, functions, sequences
- The concept of an algorithm and function growth
- Integers and Matrices
- Mathematical induction and recursion
- Basic counting principles: permutations and combinations

Methods of Instruction:
Lectures (in-person)

Learning Objectives:

- Equip students with comprehensive knowledge of the topics covered in the weekly Course Outline.
- Develop students' ability to read, understand, and articulate mathematical arguments effectively.
- Strengthen students' skills in constructing and critically evaluating mathematical proofs.
- Introduce students to the principles of mathematical modeling and its application to solving real-world problems using course concepts.
- Highlight the practical applications of mathematical modeling in diverse fields such as computer science, biology, business, economics, and beyond.

Learning Outcomes:

Upon successfully completing the course, students will be able to:

- Read, interpret, and construct coherent mathematical arguments.
- Represent relationships between sets and analyze their properties.
- Apply graph theory to model and solve relevant real-world scenarios.
- Use Boolean Algebra to design and analyze electronic circuits.

COURSE REQUIREMENTS

TEXTBOOK REQUIREMENTS

Susanna S. Epp, *Discrete Mathematics with Applications*, 5th Edition.

In this course, we will cover the majority of the material from Chapters 6 through 10 of the textbook.

WEEKLY SCHEDULE

The following schedule is tentative and subject to change. We may add extra materials, leave some sections as extended readings, or modify the sequence of topics. Updates will be communicated via Moodle and email. Please check Moodle regularly.

- **January 08 - January 26 (Week 1-3):** Set Theory
- **January 27 – February 14 (Week 4-6):** Functions
- **February 15 - February 21 (Week 7):** Study Week (no lectures)
- **February 24 – March 09 (Week 8-9):** Relations
- **March 10 - March 23 (Week 10-11):** Counting and probabilities
- **March 24 – April 08 (Week 12-13):** Graphs & Trees

MARKING SCHEME

• **Quizzes (30%):** Short quizzes will be held during. There will be 11 quizzes, each out of 3 points, for a total of 33 points. Of these, 30 points will count toward the grade, with the remaining 3 points treated as a bonus.

• **Midterm Exam (30%):** The midterm exam will be held on February 27 and will focus on set theory and functions.

• **Final Exam (40%):** The final exam will cover the entire course content and will be scheduled during the exam period in December. Calculators, cell phones, or any electronic devices are not permitted.

Missed Tests and Exams:
There are no make-up quizzes or exams.

The Final Examination Policy can be found at:
http://algomau.ca/media/styleassets/pdf/final_examination_policy.pdf

COURSE POLICIES

Email Policy

Please indicate your course code in the subject line. Emails shall be replied to within 3 working days. I will only respond to e-mails with the course code in the subject line. For example, all e-mails must have Math1912 in the subject line. You should know your section code; you can find it in your academic summary found in the student portal. Also please read the course outline before sending an email. Course-related information is in the course outline.

Academic Dishonesty

The University takes a very serious view of such offenses as plagiarism, cheating, and impersonation. Penalties for these offenses will be strictly enforced. The following website contains a complete policy statement on academic dishonesty and attendance. Students are encouraged to read this policy for further clarification of these issues:

http://algomau.ca/media/styleassets/pdf/disciplinary_regulations_on_academic_dishonesty.pdf

Disability Accommodation

If you are a student with a physical, learning, and/or psychological disability and plan to request any academic accommodations for this class, you are required to bring in an authorization letter from Disability Services listing the permitted accommodations. I will work with you to arrange your accommodations from the point in time that you deliver and discuss such an authorization letter with me. The Coordinator of Disability Services will keep your disability documentation confidential. Contact information is as follows: Coordinator of Disability Services 705-949-2301 ext. 4221; learning@algomau.ca.

ATTENDANCE

The general regulations of the University require punctual and regular attendance at academic exercises. If there are extenuating circumstances for an absence, the instructor should be notified. Absences exceeding 20% may jeopardize the receipt of credit for the course.

CANCELLED CLASSES

Students are expected to monitor their AU e-mail accounts regularly as messages about the course will be forwarded via the class alias, which automatically forwards messages to the individual student e-mail accounts issued by AU.

Withdrawal Deadline

Please refer to the Academic Calendar (on algomau.ca)

TECHNICAL SUPPORT

ITS HELPDESK

The ITS Helpdesk offers support for CMS-related problems as well as general computer or software problems.

All IT requests must be submitted through http://my.algomau.ca.

To do so, log in using your Algomau username/password and click on the "Contact IT Helpdesk" button. If you have problems logging in, there is another "Contact IT Helpdesk" link which can be used on the login screen (however it will not populate your personal information).