Department of Mathematics & Statistics
Concordia University

MATH 222
Logic, Proofs, and Discrete Structures
Fall 2025

Instructor: Dr. Ben Hersey
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*When sending me an email, please include "Math 222" in the subject line.

Class Schedule: Mondays and Wednesdays, 10:15-11:30.
Attendance is highly encouraged.

Midterm Break: No classes between October 11 and October 17, 2025.

Office Hours: TBA.

Textbook: *Discrete Mathematics and its Applications*, by Kenneth H. Rosen.
This textbook is not mandatory for completion of the course and is meant to act as a reference for the material that we cover in class.

Reference: *Mathematical Reasoning, Writing and Proof,* by Ted Sundstrom.

Assignments: Homework will be assigned almost every week, on Moodle. Late homework will not be accepted. Submit scanned assignments through Moodle as **a SINGLE PDF file**. **No other formats or ways of submitting your work are allowed.** (There are free scanner apps for your smartphone.) Solutions will be posted on Moodle.

You should provide complete arguments in your work. Some assigned problems may not be marked. Students should attempt all problems.

Midterm: There will be a midterm test scheduled in the 7th week of classes. The exact date of the exam will be announced in class at least two weeks in advance. **There will be no make-up midterm exam.**

Final Exam: To be scheduled by the exams office.

NOTE: Students are responsible for finding out the date and time of the final exam once the schedule is posted by the Examination Office. Any conflicts or problems with the scheduling of the final exam must be reported directly to the Examination Office, **not** to your instructor. It is the Department's policy and the Examination Office's policy **that students are to be available until the end of the final exam period. Conflicts due to travel plans will not be accommodated.**

Grading: 15% Assignments, 30% Midterm, 55% Final Exam

OR

15% Assignments, 85% Final Exam

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems

Objectives: Mathematics is used by a wide variety of people in a wide variety of disciplines. As such, the ways that mathematics can be studied and presented is equally varied. The core purpose of this course is to learn how a mathematician studies and presents mathematics. By putting emphasis on capturing concepts using precise definitions, generalizing examples we understand into conjectures we want to prove, and understanding the logical structure of arguments, we will develop the skills necessary to state and prove theorems with full "mathematical rigor".

The backdrop for developing these skills are "discrete structures". These are a collection of commonplace mathematical structures which appear in many different branches of mathematics.

Topics: Topics may include but are not limited to logic and proofs, basic structures, algorithms, number theory, induction and recursion, counting techniques, relations and their properties, graphs, trees, and Boolean algebra.

Student Services
You may wish to access the many services available to you as a Concordia student. An overview of these resources can be found here: https://www.concordia.ca/students/services.html

Academic Integrity and the Academic Code of Conduct
This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: https://www.concordia.ca/conduct/academic-integrity.html" *[Undergraduate Calendar, Sec 17.10.2]*

Behaviour
All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the Code of Rights and Responsibilities which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

Intellectual Property
Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing

of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities. As specified in the Policy on Intellectual Property, the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Extraordinary circumstances
In the event of extraordinary circumstances and pursuant to the Academic Regulations the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.