Department of Mathematics & Statistics
Concordia University

MATH 222

Logic, Proofs and Discrete Structures

Winter 2026

Instructor: Dr. Nadia Hardy
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When sending me an email, include "Math 222" in the subject line; also include in your message your full name and student ID.

Class Schedule: Wednesdays, 8:45-11:30, in FG B070 (SGW).
Attendance is highly encouraged.

Reading Week: There will be no classes during the mid-term break from March 2 to March 8.

Office Hours: Mondays and Wednesdays, 1pm to 2pm.
By appointment only in case of demonstrated conflict with the above hours.

Course Notes: Posted on the course Moodle site, the notes are the main reference for this course.

Textbooks: *Discrete Mathematics and its Applications*, by Kenneth H. Rosen.
Mathematical Reasoning, Writing and Proof, by Ted Sundstrom.

These textbooks are **not mandatory** and are meant to act as reference for the material that we cover in class.

Homework: Homework will be assigned almost every week, on Moodle. You will only be required to submit some weeks, and only some problems of the assigned homework set.

When an assignment is to be handed in, it is due at the beginning of the class corresponding to the due date. For example, an assignment due Wednesday, January 21, must be handed in that day, when class starts. No late assignments, no exceptions. No assignments sent by email or via Moodle, no exceptions.

Students must follow the template format provided in the Moodle site for submitting all assignments.

Solutions will be posted on Moodle. Only the best n – 1 homework sets out of the n assigned will count.

Quizzes: There will be 2-3 in class quizzes. The date of each quiz will be announced in Moodle at least a full week in advance. The quizzes will consist of 1 or 2 problems from homework sets of the previous weeks, or slight variations of those.

Midterm: There will be an in-class midterm test. The exact date of the exam will be announced in class and posted in Moodle at least two weeks in advance. There will be no make-up midterm exam. A student who misses the midterm exam for any reason will have the weight shifted to the final exam. No exceptions.

Final Exam: To be scheduled by the Exams Office.

PLEASE 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: 20% Quizzes and Homework, 30% Midterm, 50% Final Exam

OR

20% Quizzes and Homework, 80% 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 are equally varied. The core purpose of this course is to learn how *mathematicians* study and present mathematics. We consider the precise mathematical meaning of definitions, hypotheses, theorems, and examples, and study proving techniques and the rudiments of mathematics' logical structures.

The backdrop for developing these skills are "discrete structures". These are a collection of 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.

About the use of AI: ChatGPT and other AI systems can be powerful learning aids if used carefully and responsibly. This course is about reading and writing mathematics, students need to practice these skills to be able to succeed in the course and their future mathematics courses. Simply reading the production of a bot (or a textbook) will not suffice to learn how to read and how to write mathematics.

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.