MAT138H1: Introduction to Proofs

Fall 2025 — University of Toronto

Basic Information

Course Website: https://alex-youcis.github.io/MAT138.html

Lectures: LEC0101 (Mon 4–5, Wed 3–5)

Room: Bahen 1200 (Mon), Bahen 1210 (Wed)

Contact info

Instructor

Alex Youcis
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Office hours: Mon 2:30-4

Teaching Assistants

Emmanuel Sackefiyo
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Office: PGB003 (for office hours only)
Office hours: Fri 3-4

Charlie Wu
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Office:
Office hours: T 11-12

Course Overview

Goals

The course cultivates mathematical thinking. By the end the student will be comfortable with abstraction and rigor, logical analysis, and proof-writing. This will be achieved by carefully examining mathematical statements, unpacking complicated definitions, making

conjectures, and writing precise mathematical proofs.

Requirements

Hours: 36L / 12T

Prerequisite: High school calculus

Exclusion: Exclusion: MAT137Y1 / MAT137Y5 / (MATA30H3 / MATA31H3, MATA37H3) / MAT157Y1 / MAT157Y5

Distribution Requirement: Science

Breadth Requirement: The Physical and Mathematical Universes (5)

Texts

Required:
Title: *Proof and the Art of Mathematics*,
Author: Joel David Hamkins,
ISBN: 9780262360937,
U of T bookstore link: click here.

Optional:
Title: *Proof and the Art of Mathematics: Examples and Extensions*,
Author: Joel David Hamkins,
ISBN: 9780262542203,
U of T bookstore link: click here.

Organization

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- Lectures and tutorials are in person.
- Midterm and final exams are in person.

Important Dates

- Tutorials begin: TBA
- Midterm (in class): **Wed Oct 22**
- Final: **3-hour exam during Fall exam period (TBA)**

Email policy

I will only answer emails sent to my U of T email address. Also, I **strongly prefer** that course matters be discussed with me in person, either after class or during my office hours. You are free to follow-up via email (to have in writing anything we discuss in person), but for efficency sake please first talk with me in person if possible.

Questions related to your discussion sections (e.g., quizzes, missed discussion section, etc.) should be directed to your TAs, who will come to me if necessary.

Evaluation

Component	Weight
Practice exams	15%
Quizzes	25%
Midterm	25%
Final Assessment	35%

Practice exams

Overview: One practice midterm and one practice final (worth 7.5% each)—see the calendar below for due dates. Note that:

- The practice midterm will be 5 questions (two **easy**, two **medium**, and one **hard**). You should allot yourself 2 hours to complete it.
- The practice final will be 7 questions (three **easy**, two **medium**, and two **hard**). You should allot yourself 2 hours to complete it.

Grading scheme: These exams will be graded **for completion only**, but will **still be marked for correctness** so that you can prepare for exams.

Logistics: Will be handed in/returned via Gradescope.

Late policy: No late practice exams accepted.

Quizzes

Overview: 5 quizzes (5% each)—see the calendar below for quiz days. Each has 2 (one **easy**, one **medium**) problems. This will cover (**roughly**) the material from the last two weeks of lectures.

Grading scheme: The easy problem will be worth 5 points and the medium problem worth 10 points, for a total of 15 points.

Logistics: The quizzes will be given in the first 20 minutes of tutorial.

Missed quiz policy: There will be no opportunities for late quizzes except in cases of genuine need. See your TA about rescheduling.

Midterm (Oct. 22)

Overview: There will be 5 questions (two **easy**, two **medium**, and one **hard**). This will cover all the material up until that point.

Grading scheme: The easy problems will be worth 15 points each, the medium problems will be worth 20 points each, and the hard problem will be worth 30 points each.

Logistics: This will take place in class Wednesday October 22 (so you will have two hours).

Alternate sitting possible with at least 72h notice (limited spaces).

Final (Dec. TBA)

Overview: There will be 7 questions (three **easy**, two **medium**, and two **hard**). This will cover all the material up until that point.

Grading scheme: The easy problems will be worth 10 points each, the medium problems will be worth 15 points each, and the hard problem will be worth 20 points each.

Logistics: TBA.

Institutional Policies and Support

Academic integrity

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behavior on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behavior or appropriate research and citation methods, please reach out to your Course Instructor. Note that you are expected to seek out additional information on academic integrity from me or from other institutional resources (for example, the University of Toronto website on Academic Integrity). (see Academic Handbook Section 12 Academic Integrity)

Accessibility

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs. Students with diverse learning styles and needs are welcome in this course. If you have a disability that may require accommodations, please feel free to approach your Course Instructor and/or the Accessibility Services office as soon as possible. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

You can find here the Accessibility Services website. (see Academic Handbook Section 13 Accessibility/Disability Issues)

Equity, Diversity, and Inclusion

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

Important Academic Dates & Deadlines

You can find here a list of academic dates, including: enrollment dates, drop deadlines, exam periods, petition deadlines and more.

Other Academic and Personal Supports

- Writing Centre
- U of T Libraries
- Student Code of Conduct
- Feeling Distressed?
- Academic Success Centre
- College/Faculty Registrars

Schedule of Lectures (rough)

The following is a rough outline of the material for the course week-by-week. But note that **some supplementary material will be covered in class** which is not contained directly in the textbook, especially in those weeks containing supplemental material. So students are **strongly encouraged to attend class**, or at least request notes from a friend.

See the course website for a more detailed/up-to-date schedule.

Week	Material	Textbook Sections
1	What is a proof? Examples	Ch. 1–2
2	Number theory	Ch. 3
3	Number theory/Induction	Ch. 3-4 + supplemental
4	Counting, discrete math	Ch. 5
5	Proofs without words/Functions and relations	Ch. 6 + Ch. 11 + supplemental
6	Functions and relations	Ch. 11 + supplemental
7	Lattice geometry	Ch. 8–9
8	Midterm review/midterm	
9	Area, scissors congruence	Ch. 10
10	Games	Ch. 7
11	Infinity	Ch. 13 + supplemental
12	Special topics	Supplemental

Calendar (tentative)

Legend: **Q** = Quiz, **T** = Tutorial, **PM/F**= Due date of practice midterm/ final, **M**= Midterm

September 2025

Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	2	3	4	5	6	7
8	9	10	11	12 T Q1	13	14
15	16	17	18	19 T	20	21
22	23	24	25	26 T Q2	27	28
29	30					

October 2025

Mon	Tue	Wed	Thu	Fri	Sat	Sun
		1	2	3 T	4	5
6	7	8	9	10 T Q3	11	12
13	14	15 PM	16	17 T	18	19
20	21	22 M	23	24	25	26
27	28	29	30	31		

November 2025

Mon	Tue	Wed	Thu	Fri	Sat	Sun
					1	2
3	4	5	6	7 T Q4	8	9
10	11	12	13	14 T	15	16
17	18	19	20	21 T Q5	22	23
24	25	26	27	28 T PF	29	30