MAT344
Introduction to Combinatorics
Fall 2020
University of Toronto

Course information

webpage	https://www.math.toronto.edu/mayrand/mat344/
course code	MAT344H1-F
delivery method	Online synchronous on Zoom
prerequisite	MAT223 (Linear Algebra) or MAT240 (Algebra I)
description	Basic counting principles, generating functions, permutations with restrictions. Fundamentals of graph theory with algorithms; applications (including network flows). Combinatorial structures including block designs and finite geometries.

Instructors

name	email	sections	office hours
Stanislav Balchev	stanislav.balchev@mail.utoronto.ca	LEC0101 LEC9101	Mon 12–14
Maxence Mayrand	mayrand@math.toronto.edu	LEC0201 LEC9201	Tue 17–18

Email is the preferred method of communication.

Lectures

Lectures will be online on Zoom. Before each lecture, you will receive a link to the Zoom session from your official UofT email address. They will be recorded and available on Quercus.

sections	LEC0101 LEC9101 — Stanislav Balchev
times	Monday 10:00–12:00 Wednesday 10:00–11:00
first lecture	Monday, September 14, 2020
last lecture	Thursday, December 10, 2020 (make-up day)
sections	LEC0201 LEC9201 — Maxence Mayrand
times	Monday 16:00–18:00 Tuesday 16:00–17:00
first lecture	Monday, September 14, 2020
last lecture	Thursday, December 10, 2020 (make-up day)

Notice of video recording and sharing. This course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session. Course videos and materials belong to your instructor, the University, and/or other source depending on the specific facts of each situation, and are protected by copyright. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor. For questions about recording and use of videos in which you appear please contact your instructor.

Teaching assistants

name	email	tutorials
Sina Abbasi	sina.abbasi@mail.utoronto.ca	TUT0201 TUT9201
Tomas Dominguez Chiozza	tomas.dominguezchiozza@mail.utoronto.ca	TUT0301 TUT9301
Mehmet Durlanik	durlanik@math.toronto.edu	TUT0401 TUT9401
Xiao Jie	xiao.jie@mail.utoronto.ca	TUT5201 TUT6201
Yuxuan Lin	lyx.lin@mail.utoronto.ca	TUT0101 TUT9101
Reila Zheng	reila@math.utoronto.ca	TUT0501 TUT5101 TUT5102 TUT6101

Tutorials

Tutorials will be online on Zoom. You will receive a link from your official UofT email address before each tutorial. You must register to the tutorial to get the link and be able to join.

The TAs will explain solutions to some exercises, answer your questions, and review the relevant course material.

Tutorials start in the week Sep 21—Sep 25 and continue every week until the week Nov 30—Dec 4, except for the reading week.

sections	time	TA
TUT0101 TUT9101	Monday 13:00–14:00	Yuxuan Lin
TUT0201 TUT9201	Tuesday 13:00–14:00	Sina Abbasi
TUT0301 TUT9301	Wednesday 11:00–12:00	Tomas Dominguez Chiozza
TUT0401 TUT9401	Thursday 16:00–17:00	Mehmet Durlanik
TUT0501	Monday 09:00–10:00	Reila Zheng
TUT5101 TUT5102 TUT6101	Tuesday 17:00–18:00	Reila Zheng
TUT5201 TUT6201	Thursday 17:00–18:00	Xiao Jie

Textbook

Applied Combinatorics, by Mitchel T. Keller and William T. Trotter

It is freely available in html at this link:

https://appliedcombinatorics.org/book/app-comb.html

It is the most important resource for the course. We will follow it very closely.

Course content

The plan is to cover the following sections of the textbook:

1, 2, 3, 4.1, 5.1—5.6, 7, 8, 9, 13

Tentative schedule

week	sections	problem sets	note
Sep 14—Sep 18	2		
Sep 21—Sep 25	2	PS1	first tutorial
Sep 28—Oct 02	3	PS2	
Oct 05—Oct 09	4, 5	PS3	
Oct 12—Oct 16	5		no class on Monday (Thanksgiving)
Oct 19—Oct 23	5	PS4	midterm on Monday
Oct 26—Oct 30	7	PS5	
Nov 02—Nov 06	8		
Nov 09—Nov 13		PS6	reading week; no lecture and no tutorial
Nov 16—Nov 20	9	PS7	
Nov 23—Nov 27	9	PS8	
Nov 30—Dec 04	13	PS9	last tutorial
Dec 07—Dec 11	13		make-up class on Dec 10

Marking scheme

problem sets 72%

midterm exam 12%

final assessment 16%

Problem sets

quantity 9

weight 72%
Only your best 8 will count, and each will weight 9%.

marking There will only be a random subset of the questions that is marked. The number of questions will be announced in advance.

due dates Problem sets are due on Sundays at 11:59PM (one minute before midnight) and are released one week before. The due dates are:

PS1   due September 27 at 11:59PM
PS2   due October 4   at 11:59PM
PS3   due October 11   at 11:59PM
PS4   due October 25   at 11:59PM
PS5   due November 1   at 11:59PM
PS6   due November 15   at 11:59PM
PS7   due November 22   at 11:59PM
PS8   due November 29   at 11:59PM
PS9   due December 6   at 11:59PM

submission The problem sets will be sent to you via Crowdmark.

You will be asked to submit your solutions electronically on Crowdmark. No paper copy will be accepted.

The easiest way to upload your problem set is to use a scanner, but if you don't have access to one, you can also use a scanner app on your phone. Make sure that your work is legible before submitting it; otherwise, it will not be accepted.

solutions Solutions are not provided. This is to encourage you to consult with TAs, your fellow students, and the instructors to identify shortcomings in your grasp of the material.

Midterm exam

weight   12%
format   24-hour take home exam (open book) on Crowdmark
start date   Monday, October 19, 11:59AM
due date   Tuesday, October 20, 11:59AM

Final assessment

weight   16%
format   24-hour take home exam (open book) on Crowdmark
start date   Friday, December 18, 14:00
due date   Saturday, December 19, 14:00

General rules

lateness   Any work (problem set, midterm exam, or final assessment) that is submitted after the due time will be marked 0%.

plagiarism   Your submissions must be your own work, written independently, in your own words. Otherwise, it will be considered an offence under the University of Toronto's Code of Behaviour on Academic Matters (see section B.I.) and serious sanctions will be applied.

illness   A Verification of Illness (also known as a "doctor's note") is temporarily not required. Students who are absent from class for any reason (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the online absence declaration. The declaration is available on ACORN under the Profile and Settings menu. Students should also advise their instructor of their absence. Visit COVID-19 Information for University of Toronto Students page on the Vice-Provost, Students website for information on this and other frequently asked questions.

Discussion forum

We will use Piazza, which is a discussion forum where you can ask as many questions as you like, and will receive answers from other students, the TAs, and the instructor.

To join the forum, go to piazza.com and search for MAT344. You will also get an email invitation at the beginning of the course. Alternatively, you can sign up at this link:

> https://piazza.com/utoronto.ca/fall2020/mat344

Technical requirements

- A computer satisfying the minimum requirements.
- Internet access. A high speed broadband connection (LAN, Cable, or DSL) with a minimum download speed of 5 Mbps is strongly recommended.
- Headphones or speakers to listen to your computer's audio.
- Scanner or camera to provide an image of physical work completed.

General requirements:
> https://www.viceprovoststudents.utoronto.ca/covid-19/tech-requirements-online-learning/

Student Tech Support:
> https://onesearch.library.utoronto.ca/ic-help-desk-knowledge-base

Accommodations for disability

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach Accessibility Services at (416) 978 8060; studentlife.utoronto.ca/as.

Academic integrity message

The University of Toronto treats cases of academic misconduct very seriously. Academic integrity is a fundamental value of learning and scholarship at the UofT. Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that your UofT degree is valued and respected as a true signifier of your individual academic achievement.

The University of Toronto's Code of Behaviour on Academic Matters outlines the behaviours that constitute academic misconduct, the processes for addressing academic offences, and the penalties that may be imposed. You are expected to be familiar with the contents of this document. Potential offences include, but are not limited to:

In papers and assignments:

- Using someone else's ideas or words without appropriate acknowledgement.
- Submitting your own work in more than one course without the permission of the instructor.
- Making up sources or facts.
- Obtaining or providing unauthorized assistance on any assignment (this includes working in groups on assignments that are supposed to be individual work).

On tests and exams:

- Using or possessing any unauthorized aid, including a cell phone.
- Looking at someone else's answers.
- Letting someone else look at your answers.
- Misrepresenting your identity.
- Submitting an altered test for re-grading.

Misrepresentation:

- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.
- Falsifying institutional documents or grades.

All suspected cases of academic dishonesty will be investigated following the procedures outlined in the Code of Behaviour on Academic Matters. If you have any questions about what is or is not permitted in this course, please do not hesitate to contact me. If you have questions about appropriate research and citation methods, you are expected to seek out additional information from me or other available campus resources like the College Writing Centres, the Academic Success Centre, or the U of T Writing Website.