DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCES
UNIVERSITY OF TORONTO MISSISSAUGA

MAT344H5F LEC0101
Introduction to Combinatorics
Course Outline - Fall 2017

Class Location & Time	Tue, 05:00 PM - 06:00 PM IB 140 Thu, 05:00 PM - 07:00 PM IB 140
Instructor	Alex Rennet
Office Location	DH-3076
Office Hours	
E-mail Address	alex.rennet@utoronto.ca
Course Web Site	See below
Teaching Assistant	Andrew Ross
E-mail Address	a.ross@mail.utoronto.ca

Course Description

Basic counting principles, generating functions, permutations with restrictions. Fundamentals of graph theory with algorithms; applications (including network flows). [36L,12T]

Prerequisite: MAT102H5, 223H5/240H5
Exclusion: MAT344H1,MATC44H3 (SCI)
Distribution Requirement: SCI

Students who lack a pre/co-requisite can be removed at any time unless they have received an explicit waiver from the department. The waiver form can be downloaded from here.

Textbooks and Other Materials

Miklos Bona, *A Walk Through Combinatorics*, 4th Ed., World Scientific, 2017.

There should be new copies available at the UTM bookstore. This is **not** the same textbook as was used in recent semesters at UTM.

The instructor will supplement the textbook with additional readings and exercises, as necessary. These will be posted on the course website.

Assessment and Deadlines

Type	Description	Due Date	Weight
Term Test	In-Class Test	TBD	20%
Assignment	5 Hand-In Assignments	On-going	15%
Quiz	5 In-Tutorial Quizzes	On-going	15%
Final Exam		TBA	50%
		Total	100%

More Details for Assessment and Deadlines

Missed Work

If a student misses a test or a quiz, or is unable to complete an assignment for a *valid, documented reason,* the corresponding portion of their mark will be incorporated into their final exam mark.

Example: if a student is excused from the Test and one Quiz, their final mark would be calculated with Quizzes worth 12%, and the

Final Exam worth 73%.

Final Mark Calculation

Every students' final mark will be calculated by taking the *higher* of their mark on the standard marking scheme (as above), and their mark on an alternate scheme where 5% from the term test is shifted to the final exam (assuming the term test was written).

All five quizzes and all five assignments will be weighted equally.

Quiz Info

There will be **five 20-minute quizzes** held **written during your registered tutorial** on the **following dates:**

- **September 13th**
- **September 27th**
- **November 1st**
- **November 15th**
- **November 29th**

If you require accessibility accomodation for quizzes, you are encouraged to make an appointment with the AccessAbility centre on campus as soon as possible (see http://www.utm.utoronto.ca/accessability/accessability-services-2037-davis-building)

Students must write quizzes in their Registered Tutorial.

There will not be any make-up quizzes.

Test Info

There will be **one 100 minute term test**. It will be written **during class time (i.e. starting at ~5:15pm) in the usual lecture room** on **October 19th.**

If you have a conflict with the timing of the term test (for instance, if you have another course with a midterm scheduled during this time), **then you need to bring this to the attention of Prof. Alex Rennet by the end of the third week of classes (please email or bring a copy of your timetable and the syllabus of the course with the conflicting midterm).**

There will not be a make-up test.

Assignment Info

There will be **five hand-in assignments**, due **in your registered tutorial on the following dates:**

- September 20th
- October 4th
- October 25th
- November 8th
- November 22nd

Late assignments will not be accepted under any circumstances.

Assignments will be posted approximately one week before they are due.

Students' assignments should either be **very neatly handwritten**, or **typed**. More specific instructions will be given to students regarding these expectations.

Penalties for Lateness

Late assignments will not be accepted.

There are no make-up tests, quizzes or assignments.

Procedures and Rules

Missed Term Work

If you have a legitimate reason (e.g. illness, other impairment, etc.) for being unable to attend class or complete some other aspect of the course work then you need to submit documentation to the instructor as soon as possible, and no later than two weeks after the course work was due. If this is a recurring situation for whatever reason, you should speak to the instructor about it as soon as possible.

- In all cases of illness etc, you must use the**official UTM medical certificate**. The certificate must specify the exact period during which you were unable to carry out your academic work.

Missed Final Exam

Students who cannot write a final examination due to illness or other serious causes must file anonline petition **within 72 hours of the missed examination**. Original supporting documentation must also be submitted to the Office of the Registrar **within 72 hours of the missed exam**. Late petitions will **NOT** be considered. If illness is cited as the reason for a deferred exam request, a U of T Verification of Student Illness or Injury Form must show that you were **examined and diagnosed at the time of illness and on the date of the exam, or by the day after at the latest**. Students must also record their absence on ACORN on the day of the missed exam or by the day after at the latest. Upon approval of a deferred exam request, a non-refundable fee of $70 is required for each examination approved.

Academic Integrity

Honesty and fairness are fundamental to the University of Toronto's mission. Plagiarism is a form of academic fraud and is treated very seriously. The work that you submit must be your own and cannot contain anyone elses work or ideas without proper attribution. You are expected to read the handout How not to plagiarize (http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize) and to be familiar with the Code of behaviour on academic matters, which is linked from the UTM calendar under the link Codes and policies.

Groupwork and Plagiarism

Students are encouraged to work on assignments in groups.

When working on an assignment though, students are required to follow these**three simple rules:**

1. **If you work in a group, then on each copy of the assignment you hand in record the other students you worked with and which questions you worked on together.**
2. **Even if you work in a group, or have help from a tutor, you must write-up your own answer to each question.** (Copying or submitting someone else's work, letting someone copy or submit your work, writing a solution for another student, or having another student write a solution for you are **all** cases of Academic Dishonesty.)
3. **Students should cite any and all sources they use in their work.**(This includes using Wikipedia, or alternate textbooks, etc.)

Final Exam Information

Duration:	3 hours
Aids Permitted:	None

Additional Information

Course Schedule

We will aim to cover many (but not all) of the topics from Parts I, II and III in the textbook (with additional topics, possibly using additional sources, as time permits).

There will be a week-by-week schedule on the course website with a more detailed summary of the topics we will cover each week.

Learning Outcomes

Upon successful completion of this course, students should be able to:

- Apply a variety of strategies to solve combinatorial problems.
- Formulate rigorous proofs of results that arise in the context of Graph Theory and Combinatorics, including results related to:
    - Connectedness, colouring, and planarity of graphs
    - Existence and non-existence of various types of paths in graphs
    - Trees
    - Generating functions and recurrence relations
    - Binomial identities
    - Permutations
- Analyze novel definitions and concepts about graphs and combinatorial objects, for instance by:
    - Creating examples and counterexamples.
    - Relating them to familiar definitions and concepts.
    - Formulating and verifying hypotheses about them.
- Write solutions to problems and proofs of theorems that are coherent, organized and well-supported.

Course Websites

There are two websites that you'll be using this semester:

1. The course website will be your source for all of the course materials throughout the semester (a link will be emailed to the class, and posted on Portal).
2. The MAT344 Portal page will *only* be used for **making announcements** via email and for **recording your marks** in the Grade Centre.

Last Date to drop course from Academic Record and GPA is November 7, 2017.