

UNIVERSITY OF WATERLOO
DEPARTMENT OF COMBINATORICS AND OPTIMIZATION

Course Outline	MATH239 – Introduction to Combinatorics	Winter 2020
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Instructors

<i>Section</i>	<i>Name</i>	<i>Office</i>	<i>email</i>
1	Peter Nelson	MC 5128	apnelson@uwaterloo.ca
2	Marcel Golz	MC 5463	marcel.golz@uwaterloo.ca
3	Jason Bell	MC 5008	jpbell@uwaterloo.ca

Course Content

MATH 239 is an introductory course in combinatorics, the mathematics of discrete objects. The content of the course is split evenly between two areas:

- *Algebraic Enumeration:* Bijections, Formal Power Series, Sums and Products, Strings and Compositions, Recurrence Relations.
- *Graph Theory:* Isomorphism, Trees, Bipartite Graphs, Connectedness, Planarity, Matchings, Colouring.

The book of course notes is available at a low price from W Store in South Campus Hall.

Lectures

<i>Section</i>	<i>Room</i>	<i>Time</i>
1	RCH 302	12:30–1:20 MWF
2	MC 4061	2:30–3:20 MWF
3	MC 4020	9:30–10:20 MWF

Tutorials

<i>Section</i>	<i>Room</i>	<i>Time</i>
1	MC 4059	4:30–5:20 M
2	QNC 1502	3:30–4:20 Tu
3	RCH 103	1:30–2:20 Th

Assessment

Final grades will be calculated according to:

- Ten assignments (20 %)
- Mid-term exam – Thursday March 5 (20%)
- Final exam – Date TBA (60%)

Schedule

Section numbers refer to the book of course notes. Schedule for topics is approximate only.

Week	Dates	Material Covered	Assessment
1	6–10 Jan	Binomial Coefficients, Bijections (1.1–1.3)	
2	13–17 Jan	Formal Power Series (1.4–1.6)	Assignment 1 Due
3	20–24 Jan	Compositions (2.1, 2.2)	Assignment 2 Due
4	27–31 Jan	Strings (2.3–2.5)	Assignment 3 Due
5	3–7 Feb	String Decompositions (2.6–2.8)	Assignment 4 Due
6	10–14 Feb	Recurrence Relations (3.1–3.2)	Assignment 5 Due
	17–21 Feb		Reading Week
7	24–28 Feb	Graphs - basic notions (4.1–4.5)	Assignment 6 Due
8	2–6 Mar	Cycles and Connectivity (4.7–4.9)	Midterm exam: March 5
9	9–13 Mar	Trees (5.x)	Assignment 7 Due
10	16–20 Mar	Planarity (7.x)	Assignment 8 Due
11	23–27 Mar	Planarity, Matchings (7.x,8.x)	Assignment 9 Due
12	30 Mar – 3 Apr	Matchings (8.x)	Assignment 10 Due

All assignments must be submitted using crowdmark and are due 11:59PM Friday. Late assignments will not be accepted.

Tutorial Centre Hours

Graduate TA's will be available at scheduled hours in the Mathematics Tutorial Centre starting Monday 13 January. Scheduling information will be available at: <https://uwaterloo.ca/math/current-undergraduates/mathematics-tutorial-centre>

Notes

- Regular attendance at lectures and tutorials is highly correlated with success in the course.
- The main role of assignments is not assessment, but as a learning tool to ensure that students are staying on top of the material. All students are encouraged to make substantial effort to complete them. Weekly tutorials and tutorial centre hours should be very helpful for this.
- The midterm date (March 5) is late, and is after the drop with 50% refund deadline.

Academic Integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check www.uwaterloo.ca/academicintegrity/ for more information.]

Grievance

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline

A student is expected to know what constitutes academic integrity to avoid committing academic offenses and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the undergraduate associate dean. For information on categories of offenses and types of penalties, students should refer to Policy 71, Student Discipline at <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>. For typical penalties, check Guidelines for the Assessment of Penalties at <http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm>.

Appeals

A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>.

Note for students with disabilities

AccessAbility Services, located in Room 1401 of Needles Hall North, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility at the beginning of each academic term.