CO 330: Introduction to Enumeration

Fall 2020 Course Outline

Lectures. Lectures will be uploaded to the course's LEARN website on Mondays, Wednesdays, and Fridays, usually around 3:30 pm in the Waterloo time zone.

Office hours and Piazza There will be two office hours per week, one with the instructor, one with the teaching assistants. Details will be posted when they are determined. The course also has a Piazza website for questions and comments, and the instructor and TAs will check it frequently.

Topics. This is a rough guide to the topics we will cover. There may be more, depending on how it goes.
- Bijective proofs, permutations and subsets.
- Binomial identities and lattice paths, the q-Binomial Theorem.
- Recursive structure: binary rooted trees, plane planted trees, Catalan numbers.
- The algebras of polynomials, formal power series, and formal Laurent series.
- The Lagrange Implicit Function Theorem.
- Integer partitions: Euler's Pentagonal Number Theorem, Jacobi's Triple Product Formula.
- Introduction to exponential generating functions.

Resources. Go to the University of Waterloo's LEARN website learn.uwaterloo.ca to find news, assignments, solutions and information about this course. The textbook is *CO 330: Introduction to Enumeration*, which is available on the course website.

Grades. Because all activities are online this semester, examinations are logistically impossible. The course will be structured as follows:
- Six Homework assignments, 2 weeks each: 40%
- First midterm assignment, 24 hours: 10%
- Second midterm assignment, 48 hours: 25%
- Final assignment, 2 days: 48 hours: 25%

Precise dates for the assignments will be determined during the first two weeks of the semester. Homework assignments will be due usually every second Wednesday at 5:00pm (Waterloo time). Assignment 1 is due on Friday, September 23. They will be distributed on LEARN and graded via Crowdmark, and solutions will be posted on LEARN. You may (and should) ask your instructors or TAs for hints and help during their office hours or on Piazza.

The midterm and final assignments are in place of exams, but are meant to be less acary than take-home exams. The first one is to get you prepared for the other two.