MATH 7431: Geometry and Combinatorics
Winter 2020

Instructor: Gabriel Frieden

Email: gabriel.frieden@lacim.ca

Office hours: Tuesday and Thursday 2:30-3:30pm in PK 4130

Topics covered

1. Partially ordered sets, lattices, Möbius functions
2. Hyperplane arrangements, Zaslavsky's Theorem, chromatic polynomials, geometric lattices, matroids
3. Simplicial complexes, order complex of a poset, Dehn–Somerville equations
4. A more advanced topic, depending on time and student interest

References
There is no required textbook for the course. My main references are "Enumerative Combinatorics, Volume 1" and "An Introduction to Hyperplane Arrangements," both by R. Stanley. The first is available at the UQAM library (and in the LaCIM library), and the second is freely available online. Another reference for the material on posets is "Ensembles ordonnés finis: concepts, résultats et usages" by N. Caspard, B. Leclerc, and B. Monjardet.

Assignments
There will be 3 or 4 problem sets throughout the semester. Also, at the end of the semester each student will choose a topic related to the course material, write a 5-10 page paper on it, and give a 30 minute presentation in class.