

Course Syllabus

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Welcome to Math 443, Graph Theory for honours students!

Overview

From the [calendar: \(https://courses.students.ubc.ca/cs/courseschedule?pname=subjarea&tname=subj-course&dept=MATH&course=443\)](https://courses.students.ubc.ca/cs/courseschedule?pname=subjarea&tname=subj-course&dept=MATH&course=443)

Introductory course in mostly non-algorithmic topics including: planarity and Kuratowski's theorem, graph colouring, graph minors, random graphs, cycles in graphs, Ramsey theory, extremal graph theory. Proofs emphasized. Intended for Honours students.

Pre-reqs: A score of 68% or higher in one of [MATH 220 \(https://courses.students.ubc.ca/cs/courseschedule?pname=subjarea&tname=subj-course&dept=MATH&course=220\)](https://courses.students.ubc.ca/cs/courseschedule?pname=subjarea&tname=subj-course&dept=MATH&course=220), [MATH 226 \(https://courses.students.ubc.ca/cs/courseschedule?pname=subjarea&tname=subj-course&dept=MATH&course=226\)](https://courses.students.ubc.ca/cs/courseschedule?pname=subjarea&tname=subj-course&dept=MATH&course=226), [CPSC 121 \(https://courses.students.ubc.ca/cs/courseschedule?pname=subjarea&tname=subj-course&dept=CPSC&course=121\)](https://courses.students.ubc.ca/cs/courseschedule?pname=subjarea&tname=subj-course&dept=CPSC&course=121). (And at least 6 credits of Mathematics courses numbered 300 or above.)

Instructor

Instructor: Dr. Elyse Yeager. You can contact me by email at elyse@math.ubc.ca (<mailto:elyse@math.ubc.ca>). I usually stick around after class to answer questions; otherwise, office hours are by appointment.

Textbook

We will be mostly following *A First Course in Graph Theory* by Chartrand and Zhang. You may find it useful as a reference, but purchasing it is not required. I saw it on Amazon.ca for about thirty dollars. Content warning for this book: it contains short biographies about relevant mathematicians, who had complicated and sometimes tragic lives. There is at least one mention of suicide, and several mentions of work camps.

Assessment

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entire explanation, not just the final answer, so make sure you justify and show your work.

The lowest homework will be dropped. This is not intended as a grade giveaway, but rather as a paperwork-reduction tool for excused homework. Ordinary causes for excused homework (illness, late registration, computer issues, etc.) will be covered by this excused assignment, without the need to notify anyone.

Groupwork: for the first few assignments, you'll be assigned a group to work with. After that, you may choose a group of your own, or work alone. This way, everyone will know at least a few other students in the class, but nobody is stuck in a poorly functioning group. Details will be given with the assignments.

20% midterm

In-class, date TBD

30% Final Project

In lieu of a final exam, you'll present a research paper from a published journal. This assignment is scaffolded into a number of smaller assignments to help guide you through the process. This is an opportunity for you to practice reading technical papers, and giving technical talks to an audience of your peers.

Something that I love about graph theory is how accessible a lot of research problems are. Lots of results are coming out that are accessible to undergraduates with just a term or two of classes. This is not the case in all fields of mathematics.

Policies

Weekly homework will be accepted up to two days late with a penalty of 5 percentage points per day. The penalty is meant to encourage you to turn in your homework on time, so it will not be removed from late submissions, even if they are only late by a little bit. It is recommended that you turn in your homework well in advance of the midnight cut-off.

Weekly homework will not be accepted more than 2 days late. One reason for this policy is that it allows us to post solutions. Another reason is labour: it's more efficient to mark all at once, rather than a paper here and paper there. We do not have grading resources to mark papers one-by-one as they are turned in.

Course Structure

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objects. That is, we focus on their theory, not their application.

In this course, we'll cover foundational topics in graph theory. Our treatment will be proof-heavy. Depending on time, we may cover basic definitions, trees, connectivity, planarity, colouring, discharging, and extremal graph theory (including Ramsey numbers).

In this class, you should be exposed to basic concepts and results in graph theory, building a sufficient background to understand some areas of recent or current research. You should practice reading and writing proofs, in preparation for research activities you may engage in later in graduate school.

Classes will primarily be lecture-based. There will be homework to practice and extend your in-class learning. Homework will be turned in on Canvas. At the end of the course, you will read and present a research paper. This will help you get used to reading scholarly work, and presenting in a conference-like setting.

UBC's Value and Policy Statement

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious, spiritual and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available [here](http://senate.ubc.ca/policies-resources-support-student-success). (<http://senate.ubc.ca/policies-resources-support-student-success>)

Course Summary:

Date	Details	Due
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