

## Course Information for MATH 4808 Graph Theory and Algorithms, Winter 2020

---

Instructor: : [Jason Z. Gao](mailto:zgao@math.carleton.ca), 4366HP, ext. 2138, email: [zgao@math.carleton.ca](mailto:zgao@math.carleton.ca)

Lectures: Monday and Wednesday 4:05-5:25, in 411 SA.

**Office hours:** Monday and Wednesday 2:00-3:30pm, or by appointment.

---

**Prerequisites:** [MATH 3825/3855](#) or permission of the School.

---

There is no textbook for the course. The lecture notes will be posted on cuLearn. The following are some good references.

- Robin J. Wilson, *Introduction to Graph Theory*, Longman, 4th Ed., 1999. ISBN 0-582-24993-7, QA166.W55
  - D.B. West, *Introduction to Graph Theory*, Prentice-Hall, 1996 ISBN 0-13-227828-6, QA166.W43
  - J.A. Bondy and U.S.R. Murty, *Graph Theory*, Graduate Texts in Mathematics 244, Springer (2008) (ISBN 978-1-84628-969-9).
  - Reinhard Diestel, *Graph Theory*, Graduate Texts in Mathematics, Volume 173, Springer-Verlag, Heidelberg, ISBN 978-3-642-14278-9
- 

### Grading :

- Final Exam 50% (a 3-hour closed book examination).
  - Assignments (2) 30%.
  - Midterm test 20%, **Mar. 02**
  - **Retain your marked assignments and test until the end of the term.** Your term marks will be posted, any error in your recorded mark should be called to my attention **before April. 10.**
  - **Plagiarism is a serious academic offence and may lead to a failure grade.**
- 

### Academic Accommodation

You may need special arrangements to meet your academic obligations during the term such as **pregnancy obligation** and **religious obligation**.

Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist.

**Students with disabilities requiring academic accommodations** in this course must register with the Paul Menton Centre for Students with Disabilities (PMC)

for a formal evaluation of disability-related needs. Documented disabilities could include but are not limited to mobility/physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the PMC, 613-520-6608, to ensure that I receive your Letter of Accommodation, no later than two weeks before the test requiring accommodations.

- **A tentative schedule**

<b>Topic</b>	<b>Approx. # of weeks</b>
Examples of graphs, adjacency matrix and incidence matrix, planar graphs, shortest path, travelling salesman problem, Ramsey numbers, network flow, perfect rectangles, graph isomorphism, walks, paths, cycles, connectivity, spanning trees, minimum-cost spanning trees.	2
Shortest paths, eulerian graphs and hamiltonian graphs, graph coloring and the greedy coloring algorithm, chromatic number and chromatic polynomial, the deletion-contraction recursion.	2
Planar graphs, Euler's formula, Kuratowski's theorem, 5-coloring theorem, Platonic solids, the dual of a plane graph, edge coloring, matching.	2
<b>Midterm Test (Monday, Mar. 02)</b>	0.5
The matrix-tree theorem, directed graphs, directed eulerian graphs and hamiltonian graphs, tournaments, electrical networks and perfect rectangles.	2
Network flows, Max-Flow Min-Cut Theorem, augmenting path algorithm, matchings and covers, Hall's marriage theorem, König's theorem, Menger's theorem.	2
Ramsey's theorem, Integer Flows, The Tutte Polynomial, review	2
<b>Total</b>	12.5