

Topics in Operations Research

MATH 5804W (MAT 5307I), Winter 2021

[School of Mathematics and Statistics, Carleton University](#)

Instructor: Dr. Kevin Cheung

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Prerequisites: Undergraduate linear algebra, multivariate calculus, and computer programming. Knowledge of linear programming highly recommended but not required.

System requirements: Students must have their own computers on which [Visual Studio Code](#) and [Julia programming language](#) can be installed. Students must also have reliable internet access and are fully responsible for resolving their own computer/connection issues and learning how to create proper files for assignment submissions. Students experiencing **technical issues** with cuLearn should contact the [ITS service desk](#).

Textbook: There is no official textbook for the course. Lecture slides will be posted in cuLearn. A list of references is available in [cuLearn](#).

Lectures: Tue Thu 13:05 — 14:25 on [BigBlueButton](#) in cuLearn unless otherwise announced.

Instructor's Office Hours: Times to be announced.

Evaluation scheme:

Assignments (maximum 70 marks):

- top seven (out of ten) assignment scores, maximum 10 marks each
- due dates: **Jan 20, 27, Feb 3, 10, 24, Mar 3, 10, 17, 24, 31**

Project (maximum 30 marks):

- presentation (maximum 15 marks) - on **Mar 30 (if needed), Apr 1, 6, 8, 13**
- write-up (maximum 15 marks) - due last day of the final exam period

Policies for assignments

- Solutions to each assignment **must be submitted in cuLearn by the posted deadline** following all submission requirements. Failure to follow these requirements and the instructions given in each assignment will result in a deduction or even a complete rejection of the submission. Note that **up to two late assignments no more than 24 hours late each are accepted**.
- Students who miss submitting an assignment due to illness or other conditions recognized by the University need to provide appropriate supporting documentation for the missed work within three days of return to study for make-up work arrangements.
- Students may request to have any evaluated term work regraded if it has been incorrectly graded. Such a request must be submitted to the instructor in writing no later than two business days after the work is first returned. All regrades are final.

Communication: Announcements on course-related issues are made in cuLearn. It is the students' responsibility to check for messages on cuLearn and their Carleton email account every business day. **Questions about the course material should be posted in the**

discussion forum in cuLearn. Email communication is reserved for academic concerns containing personal information. **All email to the instructor must be made from students' Carleton email accounts.** The instructor will make every effort to respond to questions posted in the forum and email within one business day.

Students must conform to the University's Academic Integrity Policy. Failure to be informed of the expectations regarding academic integrity is not a valid excuse for violations of the policy.

Pregnancy/Religious Accommodation: Write to the instructor 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. For more details, visit the [Equity services website](#).

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, every term to ensure that I receive your Letter of Accommodation, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations. If you only require accommodations for your formally scheduled exam(s) in this course, please submit your request for accommodations to PMC by the deadlines published on the [PMC website](#).

Schedule

Week	Dates	Topic
1	Jan 12, 14	matrix computations, introduction to Julia
2	Jan 19, 21	linear and mixed-integer linear programming
3	Jan 26, 28	travelling salesman problem, OptArt
4	Feb 2, 4	convex and semidefinite programming, low-rank matrix completion
5	Feb 9, 11	conic mixed-integer and continuous optimization, global optimization
6	Feb 23, 25	machine learning basics
7	Mar 2, 4	stable and sparse linear regression
8	Mar 9, 11	optimal decision tree, interpretable clustering
9	Mar 16, 18	predictive to prescriptive analytics
10	Mar 23, 25	optimal design of experiment
11	Mar 30	no class OR project presentations (if needed)
12 - 13	Apr 1, 6, 8, 13	project presentations