

DATA5000: Introduction to Data Science

Winter 2023

School of Computer Science

Carleton University

Description

The course covers topics relevant to data science: working with data, exploratory data analysis, data mining, machine learning. The concepts are illustrated using the R language. Students also receive hands-on tutorials to IBM Cognos Analytics, Tableau, etc. Students will be evaluated by their course projects. The course will be lecture-based and will also offer some hands-on tutorials. The project component will be flexible and will involve data collection, manipulation, and analysis.

The project forms an integral part of this course. The project is to be completed in group of two-three students. Each group would have one technical expert (a student from Computer Science, Systems and Computer Engineering, Information Technology, Physics, Chemistry), and one or two domain expert(s) (e.g., from Communication, Geography, Biology, History, Psychology, Economics, Business, Health Sciences, Cognitive Science, Public Policy and Administration, International Affairs). Domain experts may contribute to finding the right problem, justifying why it is important to study it, extracting the value and implications of the work. Technical experts do the heavy lifting of building models. The main goal for students is to learn how to work on a multidisciplinary team, i.e., for domain experts, it is about learning technical terminology, while for technical experts, how to fruitfully work with domain experts.

Class Schedule

Lectures are held every Thursday from 11:35 AM to 2:25 PM via Zoom.
Reading week: February 20–24, 2023 (no classes).

Course Website

http://olgabaysal.com/teaching/winter23/data5000_w23.html

Instructors

Olga Baysal

Email: olga.baysal@carleton.ca

Office: HP 5431

Office Hours: by appointment via Zoom or Discord

Website: <http://olgabaysal.com/>

Majid Komeli

Email: majid.komeli@carleton.ca

Office: HP 5436

Office Hours: by appointment via Zoom or Discord

Website: <https://people.scs.carleton.ca/~majidkomeili/>

Ahmed El-Roby

Email: ahmed.elroby@carleton.ca

Office: HP 5433

Office hours: by appointment via Zoom or Discord
Website: <https://people.scs.carleton.ca/~ahmedelroby/>

Teaching Assistant

TBA

Email: TBA

Office Hours: TBA via Zoom or Discord

Course Schedule

- Thursday January 12, 2023 - Lecture 1: What is Data Science?/ Introduction to R.
- Thursday January 19, 2023 - Lecture 2: Working with Data.
- Thursday January 26, 2023 - Lecture 3: Visualization and Exploration.
- Thursday February 2, 2023 - Lecture 4: Data Mining and Machine Learning I.
- Thursday February 9, 2023 - Lecture 5: Machine Learning II.
- Thursday February 16, 2023 - Guest Lecture/Tutorial.
- Thursday February 23, 2023 - NO Class (Winter Break)
- Thursday March 02, 2023 - Tableau Tutorial.
- Thursday March 9, 2023 - IBM Cognos Analytics Tutorial.
- Thursday March 16, 2023 - Microsoft Tutorial.
- Thursday March 23, 2023 - Guest Lectures.
- Thursday March 30, 2023 - NO Class (in lieu of Data Day on March 28).
- Thursday April 06, 2023 - Project Presentations.

Evaluation

- Paper presentation: 10% (paper selection due January 19)
- Project proposal: 10% (due January 26, 11:59 PM)
- Poster draft: 5% (due March 16, 11:59 PM)
- Poster submission: N/A (due March 23, 11:59 PM)
- Poster presentation: 10% (March 28)
- Project presentation: 15% (April 6)
- Project report: 50% (due April 13, 11:59 PM)

University Policies

For information about Carleton's academic year, including registration and withdrawal dates, see [Carleton's Academic Calendar](#).

Academic Accommodations for Students with Disabilities

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the [PMC website](#) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

Pregnancy obligation

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.

Religious Obligation

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.

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support.

Student Academic Integrity Policy

Academic Integrity is everyone's business because academic dishonesty affects the quality of every Carleton degree. Each year students are caught in violation of academic integrity and found guilty of plagiarism and cheating. In many instances they could have avoided failing an assignment or a course simply by learning the proper rules of citation. See the [Academic Integrity](#) for more information.

Plagiarism

As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science. Standard penalty guidelines can be found here: <https://science.carleton.ca/academic-integrity/>.

Unauthorized Co-operation or Collaboration

Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.

Special Information

It is important to remember that COVID is still present in Ottawa. The situation can change at any time and the risks of new variants and outbreaks are very real. There are a number of actions you can take to lower your risk and the risk you pose to those around you including being vaccinated, wearing a mask, staying home when you're sick, washing your hands and maintaining proper respiratory and cough etiquette.

Feeling sick? Remaining vigilant and not attending work or school when sick or with symptoms is critically important. If you feel ill or exhibit COVID-19 symptoms do not come to class or campus. If you feel ill or exhibit symptoms while on campus or in class, please leave campus immediately. In all situations, you must follow Carleton's symptom reporting protocols.

Masks: Carleton has paused the COVID-19 Mask policy, but continues to strongly recommend masking when indoors, particularly if physical distancing cannot be maintained. It may become necessary to quickly reinstate the mask requirement if pandemic circumstances were to change.

Vaccines: While proof of vaccination is no longer required as of May 1 to attend campus or in-person activity, it may become necessary for the University to bring back proof of vaccination requirements on short notice if the situation and public health advice changes. Students are strongly encouraged to get a full course of vaccination, including booster doses as soon as they are eligible, and submit their booster dose information in cuScreen as soon as possible. Please note that Carleton cannot guarantee that it will be able to offer virtual or hybrid learning options for those who are unable to attend the campus.

All members of the Carleton community are required to follow requirements and guidelines regarding health and safety which may change from time to time. For the most recent information about Carleton's COVID-19 website and review the Frequently Asked Questions (FAQs). Should you have additional questions after reviewing, please contact covidinfo@carleton.ca.

Doctors note or medical certificate: in effect for Winter 2023 term. In place of a doctors note or medical certificate, students are advised to complete the [self-declaration form](#) available on the Registrars Office website to request academic accommodation for missed course work including exams and assignments. Students should also discuss with the course instructor the required accommodations arising from the COVID-19 situation.