

# DATA 5001 - FUNDAMENTALS IN DATA SCIENCE AND ANALYTICS

Winter 2025

We, the people of the Faculty of Science at Carleton University, acknowledge that our campus is located on the traditional, unceded territories of the Algonquin Anishinabeg people. Miigwetch for your hospitality and stewardship of this territory and the teachings that come from it. We are grateful for this land, the air that we breathe, and the water that sustains us all as well as for the animals, plants and other living beings: these enable us to research, teach, mentor, support, study, and learn. We recognize our responsibility to our natural environment and to reconciliation with Indigenous peoples.

<b>Course Instructor:</b> Professor Dave Campbell <b>Email:</b> Davecampbell@cunet.carleton.ca <b>Student Hours:</b> Weds. 11:30-12:30 Herzberg 5279 <b>How to address me:</b> Professor Campbell <b>Gender Pronouns:</b> (he/him/his)	<b>Office Location:</b> 5279 Herzberg Labs <b>Class Location:</b> 505 Southam Hall <b>Class Time:</b> TR 10:05-11:25am  Precludes additional credit for STAT 5703
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## Topics Covered

Ethics in Data Science and Analytics, visualization and knowledge discovery in massive datasets; unsupervised learning: clustering algorithms; dimension reduction; supervised learning: pattern recognition, smoothing techniques, classification.

Important dates and deadlines can be found here: <https://carleton.ca/registrar/registration/dates/academic-dates/>, including class suspension for winter breaks and statutory holidays.

## Assessments

### Tentative Grade Breakdown

COMPONENT	VALUE
Paper readings (5-7)	5%
Tests (quizzes and midterm)	25%
Assignments (4-6)	30%
Project	40%

Midterms and quizzes are closed book.

## Late and Missed Work Policies

### Late Work

Late assignments will be graded but the score will be multiplied by a random draw from a continuous Uniform(0,1) distribution for each 24 hour period or portion thereof beyond the deadline.

**Missed Work** Short-term ( 5 days or less): See the **Academic Consideration Policy** <https://carleton.ca/registrar/academic-consideration-coursework/>. Submit a request through the **Academic Consideration for Coursework Form** as soon as possible and no later than 24 hours after the deadline. Approving and determining the accommodation remains at the discretion of the instructor. Note that a maximum of two academic considerations per student will be considered per term.

Long-term (> 5 days): See the **Academic Consideration Policy** <https://carleton.ca/registrar/academic-consideration-coursework/>. Contact your instructor as soon as possible to discuss academic considerations. Approving and determining the accommodation remains at the discretion of the instructor.

## Learning Materials and other Course/Lab Resources

**Students are not required to purchase textbooks or other learning materials for this course. Materials are available for free online.**

Materials	Approximate Costs
Introduction to Statistical Learning (2nd) G. James, D. Witten, T. Hastie, R. Tibshirani	<a href="https://www.statlearning.com">https://www.statlearning.com</a>
Recommended: R for Data Science	<a href="https://r4ds.hadley.nz">https://r4ds.hadley.nz</a>
Recommended: Python Data Science Handbook	<a href="https://github.com/jakevdp/PythonDataScienceHandbook">https://github.com/jakevdp/PythonDataScienceHandbook</a>

**Additional readings will be assigned.**

## Academic Accommodations and Regulations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes are outlined on the Academic Accommodations website (<https://students.carleton.ca/course-outline/>).

**Statement on Chat GPT/Generative AI usage**

Generative AI is an assistive technology, however it does not remove the need for ensuring that you can support and explain your submissions. You remain solely responsible for all content that you submit and may be asked to explain your work after submission. Inability to adequately explain and support your submission may result in a penalty applied to the grading of your work.

### **Statement on Academic Integrity**

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy (see here). A list of standard sanctions in the Faculty of Science can be found here. Additional details about this process can be found on the Faculty of Science Academic Integrity website. Students are expected to familiarize themselves with and abide by Carleton University's Academic Integrity Policy.

### **Student Rights and Responsibilities**

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and Responsibilities Policy for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.