Enst::Geog2006a w26

Introduction to Quantitative Research

Geography and Environmental Studies

In-person lectures two hours a week, laboratory two hours a week.
Check your schedule in Carleton Central for the time and location of lectures and labs
Log on to Brightspace to access course page (http://brightspace.carleton.ca/d2l/home/37820)

instructor: Sheryl-Ann Simpson
email: sheryl-ann.simpson@carleton.ca
see Brightspce for office hours location and time + TA contact information

preclusions: BIT 2000, BIT 2009, BIT 2100 (no longer offered), BIT 2300 (no longer offered), DATA 1517, ECON 2210, NEUR 2002, PSCI 2702, STAT 2507, STAT 2601, STAT 2606.

See Brightspace for links to Carleton resources and information about:
Academic Integrity, Student Mental Health, Requests for Academic Accommodations

Course Description

We create massive amounts of numerical data, everything from measurements of historic temperature patterns, to political opinion polling, sports stats, and counts of employment and unemployment.

Quantitative measurements are increasingly being used to make environmental decisions and to set social policy. In our everyday lives quantified information plays a role in our social media popularity, in the way we plan our exercise, in terms of economic opportunities, and the ways in which we interact with the rest of the environment.

In this course we will review different ways to capture and create quantified data, think about how we make sense of this data including organizing, analyzing, interpreting and visualizing data. We will also consider the ethics and protocols around quantitative research, thinking about both the harm and benefit that we can do or provide with these methods.

Learning Outcomes

Participation in this course provides opportunities to:

1. review and demonstrate fundamental numeracy skills;
2. practice and apply descriptive statistical methods;
3. practice methods for hypothesis and correlation testing;
4. recognize and practice skills related to the specific characteristics of spatial data;
5. describe ethical questions related to quantitative data, its analysis, capture and management.

Active Learning, Care and Accessibility

We've all had different experiences when it comes to numbers and math from these being our favourite subjects to our worst nightmare. So to get the most out of this course, and meet the learning objectives, you will need to be active in your learning based on your own experiences and learning objectives.

This includes setting personal goals for the course, making time in your schedule to regularly practice and engage with the course material, asking questions and seeking help when you are unsure of something, or even when you just want to hear more about a topic. Active learning in this course also means a willingness to participate, engage, take risks, try new things and be surprised.

Active learning also mean using all of the resources available at the university to take care of yourself, because school is really important, but taking care of ourselves is even more important!

These resources include: the Centre for Student Academic Support (CSAS) [carleton.ca/csas/], and the Paul Menton Centre (PMC) for Students with disabilities [https://carleton.ca/pmc/]

Health and Counseling Services [carleton.ca/health] provide a variety of services, and you should consult them if you find yourself in need of specific physical or mental health support, and for preventative care, health and wellness promotion.

Awards and Financial Aid [carleton.ca/awards/other-assistance-2] provides support for unexpected expenses or economics hardship, alongside information about scholarships, bursaries, and work study.

Also remember your stories, including medical diagnosis, financial and family circumstances, are your own to share or not. But letting the teaching team know, in general terms, about circumstances that might impact your learning as soon as possible means we can work with you around accommodations, adjustments and alternatives to help meet the requirements of the course.

The teaching team also believes the course will be made stronger through the participation of students with a wide range of abilities, disabilities, identities, skills and experiences. As such, we've worked to make this course as accessible as possible for all students. So please do not hesitate to approach us if you require particular accommodations or support including, or in addition to/distinct from those listed on Brightspace.
We can't guarantee that we can do everything, but we can work with you to see what's possible.

Texts and Tools

There is no required textbook for the course.
Required readings will be posted on Brightspace, and there are no additional fees to access any required course material.

Some useful references that we will discuss at different points in the term:

Andersen, Chris, Maggie **Walter**, Tahu Kukutai and Chelsea Gabel. 2025. Indigenous Statistics: From Data Deficits to Data Sovereigny. London: Routledge.

Christopher, Andrew N. 2017. Interpreting and Using Statistic in Psychological Research. London: Sage.

Jones, Rhys. 2020. Essential Maths Skills for Exploring Social Data: A Student's Workbook. London: Sage. [additional online resources: https://tinyurl.com/24wjbs7f]

O'Sullivan, David and David **Unwin**. 2010. Geographic Information Analysis, 2nd Edition. Hoboken, NJ: Wiley.

You will primarily need spreadsheet software (Excel, for example) to complete assignments.
You will need R to complete assignments in the final units, and we will use GIS in some course examples.

Course Calendar and Evaluation

The course has 7 units, in addition to the outline here, we will review detailed schedules on the first day of class.

Each week we will have two **lectures** to review the main topics and ideas of the course, practice with examples, and give you opportunities to ask questions.

Each week you should attend your assigned **lab** session. These will be another opportunity to ask questions, reviews the tools needed to complete assignments, and start course assignments with support from the teaching team.

To complete each unit you will individually submit **lesson quizzes**, **lab reports**, and an **assignment** that you have complted on your own, and that apply the ideas we are learning together. The ideas in the course build on each other, so unit assignments include the application of ideas from previous units as well.

Unit 7 will be the **take-home exam** for the course, and provides an opportunity to apply learning across the term.

Final grades will be based on your scores from quizzes, labs and assignments for units 1-7.
The last day that work will be accepted is April 23.
To access Unit 6 you must submit the Unit 2 assignment by February 23, 11:59p.
To access Unit 7 you must submit the Unit 3 assignment by March 6, 11:59p.

Unit 1: Introductions and Self-Evaluation (20 points)
January 5
suggested submission date Unit 1 Assignment: January 6

Unit 2: Foundations (20 points)
January 7 - January 19
suggested submission date Unit 2 Assignment: January 23
final submission date to access Unit 6: February 23

- Addition, subtraction, multiplication and division
- Equations and inequalities
- Tables and ordering
- Quantitative research where and why

Unit 3: Getting Started (20 points)
January 21 - February 2
suggested submission date Unit 3 Assignment: February 6
final submission date to access Unit 7: March 6

- Rounding
- Percentages
- Ratios and proportions
- Variables and variable types

Unit 4: Getting to Know Your Data (10 points)
February 4 - February 25
suggested submission date Unit 4 Assignment: February 27

- Central tendencies
- Frequency and distribution
- Spatial central tendencies
- Histograms and thematic maps

Unit 5: Looking for Patterns (10 points)
March 2 - March 16
suggested submission date Unit 5 Assignment: March 20

- Normal distributions
- Point pattern analysis
- Box-plots and cartograms
- Scatterplots and bar graphs
- Sampling

Unit 6: Looking for Relationships (10 points)
March 18 - April 6
suggested submission date Unit 6 Assignment: April 8

- Hypothesis testing - central tendency
- Bivariate correlation
- Multivariate correlation
- Categoization
- Data protocols

Unit 7: Applying Your Learning (10 points)
last date to submit Unit 7 Assignment: April 23

Additional submission details will be discussed first day of class.

Remember that: "Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean."

[source: FASS-FPGA Minimal Course Outline Template]

Remember that: "Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean."

University Academic Accommodations

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy Obligation: write to the professor 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 see https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Religious Obligation: write to the professor 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 https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

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 your Letter of Accommodation at the beginning of the term. After requesting accommodation from PMC, meet with the professor to ensure accommodation arrangements are made.

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 where 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: https://carleton.ca/equity/sexual-assault-support-services

Accommodation for Student Activities: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. 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. https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

University Definitions of Plagiarism:

The University Academic Integrity Policy defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This includes reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source. Examples of sources from which the ideas, expressions of ideas or works of others may be drawn from include but are not limited to: books, articles, papers, literary compositions and phrases, performance compositions, chemical compounds, artworks, laboratory reports, research results, calculations and the results of calculations, diagrams, constructions, computer reports, computer code/software, material on the internet and/or conversations.

Examples of plagiarism include, but are not limited to:

+ any submission prepared in whole or in part, by someone else;
+ using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgment in any academic assignment;
+ using another's data or research findings without appropriate acknowledgement;
+ submitting a computer program developed in whole or in part by someone else, with or without modifications, as one's own; and
+ failing to acknowledge sources through the use of proper citations when using another's work and/or failing to use quotations marks.

(all of the text on this page is quoted or derived from: 2021 Teaching Regulations and Procedures for FASS and FPA https://carleton.ca/teaching-regulations/)