Enst::Geog2006a w23

Introduction to Quantitative Research

Geography and Environmental Studies

lecture: Monday + Wednesday 4:35-5:25 Southam Hall 416
lab: Thursdays + Fridays various, check your schedule in Carleton Central

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ta: TBA

preclusion: BIT 2000; BIT 2009; BIT 2100; BIT 2300; NEUR 2002; PSCI 2702; STAT 2507; STAT 2606

See Brightspace for links to Carleton resources and information about:
Plagiarism, Student Mental Health, Pandemic Measures, Academic Accommodation
[source: Teaching Regulations and Procedures for FASS and FPA https://carleton.ca/FASS-FPA-teaching-regulations/course-outlines/]

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 COVID-19 and the flu.

Quantitative measurements are increasingly being used to make resource management 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. Finally we will 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 making time in your schedule to regularly practice and engage with the course material, and 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–especially given the past few years–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 learning 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:

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.

Walter, Maggie and Chris **Andersen**. 2013. Indigenous Statistics: A Quantitative Research Methodology. London: Routledge.

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 students opportunities to ask questions.

Each week students should attend their 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 lesson you will individually submit a short homework **quiz** to demonstrate your understanding of course ideas.

To complete each unit you will individually submit an **assignment** that applies 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 and assignments for units 1-7.
The last day that work will be accepted is April 28.

Unit 1: Introductions and Self-Evaluation (20 points)
January 9
suggested submission date Unit 1 Assignment: January 10

Unit 2: Foundations (20 points)
January 11 - January 23
suggested submission date Unit 2 Assignment: January 27
- Addition, subtraction, multiplication and division
- Equations and inequalities
- Tables and ordering
- Quantitative research where and why

Unit 3: Getting Started (20 points)
January 25 - February 8
suggested submission date Unit 3 Assignment: February 10
- Rounding
- Percentages
- Ratios and proportions
- Variables and variable types

Unit 4: Getting to Know Your Data (10 points)
February 13 - March 8
suggested submission date Unit 4 Assignment: March 10
- Descriptive statistics - central tendencies
- Descriptive statistics - spread
- Descriptive statistics - spatial central tendencies
- Building an index
- Histograms and thematic maps

Unit 5: Looking for Patterns (10 points)
March 13 - March 27
suggested submission date Unit 5 Assignment: March 31
- Normal distributions
- Point pattern analysis
- Box-plots and cartograms
- Scatterplots and bar graphs Sampling

Unit 6: Looking for Relationships (10 points)
March 29 - April 10
suggested submission date Unit 6 Assignment: April 14
- Hypothesis testing - central tendency
- Bi-varient correlation
- Multivariate correlation
- Data protocols

Unit 7: Applying Your Learning (10 points)
last date to submit Unit 7 Assignment: April 27

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."

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