Enst::Geog2006a w22

Introduction to Quantitative Research

Geography and Environmental Studies

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workshops: Mondays and Wednesdays 1:35- 2:25 (online)
preclusions: BIT 2000; NEUR 2002; PSCI 2702; STAT 2507; STAT 2606

Course Description

We create massive amounts of numerical data, everything from measurements of historic temperature patterns, to political opinion polling, and even counts of COVID-19 cases and vaccine rates.

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 and apply 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

First a reminder that this still isn't a normal term!

We're online because of a global pandemic with health alongside social, political and economic impacts. So there will be difficulties related to both online learning and the pandemic as we make our way through the term, and we all need to find ways to be kind to ourselves and to each other as we make our way through.

But there are also opportunities, for example, when it comes to numbers and math we've all had different experiences from these being our favourite courses to our worst nightmares. So we will take advantage of being online to build flexibility into the design of the course and accommodate varied experiences.

Learning online also means that to get the most out of the course you need to take an active part in your learning. This includes asking questions and seeking help when you are unsure of something, or even when you just want to hear more about a topic. It also means taking advantage of the learning success resources at the university. Active learning in this course also means a willingness to participate, engage, take risks, try new things and be surprised.

Additionally active learning means taking care of yourself and your health, because school is really important, but taking care of ourselves, especially now, is more important!

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

Awards and Financial Aid [carleton.ca/awards/other-assistance-2/] provides support for unexpected expenses or economic hardship.

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 that we can work with you around accommodations, adjustments, and alternatives, to help you 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're working 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 supports including, or in addition to/distinct from, those listed at the end of the course

Texts and Tools

There is no required textbook for the course.
Required readings will be posted on Brightspace

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.
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 also use GIS in some course examples.

Course Calendar and Evaluation

As mentioned above we're going to take advantage of being online to add some flexibility to the course design to accommodate the wide variety of skills coming into the course, interests and areas of expertise, goals for your learning, and even locations and access this term.

In addition to the outline here, we will go over the details on the course site.

The course is broken into a series of units.
Units 1-6 can be completed asynchronously and will include readings, short lectures and evaluations including quizzes and unit evaluation assignments.
Unit 7 will be an assignment where you have to apply what we have learned throughout the course.
Final grades will be based on your scores from the evaluations for units 1-7.
The last day work will be accepted is April 28.

Scheduled lecture and lab times will be used for synchronous course question and practice sessions.

Unit 1: Introductions and Self-Evaluation

Unit 2: Foundations
- Addition, subtraction, multiplication and division
- Equations and inequalities
- Tables and ordering
- Quantitative research where and why

Unit 3: Getting Started
- Rounding
- Percentages
- Ratios and proportions
- Variables and variable types

Unit 4: Getting to Know Your Data
- Descriptive statistics - central tendencies
- Descriptive statistics - spread
- Descriptive statistics - spatial central tendencies
- Building an index
- Histograms and thematic maps

Unit 5: Looking for Patterns
- Normal distributions
- Point pattern analysis
- Box-plots and cartograms
- Scatterplots and bar graphs
- Sampling

Unit 6: Looking for Relationships
- Hypothesis testing - central tendency
- Bi-varient correlation
- Multivariate correlation
- Data protocols

Unit 7: Applying You Learning

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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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/)