

Winter 2025 - Quantitative Geography- GEOG3003
Department of Geography and Environmental Studies
Carleton University

Instructor: Dipto Sarkar (dipto.sarkar@carleton.ca)

Lectures: Monday 11:35 - 13:25

Labs: Tuesday 11:35 - 13:25

Office Hours: Wednesday 14:30-15:30

Office Location: Loeb B341

I. Course description: This course focuses on quantitative methods for geographers using R - a popular, open-source statistical software and programming environment. Topics include data management, descriptive statistics, hypothesis testing, linear regression and correlation, multiple regression, principal component analysis, cluster analysis, descriptive spatial statistics and introductory geostatistics. A strong emphasis is placed on understanding and interpreting these statistical analyses and their results in relation to real-world questions, with a focus on geographically varying phenomena such as climate, pollution and socio-economic and demographic indicators of health and well-being. Students will acquire new skills in data-management, statistical analysis and scripting using a powerful (and freely available), command-line statistics and graphing environment. The course does not require any previous computer programming experience or major expertise in math, but an interest in problem-solving and computer-based learning is a must.

"I keep saying the sexy job in the next ten years will be statistician... The ability to take data—to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it— that's going to be a hugely important skill in the next decades, not only at the professional level but even at the educational level for elementary school kids, for high school kids, for college kids."

— Hal Varian, Chief Economist, Google Inc. 2009

II. Prerequisites: None

III. Learning Outcomes: By the end of this course, students will be able to:

- Explain purpose of various statistical methods
- Perform statistical analysis on geographic data using R
- Explain assumptions associated with statistical methods
- Select appropriate statistical methods for different scenarios

IV. Texts:

1) Harris and Jarvis, 2011 Statistics for Geography and Environmental Science.

Weekly assigned resources, including online content and readings from this text will be clearly indicated on Brightspace. You will not be able to complete the quizzes successfully without the required textbook.

Costs of Educational Material: \$103.95 (based on Indigo)

V. Course calendar (tentative: dates and topics subject to change):

WEEK	QUIZ	CONCEPT/LECTURE	LAB	ASSIGNMENT
Jan 6-12		Introduction	None (Buy book, setup R)	None
Jan 13-19		Statistical Description I	Intro To R	A1 starts
Jan 20-26	1	Stat. Description II	Descriptions	A2 starts A1 Due
Jan 27-Feb 2	2	Inference	Hypo Testing	A3 starts A2 Due
Feb 3-9	3	Inference Contd.	Sup. Work A3	A3 Contd.
Feb 10-18	4	Relationships	Regression	A4 starts A3 Due
Feb 17-Feb 23		WINTER BREAK		
Feb 24-Mar 2	5	Multiple Regression	Mult. Regression	A4 Contd.
Mar 3-9	6	ANOVA	ANOVA	A5 starts A4 Due
Mar 10-16	7	Spatial Stats	Sup. Work A5	A5 Contd.
Mar 17-23	8	PCA	PCA	A6 starts A5 Due
Mar 24-30		QUIZ PREP. No class	Sup. Work A5	A6 Contd.
Mar 31-Apr 6		THEORY QUIZ	Sup. Work A6	A6 Due
Apr 7-20		Take Home Exam Start		

VI. Evaluation:

- Online Quizzes: 15%
- Assignments: 45%
- Theory quiz: 15%
- Take-home exam: 15%
- Attendance and participation: 10%

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.

Late Policy: All submissions are online at BrightSpace. No late assignments will be accepted, with the exception of medical issues/illness or if you have already arranged for an academic accommodation as described in subsequent sections of this syllabus. In such cases you must make arrangements with the course instructor at least 24 hours prior to the due date. It is your responsibility to ensure that the instructor or TA receive your submitted hard copies. If you are unable to submit an assignment in Brightspace, it is recommended that you email the instructor or TA with a copy. However, this option should only be considered as a last resort.

Lecture/Lab attendance: Lab and Lecture attendance is required to succeed in this course. However, remember that attendance does not guarantee participation grades. Participation grades are based on interactions in class.

VII. Statement on Plagiarism

The University Senate defines plagiarism as “*presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.*” This can include:

- 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;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings;
- failing to acknowledge sources through the use of proper citations when using another’s works and/or failing to use quotation marks;

Plagiarism is a serious offence that cannot be resolved directly by the course’s instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of "F" for the course.

VIII. Statement on Student Mental Health

As a University student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. Here is a list that may be helpful:

Emergency Resources (on and off campus): <https://carleton.ca/health/emergencies-and-crisis/emergency-numbers/>

Carleton Resources:

- Mental Health and Wellbeing: <https://carleton.ca/wellness/>
- Health & Counselling Services: <https://carleton.ca/health/>
- Paul Menton Centre: <https://carleton.ca/pmc/>
- Academic Advising Centre (AAC): <https://carleton.ca/academicadvising/>
- Centre for Student Academic Support (CSAS): <https://carleton.ca/csas/>
- Equity & Inclusivity Communities: <https://carleton.ca/equity/>

Off Campus Resources:

- Distress Centre of Ottawa and Region: (613) 238-3311 or TEXT: 343-306-5550, <https://www.dcottawa.on.ca/>
- Mental Health Crisis Service: (613) 722-6914, 1-866-996-0991, <http://www.crisisline.ca/>

- Empower Me: 1-844-741-6389, <https://students.carleton.ca/services/empower-me-counselling-services/>
- Good2Talk: 1-866-925-5454, <https://good2talk.ca/>
- The Walk-In Counselling Clinic: <https://walkincounselling.com>

IX. Statement on Pandemic Measures

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 should follow Carleton's [symptom reporting protocols](#).

Masks: Masks are no longer mandatory in university buildings and facilities. However, we continue to recommend masking when indoors, particularly if physical distancing cannot be maintained. We are aware that personal preferences regarding optional mask use will vary greatly, and we ask that we all show consideration and care for each other during this transition.

Vaccines: While proof of vaccination is no longer required to access campus or participate in in-person Carleton activities, 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 response and health and safety requirements please see the [University's COVID-19 website](#) and review the [Frequently Asked Questions \(FAQs\)](#). Should you have additional questions after reviewing, please contact covidinfo@carleton.ca.

X. Requests for Academic Accommodations

ACADEMIC ACCOMMODATION

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 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. For accommodation regarding a formally-scheduled final exam, you must complete the Pregnancy Accommodation Form ([click here](#)).

Religious obligation: 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. For more details [click here](#).

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).

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 will 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>

Contacts

Equity Services 503 Robertson Hall 613-520-5622 equity@carleton.ca carleton.ca/equity	Paul Menton Centre 501 University Centre 613-520-6608 pmc@carleton.ca carleton.ca/pmc
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