

**GEOGRAPHY AND ENVIRONMENTAL STUDIES**  
**Carleton University**

**COURSE OUTLINE - Fall 2025**

**Course website:** <https://brightspace.carleton.ca/d2l/home/370270>

<b>COURSE:</b>	<b>Quantitative Geography – GEOG 3003A</b>
<b>LECTURE/WORKSHOPS:</b>	Mondays 08:35-10:25; Location: <a href="#">See Brightspace</a>
<b>LABORATORY/TUTORIAL:</b>	Mondays 12:35-14:25; Location: <a href="#">See Brightspace</a>
<b>INSTRUCTOR:</b>	<b>Derek Mueller</b> Room A427, Loeb Building Email: <a href="mailto:derek.mueller@carleton.ca">derek.mueller@carleton.ca</a> Phone: 613-520-2600 x1984
<b>OFFICE HOURS:</b>	By chance or by appointment (after lecture or before lab are ideal)
<b>TEACHING ASSISTANT:</b>	<b>Steve Robinson</b> Email: <a href="mailto:stevenrobinson@cmail.carleton.ca">stevenrobinson@cmail.carleton.ca</a>

**PREREQUISITES:** Prerequisite(s): [GEOG 2006](#) or [ENST 2006](#) or [STAT 2507](#) or permission of the Department. Lecture two hours a week, laboratory two hours a week.

**PRECLUSIONS:** None

**COURSE DESCRIPTION:**

Quantitative methods used in geographical research: multiple correlation and regression, principal component/factor analysis, spatial statistics, cluster analysis, and a review of other selected techniques. Computer-based analysis. (*from Carleton University, Undergraduate Calendar*)

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.

**LEARNING OUTCOMES:**

By the end of this course, students will be able to:

- Explain the purpose of various statistical methods
- Gain an understanding of how they work, at least on a conceptual level
- Perform statistical analysis on spatial and non-spatial data using R
- Explain assumptions and limitations associated with statistical methods
- Select appropriate statistical methods for different scenarios
- Correctly interpret results

## **COURSE STRUCTURE:**

A one term course with lectures/workshops (2 hour) followed by labs/tutorials (2 hour). Both the lecture and lab are held in a computer lab. Students will be expected to use software on the lab computers (or on their own laptops) during both the lecture and lab. Evaluation will be via assignments, quizzes and tests.

## **TEXTBOOK/READINGS:**

Harris R and Jarvis C. (2011) *Statistics in Geography and Environmental Science*. 1st ed., Routledge: London  
<https://doi.org/10.4324/9781315847610>

This book is available for download (epub or pdf) through the Carleton library: [https://ocul-crl.primo.exlibrisgroup.com/permalink/01OCUL\\_CRL/1ortgfo/cdi\\_globaltitleindex\\_catalog\\_35144727](https://ocul-crl.primo.exlibrisgroup.com/permalink/01OCUL_CRL/1ortgfo/cdi_globaltitleindex_catalog_35144727)

If you want a physical copy, you can find it on reserve at the library (4 hour) or you can purchase it through the campus store or an online vendor (e.g., Indigo \$108.50).

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.

Materials will be provided on Brightspace as a file or web link or placed on reserve at the library. **Students are not required to purchase textbooks or other learning materials for this course.**

## **EVALUATION:**

- Online quizzes: 10%
- Assignments: 30%
- Tests: 30%
- Attendance and participation: 20%
- Take-home exam: 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.

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.

## **Late Policy:**

Assignments are time stamped by Brightspace upon receipt and the time they are late will be rounded up to the nearest hour. Each student can be late up to 72 hours *in total throughout the term* without penalty. After this number of late hours is accumulated, any subsequent *late submission* will be graded and returned, but the *grade will be set to zero* for calculation of your course grade. Students are responsible for tracking their accumulated late hours. Students with medical or other extenuating circumstances which cover the duration of the assignment period will be accommodated. However, students who anticipate missing course deadlines for these reasons must notify the instructor as soon as possible and, at least, within 24 hours of the deadline in question. See the accommodation policy below for more details.

## **Cell phones and social media:**

Students must turn off their cell phones before each class. Interruption of classes by users of cell phones is disruptive and distracting for instructors and students alike. Consultation of social media during classes is similarly inappropriate.

**COMMUNICATION:**

This course uses Brightspace, Carleton's learning management system to collect assignments, deliver quizzes, disseminate materials and for discussion. To access your courses on Brightspace go to <http://brightspace.carleton.ca>. For help and support, go to <http://carleton.ca/students>. Any unresolved questions can be directed to Information Technology Services (ITS) by phone at 613-520-3700 or via email at [its.service.desk@carleton.ca](mailto:its.service.desk@carleton.ca).

**Private correspondence with the instructor should be through a Carleton email account.** If you have questions of a general nature, please post these to the discussion board in Brightspace so that others can benefit from the answers. The instructor will check email and Brightspace every 24 hours and do their best to respond to queries within 48 hours.

Information on Brightspace or sent via email will be considered to have been provided to all students within 24 hours of posting and students will be fully responsible for reading and responding appropriately to this information.

**Uploading of course materials:**

Classroom teaching and learning activities, including lectures, discussions, presentations, etc., by both instructors and students, are copy protected and remain the intellectual property of their respective author(s). All course materials, including PowerPoint presentations, outlines, and other materials, are also protected by copyright and remain the intellectual property of their respective author(s).

Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).

**Permissibility of group or collaborative work:**

There are no group assignments. Students are expected to complete assignments on their own.

**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 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, art works, 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, including the unauthorized use of generative AI tools (e.g., ChatGPT);
- 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.

Plagiarism is a serious offence that cannot be resolved directly by the course's instructor. The Associate Dean of the Faculty follows a rigorous [process for academic integrity allegations](#), including reviewing documents and interviewing the student, when an instructor suspects a violation has been committed. Penalties for violations

may include a final grade of “F” for the course.

The university’s full Academic Integrity Policy can be found [here](#).

### **Generative Artificial Intelligence (AI)**

In this course, the use of generative AI is permitted except during the in-class tests. Students are encouraged to avail themselves of these tools to help them learn the material. AI also has the potential to short-circuit learning by quickly generating computer code and content that can be submitted for grading without any further student input. Students are not permitted to do this as it undermines the course learning objectives.

Students are fully responsible for the content of the coursework that they submit. They should have an understanding of the material that they submitted that is commensurate with the grade that they achieve, and should be able to explain decisions that they made on their assignments so it is clear that they did the work. Their assignments should not contain falsified references, hallucinations or other hallmarks of AI. If students use AI to assist in their assignments, they should properly document how they used it (see citing Generative AI on the [MacOdrum Library website](#)).

If a student is suspected of violating this AI policy, they may be interviewed by the course instructor or TA and may be subject to an allegation under Carleton’s Academic Integrity Policy.

As our understanding of the uses of AI and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of AI in any circumstance not described here with the course instructor to ensure it supports the learning goals for the course.

### **Statement on Student Mental Health**

As a 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. For more information, please consult <https://wellness.carleton.ca/>. Here is a list that may be helpful:

#### **Emergency Resources (on and off campus):**

- <https://carleton.ca/health/emergencies-and-crisis/emergency-numbers/>
- Suicide Crisis Helpline: call or text 9-8-8, 24 hours a day, 7 days a week.
- For immediate danger or urgent medical support: call 9-1-1

#### **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>

### **Academic Accommodation:**

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, including information about the *Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances*, are outlined on the Academic Accommodations website (<https://students.carleton.ca/course-outline> ).

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

**Academic consideration for medical or other extenuating circumstances:** Students must contact the instructor(s) as soon as possible, and normally no later than 24 hours after the submission deadline for course deliverables. Please be prepared to complete the [Academic Consideration for Coursework Form](#).

**Other Important Locations on Campus:**

Writing Services <https://carleton.ca/csas/support/> (4<sup>th</sup> Floor, MacOdrum Library)

Centre for Student Academic Support <https://carleton.ca/csas/> (CSAS, 4<sup>th</sup> Floor, MacOdrum Library)

### CLASS SCHEDULE/TOPICS (Subject to modification!!)

Month	Day	Topic	Quiz	Lab	Assignment due
Sep	08	01 – Course overview, expectations, introductions	-	None (buy book, setup R)	None
	15	02 – Descriptive statistics I	1	Intro to R	A1 starts
	22	03 – Descriptive statistics II	2	Descriptions	A2 starts; <b>A1 due</b>
	29	04 – Inferential statistics I	3	Hypo Testing	A3 starts; <b>A2 due</b>
Oct	06	05 – Inferential statistics II	4	Sup. Work A3	A3 cont.
	13	THANKSGIVING – NO CLASS	-	-	<b>A3 due</b>
	20	READING WEEK – NO CLASS	-	-	-
	27	06 – Mid-term test	-	-	-
Nov	03	07 – Relational statistics I	4	Regression	A4 starts
	10	08 – Relational statistics II	5	Multiple Regression	A4 cont.
	17	09 – ANOVA	6	ANOVA	A5 starts; <b>A4 due</b>
	24	10 – Spatial Statistics	7	Sup. Work A5	A5 cont.
Dec	01	11 – Principal Component Analysis	8	PCA	A6 starts; <b>A5 due</b>
	05	13 – End of term test		Sup. Work A6	<b>A6 due</b>
		Take home exam Dec 8-20			

*Written assignments are typically due at 23:59 on Brightspace the day prior to class (or as noted in Brightspace);*

Please consult the course Brightspace page for an updated schedule plus details about each topic and readings.