

Fall 2019 - Quantitative Geography - GEOG3003

Department of Geography and Environmental Studies

Instructor: Koreen Millard koreenmillard@cunet.carleton.ca

Office: Loeb A301D

office hours: TBD

Lecture: Mondays 11:35 am - 1:25 pm

Lecture Location: Loeb A200

Lab: Mondays 3:35 - 5:25 pm

TA:TBD

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 particular 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 particular expertise in math, but an interest in problem-solving and computer-based learning is a must.

II. Preclusions: GEOG3002 (no longer offered)

III. Learning Outcomes:

- Develop theoretical and practical understanding of common statistical analyses
- Be able to determine the appropriate statistical test/method to use to answer a specific geographical question, considering the data provided/available
- Use R Statistics software to undertake common parameteric and non-parameteric statistical tests

IV. Texts: Harris and Jarvis, "Statistics for Geography and Environmental Sciences".

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

lecture date	Lecture Topic	Lab name	Due in Lecture
September 9	Intro	R boot camp	
September 16	R “boot camp” with TA	R “boot camp”	
September 23	Probability, Central Limit theorem, hypothesis testing, tests of significance	Lab 1: descriptive statistics	
September 30	Descriptive Statistics (standard error, dispersion, skewness and kurtosis, data transformation)	Lab 1: descriptive statistics	
October 7	Parametric and non parametric tests (one sample tests (KStest), two sample tests (t-tests, F-test), difference of proportions tests)	Lab 2: Parametric and non parametric tests	Lab 1: descriptive statistics
October 14	No class - Thanksgiving	Lab 2: Parametric and non parametric tests	
October 21	No class - winter break	None	None
October 28	Relationships (scatter plots, correlation and regression)	Lab 3: statistical models	Lab 2: Parametric and non parametric tests
November 4	mid term (in lecture period)	Lab 3: statistical models	
November 11	Decision trees and multiple regression	Lab 3: statistical models	
November 18	ANOVA	Lab 4: ANOVA	Lab 3: statistical models
November 25	PCA	Lab 5: PCA and Spatial data	Lab 4: ANOVA
December 2	Spatial data in R	Work on final project	Lab 5: PCA and Spatial data
December 6	wrap up		

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VI. Evaluation:

Boot camp submission @ 5%

5 labs @ 10% each

5 quizzes @ 2% each

mid term @ 10%

Final project @ 25%

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: A hard copy of all lab assignments must be handed in to your TA or instructor no later than the **BEGINNING** of the scheduled meeting on the assignment due date, unless otherwise stated on the assignment sheet or syllabus. **No late assignments will be accepted**, with the exception of those accompanied by a doctor's note 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 and provide 3rd party documentation to her within 5 days of the due date verifying the particular circumstance leading to the late submission. 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 person, it is recommended that you email the instructor or TA with a digital version in addition to a hard copy left in the assignment drop-slot on the door of the departmental mail room. However, this option should only be considered as a last resort.

Lecture/Lab attendance: While attendance to lectures and labs is not recorded, it is **highly recommended that you attend all sessions**. R coding demonstrations and one-on-one help with R will be available in both lecture and lab sessions. Lectures will also cover theoretical aspects of statistics that will help you with the interpretation of your labs and final project.

VII. Statement on Plagiarism

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;
- handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs."

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. Requests for 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 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.

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.

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

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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 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>