Statistics and Spatial Analysis (GEOG202) Winter 2024
Department of Geography
McGill University

Lectures: Friday, 11:30 - 14:30, Burnside 306
Lab: Wednesday 14:30 – 17:30, Burnside 511

Instructor: Dr. Mallik Mahmud mallik.mahmud@mcgill.ca
Office hours: By appointment only

Teaching Assistant: Duo Zhang duo.zhang4@mail.mcgill.ca
Office hours: Wednesday 14:30 – 17:30 @Burnside 511

Course Objectives & Outline

This course will introduce you to basic statistical, spatial and non-spatial analysis concepts. The emphasis is on understanding how to select an appropriate descriptive tool or analytical test for different types of data, how to manage particularly spatial problems in statistical analysis, how to conduct basic analyses using statistical software, and how to interpret the output of analyses.

By the end of the course, you will be able to acquire:

- a knowledge and understanding of basic statistical concepts
- analytical methodological skills to apply fundamental spatial and non-spatial analysis
- analytical writing skills to produce, read and interpret analytical reports
- an intermediate proficiency in a statical software package
- confidence in dealing with numeric and spatial analysis

Mode of Delivery

The course will be offered in a synchronous format for both lectures and labs. Each week, a new topic will be introduced and discussed in class. Students are encouraged to participate actively in class discussions and interactive course content. The instructor will provide lectures and share relevant materials via *McGill myCourses*. The teaching assistant (TA) will lead the lab sections. The TA should be the first point of contact for any lab-related queries.

Required Reading

- Lambo Jr, A. J., & McGrew Jr, J.C. (2024). *An introduction to statistical problem solving in geography*. 4th edition.Waveland Press.

Further Reading Suggestions

- Diez, D., Çetinkaya-Rundel, M. and Barr, C.D. (2019): OpenIntro Statistics. 4th edition. Also online available at openintro.org/os
- McCarroll, D (2016): Simple Statistical Tests for Geography. CRC Press / Chapman and Hall.
- Ismay, C and Kim, A.Y. (2020): Statistical Inference via Data Science. A ModernDive into R and the Tidyverse. CRC Press. Also online available at https://moderndive.com

Course Evaluation & Assignment Details

Your final mark will be composed of

1. Mid-term 15 % of final mark
2. Lab assignments 50 % of final mark
3. Project proposal 10 % of final marks
4. Project 25 % of final mark

There will be NO final exam, which an individual project will replace. During the first weeks you can decide on a topic of your interest, then you have to write a *one-page project proposal* (10 % of final mark) which includes your research question, your hypotheses, the method and the data set you are planning to use. We will discuss your proposal during class. Please be prepared to contribute to this class. In the remainder of the course, you will have time to work on the *project report* (25% of final mark), which consists of two parts: presentation (5%) and report (25%). In the last week before the exam period starts, you must present the key findings and major roadblocks to the class in a 5-minute project presentation.

The five **lab assignments** will comprise applied questions of the material discussed in class that you either have to answer manually or with software assistance. TA will assist you during lab hours. They have to be handed in *at the beginning of the class when they are due* (due dates see below in the course schedule). *Assignments submitted after the deadline will be considered late*. For all assignments, assessment will be based not only on content but also on structure, clarity, presentation and organization of material and results.

Academic Integrity

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see http://www.mcgill.ca/students/srr/honest for more information). (approved by Senate on 29 January 2003)
L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest/).

Language of Evaluation

"In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded." (approved by Senate on 21 January 2009)
"Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas des cours dont l'un des objets est la maîtrise d'une langue)."

Grading

See the following tables for grading. More details can be found here:

https://www.mcgill.ca/study/2018-2019/university_regulations_and_resources/undergraduate/gi_grading_and_grade_point_averages

Grades	Grade Points	Numerical Scale of Grades
A	4.0	85 – 100%
A-	3.7	80 – 84%
B+	3.3	75 – 79%
B	3.0	70 – 74%
B-	2.7	65 – 69%
C+	2.3	60 – 64%
C	2.0	55 – 59%
D	1.0	50 – 54%
F (Fail)	0	0 – 49%

Grade appeals

Instructors and teaching assistants take the marking of assignments very seriously, and we work diligently to be fair, consistent, and accurate. Nonetheless, mistakes and oversights occasionally happen. If you believe that to be the case, you must adhere to the following rules:

- If it is a mathematical error simply alert the TA of the error.
- In the case of more substantive appeals, you must:
    1. Wait at least 24 hours after receiving your mark.
    2. Carefully re-read your paper/assignment/test, guidelines, marking schemes, and the grader's comments.
    3. If you wish to appeal, you must submit a written explanation to the instructor why you think your mark should be altered. Please note statements such as "I need a higher grade to apply to X" are not compelling. If you need a certain grade to apply to X, try to comprehend the material well and you will perform well in the assignments. Also, please note that upon *re-grade your mark may go down, stay the same, or go up*.

Missed Assignments and late submission

In fairness to those of you who complete assignments on time, *late assignments will be penalized by 10% per day (starting minutes after the due time)*.

You can use request for accommodation request via student service at
https://students.accessibility.mcgill.ca/ClockWork/user/SelfRegC/default.aspx

Queries

I am open to discuss matters related to course topics, assignments, exams or your academic interest related to the course content. Please approach me after class or by e-mail. In line with McGill policy, I prefer correspondence via your McGill e-mail addresses. In e-mails, please insert your full name. E-mail is a piece of formal correspondence and should be treated as a permanent record of communication. I will endeavour to respond to e-mails within 48 hours, but this may not always be possible. Please note that I am generally offline weekdays after 5 pm and on weekends. E-mails containing questions that can be answered by referring to this syllabus, or to administrative matters discussed in class or posted on MyCourses (e.g. specifics of assignments, instructions on how best to prepare for the exam) may not receive a response.

MyCourses Policy

Please check MyCourses regularly for updated course information, required readings or materials. All use of MyCourses, especially 'Discussions' content, must relate to the content of course material. MyCourses should not be used as a forum for evaluations about the course or other content that is unrelated to sessions or readings (You will have a chance to evaluate the course near the end of the term). All student posts are expected to be respectful in tone and content. Violations of this policy will result in restricted access and other penalties at the instructor's discretion.

Course content

This course focuses on basic spatial and non-spatial statistical analysis. We will begin the course by covering basic concepts in understanding datasets and probability distributions. The course focuses on helping students understand the data they are working with, describe the data, select an appropriate statistical test, use standard software packages to run that test, understand the output, and interpret results. The second component of the course focuses more specifically on spatial analyses. Students will be able to learn and apply standard spatial statistical techniques and use the state-of-the-art software package available for analysis. The statistical concepts and theories introduced in this course are equivalent to standard introductory statistics course credits.

What will not be covered in this course

This is not a standard statistics course – we will not focus on the detailed mathematics of statistical theory. While brief forays into the equations and math behind statistical approaches will be provided, the course focuses on application and understanding. This is not an advanced spatial statistics course either. Such courses usually require at least one prerequisite in basic statistics. GEOG202 provides such a prerequisite (including an introduction to statistics) but goes a little further by introducing spatial concepts and delving into some spatial analysis.
This course will not cover basic GIS techniques, and we will not use standard GIS software (e.g. ArcGIS) during labs. For students particularly interested in the spatial aspects of analysis, a GIS course would be an excellent complement to GEOG202.

Indigenous Land Statement

McGill University is on land which has long served as a site of meeting and exchange amongst Indigenous peoples, including the Haudenosaunee and Anishinabeg nations. We acknowledge and thank the diverse Indigenous people whose footsteps have marked this territory on which peoples of the world now gather.
L'Université McGill est sur un emplacement qui a longtemps servi de lieu de rencontre et d'échange entre les peuples autochtones, y compris les nations Haudenosaunee et Anishinabeg. Nous reconnaissons et remercions les divers peuples autochtones dont les pas ont marqué ce territoire sur lequel les peuples du monde entier se réunissent maintenant.