

GEOG 3210A – Geocomputation Course Outline: Section 001 Fall 2022

1. Course Information

| | Delivery Mode | Day/Time | Location |
|---------|---------------|----------------------|----------|
| Lecture | In Person | Tuesday, 12:30-14:30 | UC2105 |
| Lab | In Person | Tuesday, 16:30-18:30 | SSC1059 |

*Details about design and delivery of the course are listed below in Section 5



| Classes Start | Fall Reading Week | Classes End | Study day(s) | Exam Period |
|---------------|-------------------|-------------|--------------|----------------|
| September 8 | Oct 31-Nov 6 | December 8 | December 9 | December 10-22 |

September 16, 2022: Last day to add a first-term half course

October 10, 2022: Thanksgiving Holiday

November 12, 2022: Last day to drop a first term half course without penalty



| Course Instructor | Contact Information | Office Hours |
|-------------------|--|--------------|
| Jed Long | jed.long@uwo.ca | TBD |

| Teaching Assistant(s) | Contact Information | Office Hours |
|-----------------------|--|--------------|
| Stanley Ho | sho282@uwo.ca | TBD |

2. Calendar Description

An introduction to multivariate statistics and data analysis using computational methods; reproducibility in data analysis, data presentation, exploratory data analysis, and data mining for Geography.

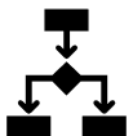
Antirequisite(s): All other senior level statistics courses numbered 2000 or above and not listed in the prerequisites.

Prerequisite(s): Geography 2210A/B or Biology 2244A/B or Statistical Sciences 2244A/B and enrolment in a geography program or permission from the instructor.

Extra Information: 2 lecture hours, 2 laboratory hours.

Course Weight: **0.50**

Prerequisite checking is the student's responsibility.



Senate Regulations state, “unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the even that you are dropped from a course for failing to have the necessary prerequisites.”

3. Textbook



(Optional) Rogerson, P. A. (2015) *Statistical Methods for Geography: A Student's Guide*. SAGE Publications. Fourth Edition. pp 396. Paperback ISBN: 978-1446295731.

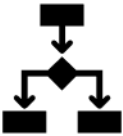
Textbook Website:

<https://study.sagepub.com/rogerson4e/student-resources/inferential-statistics>

All other material will be posted on the OWL course website.

4. Course Objectives and Format

Course Objectives:



- I. To develop a working knowledge of statistical concepts as applied to geographical data.
- II. To become competent in data visualization and exploratory (spatial) data analysis.
- III. To understand issues with performing statistical analysis on geographical data.
- IV. To learn new computational skills, specifically the statistical software R, along with RStudio.

Although mathematical detail is not emphasized, competence in simple mathematical notation and arithmetic are fundamental. All computations will be performed using statistical software. The primary piece of software we will be using is R and RStudio.

Course Format:

Lectures: In person lectures, online videos, live tutorials, and readings

Labs: 2 hrs (In person delivery, demonstration and supported work time).

Expectations:

- Engagement with lecture and lab material is imperative to success in this course.
- The course material is cumulative.
- You should review lectures and readings weekly.
- It is the student’s responsibility to cover any material missed by failure to attend lectures, please also see all material on the course website.
- Students must be organized, especially with computer files, please seek help if you are struggling with this component.

All course material will be posted to OWL: <http://owl.uwo.ca>. Any changes will be indicated on the OWL site and discussed with the class.

[Google Chrome](#) or [Mozilla Firefox](#) are the preferred browsers to optimally use OWL; update your browsers frequently. Students interested in evaluating their internet speed, please click [here](#).

If students need assistance, they can seek support on the [OWL Help page](#). Alternatively, they can contact the [Western Technology Services Helpdesk](#). They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Course Content and Schedule

Lecture Content (Tuesday; 12:30-14:30)

| | Date | Topic | Reading Material |
|----|-------------|-----------------------------------|-------------------------|
| 1 | Sep 13 | Geocomputation, Course Overview | Ch. 1, Ch. 2 |
| 2 | Sep 20 | Visualizing Data | Ch 3 |
| 3 | Sep 27 | Probability | Ch. 4, Ch. 5 |
| 4 | Oct 4 | Statistical Tests | Ch. 6 |
| 5 | Oct 11 | Advanced R | -- |
| 6 | Oct 18 | Correlation and Linear Regression | Ch. 7 |
| 7 | Oct 25 | Multivariate Regression | Ch. 9 (Sec. 9.1 – 9.5) |
| 8 | Nov 1 | Reading Week, No Lecture | -- |
| 9 | Nov 8 | Logistic Regression | Ch. 8, Ch. 9 (Sec. 9.6) |
| 10 | Nov 15 | Maps in R | -- |
| 11 | Nov 22 | Multivariate Cluster Analysis | Ch 12 |
| 12 | Nov 29 | Regionalization | -- |
| 13 | Dec 6 | Geocomputation | -- |

Labs (Tuesday; 16:30 – 18:30)

| | Lab Date | Topic | Relevant Swirl Lessons |
|----|-----------------|-----------------------------------|-------------------------------|
| 1 | Sep 13 | Data Analysis in R | 1 – 6 |
| 2 | Sep 20 | Visualizing Data | 7, 12, 15 |
| 3 | Sep 27 | Data Analysis in R II | 8 – 11 |
| 4 | Oct 4 | Probability and Statistical Tests | |
| 5 | Oct 11 | Assignment 1 Help | |
| 6 | Oct 18 | Linear Regression | |
| 7 | Oct 25 | Multivariate Regression | |
| 8 | Nov 1 | Reading Break, No Lab | |
| 9 | Nov 8 | Logistic Regression | |
| 10 | Nov 15 | Assignment 2 Help | |
| 11 | Nov 22 | Cluster Analysis | |
| 12 | Nov 29 | Regionalization | |
| 13 | Dec 6 | Assignment 3 Help | |

6. Learning Outcomes

Upon successful completion of this course, students will be able to:

- Analyse quantitative geographical and statistical data
- Make informative graphical visuals using various data types
- Perform statistical tests to compare between different groups
- Fit regression models (linear and non-linear) using multiple covariates
- Perform exploratory (spatial) data analysis, such as cluster analysis
- Code statistical tests in R using the RStudio environment
- Interpret statistical results from the work of others



7. Communication



- All material and communication will be administered via the OWL site.
- Technical help and course related Q&A will be provided through OWL discussion forums so that other students can benefit from questions and answers. Both the instructor and TA will check forums regularly.
- For any other communication, the centrally administered **e-mail account** provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner. You can read about the privacy and security of the UWO email accounts [here](#).

8. Evaluation

Below is the evaluation breakdown for the course. Any deviations will be communicated.

| Evaluation Components | Weight (%) | Due Date |
|---------------------------|------------|---------------------|
| 1. Labs | 10% | Various |
| 2. Assignment 1 | 20% | Friday, October 14 |
| 3. Assignment 2 | 20% | Friday, November 18 |
| 4. Assignment 3 | 20% | Friday, December 09 |
| 5. Final Exam (take home) | 30% | TBD |



Students are responsible for material covered in the lectures as well as the assigned chapters/sections in the text.

- All assignments are due at 11:55 pm EST unless otherwise specified
- Written assignments will be submitted to Turnitin (statement in policies below)
- Students will have unlimited submissions to Turnitin
- Rubrics will be used to evaluate assessments and will be posted with the instructions

☒ After an assessment is returned, students should wait 24 hours to digest feedback before contacting their evaluator; to ensure a timely response, reach out within 7 days

Click [here](#) for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

Information about late or missed evaluations:

☒ Late assessments without illness self-reports will be subject to a late penalty 10%/day

☒ Late assessments with illness self-reports or self reported absences (see below) are subject to an automatic extension of 5-days unless otherwise discussed with the instructor.

Grades will not be adjusted on the basis of need. It is important to monitor your performance in the course. Remember: *You* are responsible for your grades in this course.

9. Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The accommodation policy can be found here: [Academic Accommodation for Students with Disabilities](#).

Academic Consideration for Student Absence

Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the term, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student's final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

[Policy on Academic Consideration for Student Absences](#)

[Student Medical Certificate \(SMC\)](#)

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the [Western Multicultural Calendar](#).

10. Make-up Examinations

Makeups will be granted with approved documentation only. All documentation for missed exams must be provided to the Academic Counselling Office within 48 hours of the scheduled exam, otherwise the instructor will assign a grade of zero.

The format and content of make-ups may differ substantially from the scheduled test or examination.

11. Use of Electronic Devices

Electronic devices will be allowed and are necessary for all forms of assessment.

12. How to Be Successful in this Class:

Students enrolled in this class should understand the level of autonomy and self-discipline required to be successful.

1. Invest in a planner or application to keep track of your courses. Populate all your deadlines at the start of the term and schedule time at the start of each week to get organized and manage your time.
2. Make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
3. Take notes as you go through the lesson material. Keeping handwritten notes or even notes on a regular Word document will help you learn more effectively.
4. Connect with others. Try forming a study group and try meeting on a weekly basis for study and peer support.
5. Do not be afraid to ask questions. If you are struggling with a topic, check the online discussion boards or contact your instructor(s) and or teaching assistant(s).
6. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.



13. Continuity of Education Plan (in-person class pivoting to online learning)

In the event of a COVID-19 resurgence during the course that necessitates the university to direct courses move away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

14. Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

15. Western's Commitment to Accessibility

The Department of Geography and Environment strives at all times to provide accessibility to all faculty, staff, students and visitors in a way that respects the dignity and independence of people with disabilities.

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 519-661-2147 for any specific question regarding an accommodation. Information regarding accommodation of exams is available on the Registrar's website.

More information about "Accessibility at Western" is available.

16. Mental Health

If you or someone you know is experiencing distress, there are several resources here at Western to assist you. Please visit Western's Health and Wellness website for more information on mental health resources.

17. Support Services

Western's Support Services
Student Development Centre

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

18. Important Dates

September 8: Classes resume

September 16: Last day to add a first term half course

October 10: Thanksgiving Holiday – Department Office Closed

October 31 to November 6: Fall Reading Week (No classes; Department Office open)

November 12: Last day to drop a first term half course without penalty

November 30: Last day to drop a full course without penalty

December 8: Classes end

December 9: Study day

December 10-22: Examination Period