

GEOG 3211A – Spatial Statistics

Course Outline: Section 001 Fall 2022

This course is taught in-person

1. Course Information

	Delivery Mode	Day/Time	Location
Lecture	In-person	Mondays 1:30 – 3:00 PM	SSC 1059
Lab	In-person	Mondays 3:30 – 5:30 PM	SSC 1059

*Details about design and delivery of the course are listed below in Section 6

Classes Start	Fall Reading Week	Classes End	Study day(s)	Exam Period
September 8	October 31-November 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
Prof. Jinhyung Lee	jinhjung.lee@uwo.ca	By appointment via email

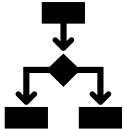
Teaching Assistant(s)	Contact Information	Office Hours
Ms. Reyhane Javanmard	rjavanma@uwo.ca	TBD

2. Calendar Description

Topics include exploratory spatial data analysis, global and local spatial statistics, spatial autocorrelation, spatial regression models, and geographically weighted regression.

The emphasis will be on developing analytical skills with practical applications using statistical software and geographic information systems.

2 lecture hours, 2 laboratory hours, 0.5 course



Prerequisite(s): Third or fourth year status at the University, Geography 2220A/B and one of Geography 2210A/B, Biology 2244A/B or Statistical Sciences 2244A/B, or other equivalent, or permission of the instructor.

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 event that you are dropped from a course for failing to have the necessary prerequisites."

3. Textbook

A HIGHLY **RECOMMENDED** textbook is below:



Guangqing Chi and Jun Zhu, Spatial Regression Models for the Social Sciences (2019), ISBN 154430207X, Sage Publications.

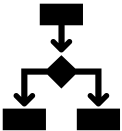
AVAILABLE at Book Store: <https://bookstore.uwo.ca/product/cebebookid9718023>

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

4. Course Objectives and Format

Course objectives:

- I. Apply a variety of spatial statistical methods for analyzing geographic data.
- II. Obtain skills in using reproducible geographic data science and GIS software.
- III. Interpret results obtained by using methods of spatial statistics.



Mode	Dates	Time	Frequency
Lecture – in-person	Mondays	1:30 – 3:00 PM	Weekly
Lab – in-person	Mondays	3:30 – 5:00 PM	Weekly

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](#). [Using the right browser is important, especially when using different features integrated with OWL]

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

General

Week	Dates (Monday)	Topic	Lab/Assignment
1	Sep 8-9	N/A	N/A
2	Sep 12	Course overview and introduction	Lab 1
3	Sep 19	What is spatial data and spatial statistics?	Lab 2
4	Sep 26	Exploratory spatial data analysis (ESDA)	Assignment 1
5	Oct 3	Spatial weights and lagged variables	Assignment 1 help
6	Oct 10	Global spatial autocorrelation	Lab 3 Assignment 2
7	Oct 17	Local spatial autocorrelation	Lab 4 Assignment 2 help
8	Oct 24	Exam 1	Assignment 2 help
9	Oct 31	Reading Week (No Lecture)	N/A
10	Nov 7	Intro to regression	Assignment 2 help
11	Nov 14	Spatial regression – Part 1	Lab 5 Assignment 3
12	Nov 21	Spatial regression – Part 2	Lab 6 Assignment 3 help
13	Nov 28	Geographically weighted regression (GWR)	Lab 7 Assignment 3 help
14	Dec 5	Exam 2	Assignment 3 help

Lab

	Topic	Format
Lab 1	Intro to R and R studio	In-class exercises with live- demonstrations by the TA
Lab 2	Exploratory (spatial) data analysis in R	
Lab 3	Global Moran's I in R	
Lab 4	Local Moran's I in R	
Lab 5	Spatial lag model in R	
Lab 6	Spatial error model in R	
Lab 7	Geographically weighted regression (GWR) in R	

Exam

	Scope	Time	Format
Exam 1	Week 2-7	In class time, Monday, Oct 24 th , 2022	Short/long answer questions
Exam 2	Week 10-13	In class time, Monday, Dec 5 th , 2022	Short/long answer questions

Assignment

	Topic	Assigned date	Due date
Assignment 1	Exploratory spatial data analysis using GeoDa	Sep 26	Oct 10 (Monday)
Assignment 2	Spatial autocorrelation	Oct 10	Nov 7 (Monday)
Assignment 3	Spatial regression	Nov 14	Dec 7 (Wednesday)

6. Communication



- ☒ Students should check the OWL site every 24 – 48 hours
- ☒ A weekly update will be provided on the OWL announcements
- ☒ 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](#).
- ☒ Emails will be monitored daily; students will receive a response in 24 – 48 hours, **excluding weekends**

7. Evaluation

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

Assessment	Weighting
Assignment 1	10%
Assignment 2	20%
Assignment 3	20%
Exam 1	25%
Exam 2	25%

The evaluation methods described in the course outline are essential requirements for the course.

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
- ☒ Assignments will be accepted up to **48 hrs** after their scheduled due date, excluding weekends (e.g., if your lab is due on a Tuesday, you have until Thursday to hand it in).
- ☒ 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.

A+	90-100	One could scarcely expect better from a student at this level
A	80-89	Superior work which is clearly above average
B	70-79	Good work, meeting all requirements, and eminently satisfactory
C	60-69	Competent work, meeting requirements
D	50-59	Fair work, minimally acceptable
F	below 50	Fail

Information about late or missed evaluations:

- ☒ Assignments (Labs, Term Project Proposal, Term Project Final Report) will **NOT be accepted for grading more than 48 hours** (excluding weekends) after the scheduled due date & time (e.g., if your lab is due on a Tuesday, you have until Thursday to hand it in).
- ☒ Late assessments **without** illness self-reports will be subject to a late penalty **10 %/day**.
- ☒ Late assessments **with** illness self-reports should be submitted within 24 hours of submission of the last illness self-report.
- ☒ **A make-up test for Exams will NOT be offered**. If you self-report an absence on the test date, the test will be **reweighted to the final or vice versa**.

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.

8. 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

The University recognizes that a student's ability to meet their academic responsibilities may, on occasion, be impaired by medical illness. Illness may be acute (short term), or it may be chronic (long term), or chronic with acute episodes. The University further recognizes that medical situations are deeply personal and respects the need for privacy and confidentiality in these matters. However, in order to ensure fairness and consistency for all students, academic accommodation for work representing 10% or more of the student's overall grade in the course shall be granted only in those cases where there is documentation indicating that the student was seriously affected by illness and could not reasonably be expected to meet their academic responsibilities.

Policy on Academic Consideration for Medical Illness - Undergraduate Students

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](#).

9. 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. Follow weekly checklists created on OWL or create your own to help you stay on track.
4. 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.
5. Connect with others. Try forming a study group and try meeting on a weekly basis for study and peer support.
6. 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).
7. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.

10. 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.

11. Information on COVID-19

Masking Guidelines

Students will be expected to wear triple layer, non-medical, paper masks at all times in the classroom as per University policy and public health directives. Students who are unable to wear a mask must seek formal accommodation through Western Accessible Education, and present medical documentation.

Students are not permitted to eat or drink while in class to ensure masks stay in place. Students will be able to eat and drink outside of the classroom during scheduled breaks.

Students unwilling to wear a mask as stipulated by Western policy and public health directives will be referred to the Dean, and such actions will be considered a violation of the student Code of Conduct.

Course Absences due to Daily COVID Screening Questionnaire

Missed assessments (e.g., presentations, essays, quizzes, tests, midterms, etc.) require formal academic considerations (typically academic counselling).

12. 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>).

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

13. 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.

14. 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.

15. 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.

16. 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