

# GEOG 3211B – Spatial Statistics

## Course Outline: Section 001 Winter 2022

[Syllabus subject to modification](#)

### 1. Course Information

	Delivery Mode	Day/Time	Location
Lecture	On-line	Asynchronous	
Lab	In-person	Monday 4:30 pm	SSC-1059

Classes Start	Spring Reading Week	Classes End	Study day(s)	Exam Period
January 10	February 21-25	April 8	April 9	April 10-30

January 18, 2022: Last day to add a second-term half course

March 14, 2022: Last day to drop a second-term half course without penalty.



Course Instructor	Contact Information	Office Hours
Jacek Malczewski	<a href="mailto:jmalczew@uwo.ca">jmalczew@uwo.ca</a>	<u>By appointment</u> via email

Although I will usually reply the same day, please allow up to 48 hours.

Please email from your @uwo.ca account and use "Geog3211 – Email Topic" in the subject line.



Teaching Assistant	Contact Information	Office Hours
Vali Vakshoori	<a href="mailto:svakhsho@uwo.ca">svakhsho@uwo.ca</a>	TBD

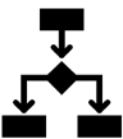
### 2. Calendar Description

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: 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. Readings

- Anselin L. (2005) *Exploring Spatial Data with GeoDa: A Workbook* (see OWA/Resources)
- Charlton M. and S. Fotheringham (2009) Geographically Weighted Regression: A Tutorial on using GWR in ArcGIS 9.3 and White Paper, National Centre for Geocomputation: National University of Ireland (see OWA/Resources)



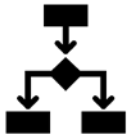
### 4. Course Objectives and Format

There are four objectives of this course:

- to apply a variety of spatial statistical methods to geographical data,
- to acquire problem-solving skills with geographical data,
- to acquire skills in using GIS and statistical software for analyzing geographical data,
- to interpret results obtained by using methods of spatial statistics.

The course material is cumulative. Therefore you should review lectures and readings weekly - do not expect success if you only study and practise before exams. This course is also problem-based and applied - you must do all exercises to fully understand the material and successfully complete the course.

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. Learning Outcomes

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

- Synthesize and evaluate geographical information from diverse sources, including geo-spatial data
- Analyze real-world problems and policy applications using geographical concepts, skills and understanding
- Develop knowledge and practical skill with standard methods in GISci including geo-spatial data acquisition, interpretation, quantitative processing and analysis; geo-spatial databases; spatial modeling; and application to geographic problems
- Technological skills (computer hardware, software, instrumentation) including use of geographical and data analysis software.
- Geographical data: statistical concepts, analysis and inference; quantitative and qualitative analysis; numerical and/or mathematical analysis; calculations; programming; problem solving.

## 6. Course Content and Schedule

Date	Lectures / Topics	PowerPoint/ Audio Unit #	Required readings
Jan. 10	Introduction	1.1	
Jan. 17	Spatial data and spatial statistics	1.2	
Jan. 24	Exploratory spatial data analysis	2	Anselin, pp. 43-91
Jan. 31	Spatial weights and lagged variables	3.1	Anselin, pp. 106 -128
Feb. 7	Global spatial autocorrelation	3.2	Anselin, pp. 129 -138
Feb. 14	Local spatial autocorrelation	3.3	Anselin, pp. 139 -164
Feb. 21	Reading Week		
<b>Feb. 28</b>	<b>Test 1</b>		
Mar. 7	Spatial regression	4.1, 4.2, 4.3	Anselin, pp. 165-200
Mar. 14	Spatial regression	4.4	Anselin, pp. 201- 223
<b>Mar. 21</b>	<b>Test 2</b>		
Mar.28	Geographically weighted regression	5	Charlton and Fotheringham
<b>Apr. 4</b>	<b>Quiz</b>		

**Note:** lecture slides and audio recordings are the copyright of the instructor, and may not be disseminated, shared, or made available online.

**Anselin L.** (2005) *Exploring Spatial Data with GeoDa: A Workbook*

**Charlton M. and S. Fotheringham** (2009) Geographically Weighted Regression: A Tutorial on using GWR in ArcGIS 9.3 and White Paper, National Centre for Geocomputation: National University of Ireland.

## 7. Communication

Students should check the OWL site regularly

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.

## 8. Evaluation

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

Date	Labs / Tests	Weighting %	Due Date
Jan. 31	Lab 1. Exploratory spatial data analysis	8	Feb. 14
Feb. 14	Lab 2. Spatial autocorrelation	8	Feb. 28
Mar. 14	Lab 3. Spatial regression	8	Mar. 21
Mar. 28	Lab 4. Geographically weighted regression	8	Apr. 4
<b>Feb. 28</b>	<b>Test 1</b> (synchronous, on-line, open-book)	22	
<b>Mar. 21</b>	<b>Test 2</b> (synchronous, on-line, open-book, cumulative)	34	
<b>Apr. 4</b>	<b>Quiz</b> (synchronous, on-line, open-book, cumulative)	12	

Test 1, Test 2 and Quiz will be held on Mondays, February 28, 2:30 -3:30pm, March 21, 2:30 - 4:00pm, and April 4, 2:30-3:00pm, respectively. An online synchronous, open-book format applies.

**A make-up Test 1 will not be offered. The weights of missed Test 1 will be transferred to Test 2.**

Test 2 makeup will be granted with approved documentation only.

All documentation for missed Test 2 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 will **differ substantially** from the scheduled Test 2 or Quiz.

**Make-up Test 2 and Quiz will be offered as an in-person format.**



The lab component of the course consists of four assignments worth 24% of your final grade.

Laboratory exercises submitted late without approved documentation or the submission of a self-reported absence will be subject to a penalty.

**Late penalty:** Late labs have a penalty of 5% per day. A mark of 0% will be recorded if work is submitted more than a week late. Per day is defined each 24-hour period succeeding the allocated assignment deadline – not midnight.

You are responsible for material covered in the lectures as well as the assigned chapters/ sections in the textbooks.

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

All work must be done independently. Not adhering to these conditions will be considered a **scholastic offence** (see the statement in policies below)

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

## 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 online 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. (**Note:** The weight of a missed Test 1 will be transferred to Test 2; see Section 8 Evaluation).

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.**

For Western University policy on Consideration for Student Absence, see [Policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs](#)

and for the Student Medical Certificate (SMC), see:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf).

### 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

A make-up Test 1 will not be offered. The weight of a missed Test 1 will be transferred to Test 2. Test 2 makeup will be granted with approved documentation only.

All documentation for missed Test 2 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 will **differ substantially** from the scheduled Test 2 or Quiz. **Make-up Test 2 and Quiz will be offered as an in-person format.**

## 11. Use of Electronic Devices

Electronic devices will be allowed during tests and examinations.

## 12. How to Be Successful in this Class



The course is problem based and applied - you must practice problems and do all exercises in order to fully understand the material and successfully complete the course. The course material is cumulative. You should review lectures and readings weekly - do not expect success if you only study and practise before exams.

## 13. Course delivery with respect to the COVID-19 pandemic

Although the intent is for this course to be delivered in-person, the changing COVID-19 landscape may necessitate some or all of the course to be delivered 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 assessments affected will be conducted online as determined by the course instructor.

When deemed necessary, tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide personal information (including some biometric data) and the session will be recorded. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: <https://remoteproctoring.uwo.ca>.

## 14. 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., assignments, quizzes, tests, midterms, etc.) require formal academic considerations (typically self-reported absences and/or academic counselling).

Students who demonstrate a pattern of routinely missing coursework due to self-reported COVID symptoms, and therefore do not demonstrate mastery of the learning outcomes of the course, will not receive credit for the course.

### **15. 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.

[Include this paragraph on plagiarism-checking software only if relevant. If not relevant delete the paragraph below]

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.

### **16. 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.

### **17. 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.

## **18. Support Services**

Western's Support Services  
Student Development Centre

## **19. Important Dates**

January 10: Classes resume

January 18: Last day to add a second term half course

February 21: Family Day – Department Office Closed

February 21-25: Spring Reading Week (No classes; Department Office open)

March 14: Last day to drop a first term half course without penalty

April 8: Classes end

April 9 Study days

April 10-31: Examination Period