

**WESTERN UNIVERSITY**  
**DEPARTMENT OF GEOGRAPHY**  
**GEOGRAPHY 3211: Spatial Statistics**

Website: <http://publish.uwo.ca/~jmalczew/3211.htm>

	<b>Lectures</b>	<b>Labs</b>
<b>Location:</b>	SSC#3028	SSC#1425
<b>Days:</b>	Monday	Monday
<b>Hours:</b>	2:30 - 4:30 pm	4:30 - 6:30 pm

**Prerequisites:** Third or fourth year status at the University including Geography 2210A/B or equivalent and Geography 2220A/B or permission of the instructor.

“Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may 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.”

### **Instructor Information**

**Name:** Jacek Malczewski

**Contact information:**

Office: Room 2422 SSC  
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Office hours: Monday 1:30 – 2:30pm  
Tuesday 9:00 – 10:00am  
or by appointment

### **TA Information**

**Name:** Jenny Tjhin

**Contact information:**

Office: Room 1424 SSC  
E-mail: [jtjhin@uwo.ca](mailto:jtjhin@uwo.ca)  
Office hours: Monday 1:30 – 2:30pm

### **Course Syllabus**

“Topics include exploratory spatial data analysis, global and local spatial statistics, spatial autocorrelation and interpolation, 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”.

There are four objectives of this course:

- (i) to apply a variety of spatial statistical methods to geographical data,
- (ii) to acquire problem solving skills with geographical data,
- (iii) to acquire skills in using GIS and statistical software for analyzing geographical data,
- (iv) 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 practice before exams. This course is also problem based,

and applied - you must practice problems and do all exercises in order to fully understand the material and successfully complete the course.

### SCHEDULE OF CLASSES

Lecture # Date	Topic	Readings
09/01/2017	Introduction: course outline	
1	Nature of spatial data Exploratory spatial data analysis	Bailey and Gatrell, pp. 3-40 Anselin, pp. 43-91
2	Spatial weights	Anselin, pp. 106-128
3	Global spatial autocorrelation statistics	Anselin, pp. 124-138
4	Local spatial autocorrelation statistics	Anselin, pp. 138-164
5	Spatial regression	Anselin, pp. 165-223 Bailey and Gatrell, pp. 282-289
6	Spatial regression (con.)	Anselin, pp.201-223
7	Geographically weighted regression	Charlton and Fotheringham
8	Spatial interpolation	ESRI, pp. 1-19. Bailey and Gatrell, pp. 161-201
9	Synthesis	
20/02/2017	Reading week	
27/02/2017	Mid-term test	
17/04/2017	TBA	

**Note!** Lecture attendance is critical. You cannot learn the material if you are not there.

### Course Materials

**Anselin L.** (2005) *Exploring Spatial Data with GeoDa: A Workbook*,  
<http://geodacenter.asu.edu/system/files/geodaworkbook.pdf>

**Bailey, T.C. and A. C. Gatrell** (1995) *Interactive Spatial Data Analysis*, London: Longman Group Limited. (QA278.2.B35 1995)

**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. <http://publish.uwo.ca/~jmalczew/GWR.zip>

**ESRI** (2001) *ArcGIS Geospatial Analyst*, Redlands: ESRI.  
<http://publish.uwo.ca/~jmalczew/geostat.zip>

### Methods of Evaluation

#### LAB SCHEDULE

Date	Topic	% of final mark	Due date
30/01/2017	Exploratory spatial data analysis	5	06/02/2017
06/02/2017	Spatial autocorrelation statistics	5	13/02/2017
13/02/2017	No lab		

20/02/2017	Reading week		
27/02/2017	No lab		
06/03/2017	Spatial regression	5	13/03/2017
13/03/2017	Geographically weighted regression	5	27/03/2017
27/03/2017	Spatial interpolation	5	03/04/2017

**You are required to attend labs in this course.** Attendance at labs is **mandatory** and absence will be **penalised by deduction of 2% of the total course mark** for each lab missed.

Each exercise will have a due date and should be handed in to your TA during the respective lab session. **An assignment loses 10% of its total possible value for each day late.** Assignments more than 5 days late will not be accepted. Medical and compassionate grounds, accomplished by suitable documentation, may be accepted as justification for late assignment submission. Labs must be stapled securely, and clearly labelled with your name, student number. Labs must be typed or hand-written legibly. Computations will be performed using GeoDA and ArcGIS.

**Your grades will be based on composite performances for the following:**

Assignments	25%
Mid-term test (open-book, 100 min. Feb. 29, 2017)	30%
Final exam (open-book, cumulative, 2 hours)	45%

The exams are designed to assess individual competence in course material. The focus is on material covered in lectures and labs. The final exam is cumulative.

A restricted open-book format applies; only a calculator, textbook and lecture notes can be used in the test and exam. The level and intensity of questions posed will reflect this facility. Checking formulae and tables is practical, but it will not be possible to look up answers to all questions in the available time. A calculator is essential for the mid-term test and final exam.

**Note:** In accordance with university policy, missed tests and exams cannot be made up except on written medical grounds and notification prior to exam date (see

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

Downloadable Student Medical Certificate (SMC) at:

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

Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments worth 10% or more of their final grade must apply to the Academic Counselling office of their home Faculty and provide documentation. Academic accommodation cannot be granted by the instructor or department.

Students with special accommodation will write make-up tests and examinations administered by the department on Fridays during respective periods of fall and winter terms. To prevent prior disclosure, the format and contents of make-ups may differ substantially from the scheduled test or examination.

## **Additional Statements**

### **Statement on Use of Electronic Devices**

No electronic devices will be allowed during tests and examinations.

### **Statement on 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, at the following Web site: [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf)”

“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.”

### **Western's commitment to accessibility**

The University of Western Ontario is committed to achieving barrier free accessibility for persons studying, visiting and working at Western.

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 661-2111 x 82147 for any specific question regarding an accommodation.

### **Mental Health**

If you or someone you know is experiencing distress, there are several resources here at Western to assist you. Please visit the site below for more information on mental health resources:

<http://www.uwo.ca/uwocom/mentalhealth/>.

### **Support Services**

Registrarial Services: <http://www.registrar.uwo.ca/>

Student Development Services: <http://www.sdc.uwo.ca/>

Social Science Academic Counselling: <http://counselling.ssc.uwo.ca/>