Geography 547 – Spatial Analysis
Fall 2009

Course description and objectives

The objective of this course is to introduce basic statistical methods for describing, modeling, and analyzing spatial (geographical) data. The majority of this course will focus on the statistical analysis of non-spatial data, such as descriptive statistics, analysis of variance, correlation analysis, regression analysis, and principal component. The rest of this course will focus on spatial data handling. In particular, spatial pattern analysis and spatial regression will be introduced. This course can be viewed as 'Introduction to' Spatial Analysis, and students interested in more advanced methods are encouraged to take Geog 625 Intermediate GIS.

Lecture Time & Location	**Lab time & location**
TR 12:30 PM - 1:45 PM Bolton B95	Lab 801: T 2:00 - 3:45 PM, 293 Bolton Lab 802: R 2:00 - 3:45 PM, 240 Sabin

Instructor	**TA**
Dr. Woonsup Choi Office: 496 Bolton Hall Phone: 229-2671 Email: choiw@uwm.edu Office Hours: M 3:00 PM – 4:00 PM and R 11:00 AM – 12:00 PM or by appointment	***Ms. Lu Chen*** Office: 440 Bolton Hall Phone: 229- 5818 Email: luchen@uwm.edu Office Hours: TR 11:00 AM – 12:00 PM or by appointment

Textbooks

Required:

Rogerson, Peter A., 2006, *Statistical Methods for Geography*, 2nd ed., SAGE Publications, ISBN: 9781412907965. Available at the Bookstore.

Optional (available at the library reserve):

James E. Burt and Gerald M. Barber, 1996, *Elementary Statistics for Geographers*, 2nd ed., Guilford Press.

A. Stewart Fotheringham, Chris Brunsdon and Martin Charlton, 2000, *Quantitative Geography: Perspectives on Spatial Data Analysis*, SAGE Publications.

Software for exercise

(1) SPSS, references can been found at the Main Library

(2) An Introduction to R: can be downloaded from URL: http://www.r-project.org/
(3) ArcGIS spatial analysis toolbox

Class website

Class website can be accessed through D2L. Some materials from last year are already available.

Credit hours

This course has four credit hours (graduate and undergraduate) consisting of two 75-minute lectures and one 75-minute lab each week.

Course requirements

Prerequisites:
Junior or above; Geog 247(P); or Graduate standing; or Special Student (including School Specials, Post-Baccalaureate, Certificate, University Specials, 2nd Degree)

Examinations:
There will be three examinations for this course, which are NOT cumulative.

Exercises:
Six take-home exercises will be given and collected corresponding to the topic covered in the class. Each of them will be handed out during a lab session and must be submitted to TA by the beginning of the following lab session.

Class participation:
Throughout the semester, quizzes and other assignments may be given without advance notice as a component of class participation. Attendance and participation in class discussion are expected to all students.

Class project (graduates only):
A project that utilizes statistical technologies to solve research problems is required for graduate students. The project consists of topic (1 page), preliminary report (2 pages), in-class presentation, and paper, each of which is due on different days and graded separately. Each item must be submitted by 12:30 PM of the due date on D2L. PAPER FORMAT: 10-13 pages excluding cover and references, 2.5 cm margins, double-spaced, paginated, and 12-pt font size. PAPER DUE DATE: 12:30 PM of the 15th of December (on D2L).

UG project (optional):
Undergraduate students can elect to do class project to obtain up to 50 additional points. The same requirements as the graduate project apply. Failure to submit the proposal on time results in denial of the opportunity.

Evaluation

Grades will be assigned on the basis of the total points accumulated from the course requirements throughout the semester.

Points:

	UG	G
Exams	150	150
Pop quizzes	30	30
Assignments	100	100
Project	N/A	100 (Topic 10; Preliminary 10; Presentation 20; Paper 60)
UG Project	(50)	N/A
Participation	20	20
TOTAL	**300**	**400**

Grading scale:

- A: 90-100%, A-: 87-89%
- B+: 83-86%, B: 80-82%, B-: 77-79%
- C+: 73-76%, C: 70-72%, C-: 67-69%
- D+: 63-66%, D: 60-62%
- F: 0-59%

Other course policies

Disability statement:
Any student who feels he or she may need an accommodation based on the impact of a disability should contact Instructor privately as early as possible to discuss his or her specific needs.

Late submissions:
Any late submission results in loss of 5% of the maximum point per hour or 1/5 of the maximum point per day, whichever is smaller. No excuses will be accepted regarding the Internet problems.

Religious observances:
A student should notify Instructor, within the first three weeks of the beginning of class, of the specific days or dates on which he or she will request relief from an examination or academic requirement for a religious observance. The exam or academic requirement will be rescheduled or the student will be given a make-up. The student notification will be kept confidential.

Finality of grade:
All grades, once released on D2L or PAWS, are final except in cases of clerical error.

Other notice:

- Make-ups will be allowed at the discretion of Instructor when a pre-approval has been obtained or in case of emergency with written proof
- Cheating on exams, quizzes, or lab exercises will not be tolerated. Additional information about the policies and procedures can be found at http://www4.uwm.edu/secu/SyllabusLinks.pdf and are posted in the Geography Department main office, BOL 410
- In the event of disruption of normal classroom activities due to an H1N1 swine flu outbreak, the format for this course may be modified to enable completion of the course. In that event, you will be provided an addendum to this syllabus that will supersede this version.
- Other unspecified matters will be handled according to the University policies listed on http://www4.uwm.edu/secu/SyllabusLinks.pdf
- If you are having any trouble in class, please see Instructor as soon as possible.
- Email is the best way to contact Instructor. Your emails will be responded to by the end of the next office hour. Make sure to have the subject of the mails start with [Geog 547].

Tentative schedule

Week	Date	Lecture topic	Ch.	Lab and exercise
1	3-sept.	Introduction to statistical analysis	1	**No lab this week**
2	8-sept.	Descriptive statistics and data distribution	2	SPSS: Descriptive statistics
	10-sept.			
3	15-sept.	Probability	3	SPSS: data distribution Exercise 1 handed out
	17-sept.	Probability	4	
4	22-sept.	Hypothesis testing and sampling	5	SPSS: binomial test
	24-sept.	Hypothesis testing and sampling	5	
5	29-sept.	Analysis of variance	6	SPSS: t-test Exercise 2 handed out
	1-oct.	Analysis of variance	6	
6	6-oct.	**Exam 1**		SPSS: one-way ANOVA
	8-oct.	Corrleation	7	
7	13-oct.	Corrleation **Mid-term evaluation**	7	SPSS: correlation Exercise 3 handed out
	15-oct.	Regression analysis	8	
8	20-oct.	Regression analysis	8	SPSS: simple regression
	22-oct.	Multiple regression	9	

9	27-oct.	Multiple regression	9	SPSS: multiple regression Exercise 4 handed out
	29-oct.	Principal component analysis	12	
10	3-nov.	Principal component analysis	12	
	5-nov.	Spatial patterns	10	
11	10-nov.	**Exam 2**		SPSS: PCA
	12-nov.	Guest lecture **Project proposal proposal due**		
12	17-nov.	Spatial patterns	10	Moran's I Exercise 5 handed out
	19-nov.	Spatial regression	11	
13	24-nov.	Spatial regression **Project preliminary report due**	11	**No lab this week**
	26-nov.	**Thanksgiving recess**		
14	1-déc.	Project presentation		Exercise 6 handed out
	3-déc.	Project presentation		
15	8-déc.	Project presentation		**No lab this week**
	10-déc.	**Exam 3**		
16	15-déc.	**Term paper due**		