

LEHMAN COLLEGE
City University of New York
Department of Earth, Environmental and Geospatial Science

GEP 630 / EES79903
Geostatistics & Spatial Analytical Concepts
(3.0 credits, 4.0 hours)
and
GEH245
Introduction to Quantitative Methods of Geography
(3.0 credits, 3.0 hours)

Syllabus, Spring 2016

Instructor: Glen Johnson, PhD
Office: Gillet Hall, Rm. 413
Office hours: Wednesdays from 2:00 – 5:00 PM or by appointment (email)
Email: glen.johnson@lehman.cuny.edu (best way to contact me)

Course Duration: February 3, 2016 – May 25, 2016
Time: Wednesday 6:00 – 9:30 PM (GEP 630 / EES79903)
6:00 – 8:40 PM (GEH 245)
Room: 322 Gillet Hall, Lehman College

Course Description:

Emerging fields of geospatial statistics, applying quantitative techniques to real-world geographic problems. Concepts and application of exploratory spatial data analysis (ESDA), traditional statistics and geospatial statistics within various software packages, including GeoDa, ArcGIS, [R], and Excel.

Prerequisite (for GEP 630): GEP 504 or Departmental permission.

Required Text:

- Geospatial Analysis, 5th Edition. de Smith, Goodchild, Longley (2015). Available for free on-line access at <http://www.spatialanalysisonline.com/HTML/index.html>
- Additional readings will be provided via blackboard and other internet web sites.

Use of Technology and Blackboard Information:

Blackboard will be used to post documents and assignments. It can be accessed via www.lehman.cuny.edu. If you have any problems with your Lehman e-mail address, password, or blackboard login, contact the computer helpdesk at 718-960-1111.

Important Dates

Feb 4= Last day to drop with 75% tuition refund; **Feb 11**= Last day to drop with 50% tuition refund;
Feb 18 = Last day to drop with 25% tuition refund and last day to drop without the grade of "W"; **April 11** = Last day to withdraw with grade of "W" (no refund)

Course Learning Objectives:

Upon successful completion of this course, students are expected to:

- Clearly present geospatial patterns of quantitative measurements through thematic and other types of symbolic mapping, using appropriate cartographic techniques;
- Identify and apply appropriate statistical methods to accompany maps and other graphical presentations of data in order to objectively determine the significance of geospatial and spatiotemporal patterns and associations;
- Know when and how to apply quantitative geospatial analysis for helping to solve the information needs that arise from real-world challenges, particularly from environmental and public health issues;
- Understand the limitations of geospatial analysis, especially the potential for different, conflicting, messages that depend on choice of mapping and analysis parameters;
- Present geospatial analyses through a written paper and/or an oral presentation that clearly and concisely expresses a problem, the methodology to address the problem, the analytical and graphical results, and finally to summarize and explain the meaning of results in plain language for a mixed audience.

Course Format:

This course includes lectures, discussions, computer lab, readings, assignments, quizzes and final exam.

Grading Policy:

Grades will not be curved, there will be no extra credit and no grades will be dropped.

Components of Final Grade:

<u>Graduate Students</u>	
5%	class participation
50%	Assignments
30%	Term Project
5%	Mid-Term Quiz
10%	Final Exam

<u>GEH 245 Students</u>	
10%	class participation
50%	Assignments
25%	Term Project
5%	Mid-Term Quiz
10%	Final Exam

Grade Scale

<u>GEH 245</u>		<u>GEP 630 / EES79903</u>	
A	≥ 93%	A	≥ 93%
A-	90-92%	A-	90-92%
B+	87-89%	B+	87-89%
B	83-86%	B	83-86%
B-	80-82%	B-	80-82%
C+	77-79%	C+	77-79%
C	73-76%	C	73-76%
C-	70-72%	C-	70-72%
D+	67-69%	F	<70%
D	63-66%		
D-	60-62%		
F	< 60%		

Class Participation:

Class participation includes engagement in discussions and answering of questions during lecture. Lateness and absence will count against this part of the grade.

Assignments:

Assignments, which account for 50% of the final grade, consist of in-class and take-home work. They include data compilation and analysis using various software, plus interpretation of results. Assignments will be submitted by their respective due dates as brief write-ups with appropriate tables, maps and other graphics as needed.

All assignments must be emailed *before* the scheduled class time on the due date to receive credit.

Written assignments must be saved in either PDF format or as a WORD document (.DOC or .DOCX), having 1" margins, 1.5" spacing, 12 point fonts, and be saved as

LastName_FirstName_AssignmentName (e.g. Smith_Joe_Assignment1.doc). The email containing the file should be titled with the course number followed by the student name and assignment name (e.g. **GEP630, Joe Smith, Assignment 1**).

Testing:

A midterm quiz, worth 5% of the final grade, will be done as an open-book, online exercise.

A comprehensive final exam, worth 10% of the final grade, will be taken in-class during final exam week.

Term Project:

The term project is a substantial part of the final grade. While students are encouraged to work together to help each other, each student must submit an independent project. Graduate students are required to present their project to the class towards the end of the semester, following a similar format as a conference presentation. Undergraduate students are not required to present their term project, but may do so if desired and if time allows. All students must submit either a power point presentation or a report if they do not present (undergrads). Whether submitted as a presentation or a report, the project must follow the structure of 1) Introduction, 2) Methods, 3) Results, 4) Conclusions 5) Cited references and acknowledgements. Each project will be graded according to the rubric outlined below, for a total of 12 points (12/12 = full grade).

	Beginning 1	Developing 2	Accomplished 3	Exemplary 4
Maps and other Graphics	incomplete or are not relevant to data presented	appropriate, but are lacking accuracy	appropriate for data; overall presentation is acceptable, but with minor errors	appropriate for the data, clearly presented and easy to interpret; with no errors
Statistics	Incomplete, incorrect or inappropriate statistics presented	Appropriate statistical methods, but incorrect results	Appropriate statistical methods and results, but with minor errors	Appropriate statistical methods and results, with no errors
Presentation and/or Report	Incomplete, unorganized, and difficult to follow	Communicates some important information, with major omissions; not organized well	Communicates important information, with acceptable organization	Communicates important information; well organized; clear scientific language used

Course Policies

Lateness and absences: Lateness or absence will count against your class participation grade unless there is an emergency or it is cleared with the professor in a timely fashion *before* class. If you miss a session, it is your responsibility to check blackboard and with your classmates for notes and other course materials.

Late submission of assignments or exams: Late assignments/exams will generally not be accepted unless it is cleared with the professor *well before the due date*. Under special circumstances, unexcused late assignments may be accepted (at the professor's discretion) but one full letter grade will be subtracted. If there is a medical reason for lateness, please supply documentation.

Blackboard: Blackboard will be used to distribute and update assignments, readings, and other course materials. It is the student's responsibility to check it regularly.

Use of Personal Communication Devices: The use of cell phones and other portable communication devices are not permitted during class.

Computers: Room 322 Gillet Hall is a computer lab where the following rules apply:

- During lectures, computers can only be used for following the presentation on power point or for taking notes. Non-class uses, such as checking personal email and personal web browsing, will reduce the "class participation" component of your final grade (the instructor will know!).
- No drinking or eating of any kind in the lab.
- **NO PRINTING OF ANY MATERIALS WITHOUT PERMISSION FROM THE INSTRUCTOR OR THE LAB MANAGER!**

Incompletes: A grade of incomplete will **only** be considered if you are clearly making a good faith effort to complete the course (i.e., attending regularly, participating in discussions) and have a good reason for not completing the work.

Dropping: the last day to drop the course with the grade of "W" is April 16 (no refund)

Academic dishonesty: Academic dishonesty will not be tolerated. Academic dishonesty includes, but is not limited to, cheating, plagiarizing (including "cutting and pasting" or paraphrasing information from the internet without proper citation), fabricating information or citations, facilitating acts of academic dishonesty by others, submitting work of another person or papers written for other courses, or tampering with the academic work of other students. Students may be asked to submit their notes and references to prove that their work is their own. For further clarification, please read CUNY's policy on academic integrity at

http://www.lehman.edu/lehman/about/policies_pdf/CUNYAcademicIntegrityPolicy.pdf. Violators will be reported to the head of the Department and to the Dean of Student Affairs.

Syllabus Modification: The instructor may modify the syllabus and study plan.

Accommodation for Students with Disabilities:

Lehman College is committed to providing access to all programs and curricula to all students. Students with disabilities who may need classroom accommodations are encouraged to register with the Office of Student Disability Services. For more information, please contact the Office of Student Disability Services, Shuster Hall, Room 238, tel #: 718-960-8441.

The Academic Center for Excellence (ACE) and the Science Learning Center (SLC):

Lehman College has two tutoring centers on campus. The ACE provides appointment-based and drop-in tutoring in the humanities, social sciences and writing, as well as general writing skills. The SLC provides drop-in tutoring for natural and computer science courses. To obtain more information about the ACE and SLC, please visit their website at <http://www.lehman.edu/issp>, or call the ACE at 718-960-8175, and the SLC at 718-960-7707.

Schedule:

-Readings are to be done *before* the class for which they are assigned (e.g. the readings for session 3 should be done in advance of session 3, etc.). "GA" refers to "Geospatial Analysis, 5th Edition. de Smith, Goodchild, Longley. (available at <http://www.spatialanalysisonline.com/HTML/index.html>)

-Assignments are due on the dates that they are posted in the schedule below.

-The schedule, readings, and assignments are *subject to change* by the instructor.

Session	Date	Topic	Readings	Assignments (due date)
1	2/3	Introduction to topic and software		Download / install / familiarize with GeoDa and SatScan
2	2/10	Data quality considerations and Introduction to smoothing methods	GA, Chaps. 1,2,3, 5.1, 5.2, 5.5; Boscoe and Pickle, 2003; Rushton, 2003	Lab 1: ESDA and basic smoothing of thematic maps (due 2/11)
3	2/17	Cluster Detection 1: Point Pattern Analysis	GA, Chaps. 5.4	Lab 2: Point Pattern Analysis (due 2/25)
	2/24	Cluster Detection 2: Spatial Lattice Patterns	SatScan manual; GA, Chap. 5.2.6;	Lab 3, part 1: Lattice Cluster Analysis (due 3/11)
4	3/2	Cluster Detection 3: Spatio-temporal Patterns	SatScan manual; Kulldorf et al 2005 Recuenco et al 2007	Lab 3, part 2: Lattice Cluster Analysis (due 3/11)
5	3/9	Geostatistics 1: Variograms	GA, Chap 6.6.1; 6.7.1	Lab 4, part 1: Geostatistics (due 3/25)
6	3/16	Geostatistics 2: Kriging	GA, Chap 6.7.2	Lab 4, part 2: Geostatistics (due 3/25)
7	3/23	Mid-term quiz NO CLASS		
8	3/30	Measuring Spatial Associations 1: Ordinary Least Squares and Geographically Weighted Regression	GA, Chap 5.6.1; 5.6.2; 5.6.3	Lab 5, part 1: Spatial Regression (due 4/15)
9	4/6	Measuring Spatial Associations 2: Spatial Regression	GA, Chap 5.6.4; Johnson and Lu 2011 Johnson 2004 (optional)	Lab 5, part 2: Spatial Regression (due 4/15)
	4/13	Measuring Spatial Associations 3: Cluster Detection Revisited (with covariates)		Lab 6: Covariate-adjusted Cluster Detection (due 4/29)
10	4/20	Review		
11	4/27	SPRING BREAK		
12	5/4	in-class work on term projects and student presentations		
13	5/11	Term Project student presentations		
14	5/18	Term Project student presentations		
15	5/25	Final Exam		