Geography 585, Fall 2015 Dr. Li An (Instructor)
Quantitative Methods in Geographic Research Office: Storm Hall 308B
Class meet at Hepner Hall 128 Office hours: MW 1:00 pm - 1:50 pm or
MW 2:00 pm-3:15 pm by appointment
Email: lan@mail.sdsu.edu Phone: 619-594-5932
* SAL for several times (See the course calendar below).

1. OVERVIEW

Quantitative Methods in Geographic Research (GEOG 585) introduces concepts and techniques of a set of quantitative methods, emphasizing their applications in geographic research. Quantitative methods have connections to many fields (such as ecology, commerce, marketing, and redistricting of political jurisdictions) and your daily life. Using two San Diego related spatial datasets (rather than lifeless numbers alone), we will explore questions, test hypotheses, and solve problems throughout the course, aiming to achieve the following goals:

a. Foundational knowledge: You will understand and remember a set of significant concepts, terms, and relationships (see the list).
b. Application: Given research questions, you will be able to collect and visualize data of necessity using multiple ways (e.g., graphs), make inferences and test hypotheses, and establish relationships among varying geographic phenomena through building your own regression models.
c. Integration: You will be able to relate the methods in this class to patterns and processes over varying spatial scales in other disciplines of your interests.
d. Human dimension: You will be more confident about your ability when you confront lifeless numbers, able to inform or educate other people using real-world spatial data and statistics. You will find that quantitative reasoning is fun, not boring or intimidating.
e. Learn how to learn: You will be able to identify useful resources (e.g., datasets, web sites), expose to multiple data collection and analysis methods, and find your preferred learning style.

2. PREREQUISITES

All participants are expected to have taken either GEOG 385 (Spatial Data Analysis) or a course in probability and statistics, or have the working knowledge of the materials presented in these two courses. Otherwise, seek permission from the instructor.

3. TEXTBOOK(S)

1. **Required** text: A bound collection of chapters from multiple sources, available at Aztec Bookstore, around $50 each.
2. Optional text: Statistical Methods for Geographers (Clark and Hosking 1986, John Wiley & Sons: New York. ISBN 0-471-81807-0), available at SDSU bookstore; you can also buy online (e.g., amazon.com) at a possibly lower cost.

4. COURSE ORGANIZATION AND GRADING

Your scores of the class (1000 points) will be comprised of the following components:

a. 200 points (20%) for in-class work, such as group discussions, individual-group quizzes, and in-class short assignments (e.g., essays).
b. 200 points (20%) for the two open-book and open-notes midterm exams, 100 points each.
c. 300 points (30%) for the six home assignments, 40, 80, 30, 50, 40, and 60 points for each. Undergraduate students are only required to work on **FOUR** assignments, and the rest two will get a score corresponding to the average percentage of the four that are completed (If more than four assignments are turned in, the four scores with the highest percentages will be kept, and the rest two scores will be replaced by a score corresponding to the average percentage of the top four).
d. 300 points (30%) for a class project.
   Proposal: 50 points (the average of your 1st proposal and your revised proposal)
   Proposal presentation: 30 points
   Letter to stakeholders or government: 20 points
   Final project presentation: 80 points
   Final project report: 120 points

5. POLICIES AND PROCEDURES

Computational resources: Though this course is not specifically designed for software training, participants are encouraged to get your hands wet to explore the powerful capacities of SAS and ArcGIS in geographic data processing and analysis. These two software packages are available in all the SAL and CESAR computers.

Conduct: Attendance and attentiveness in class pays off on your home assignments, exams, and project. Reading materials (e.g., newspapers) or other distracting behavior during class will not be permitted. Lateness to class disrupts the activities and is not appreciated by either the instructor or your fellow students. You are responsible to know the elements of, and penalties for, academic misconduct, including dishonesty, plagiarism, cheating, etc. Please go http://www.sa.sdsu.edu/srr/index.html for more information. The penalty for violating these SDSU policies in this class is an "F" for the exam, assignment, or in-class work where the violation occurs.

Lateness: All the assignments should be turned in on time. Late assignments will be

docked 10% per day, beginning effective on the due date, unless a pre-permission is granted from the instructor for special reasons such as sickness. Lateness over four days will not be accepted. The valid excuses for missing the exam or failing to turn in an assignment on time are illness requiring medical care, university responsibilities, or personal emergency of a serious nature. Documentation is required, or permission from the instructor. Excuses such as a time conflict, oversleeping, and forgetting are not accepted. In case that a makeup exam is justified and needed, contact the instructor as soon as possible.

Other notes: Students with disabilities should talk to me for any possible facilities or assistance. Go to http://www.sa.sdsu.edu/sds/ for more information. By the end of the second week of classes, students should notify the instructor of planned absences in this class for religious observances, if any.

GEOG 585 (F 2015) Course Calendar

Week	Date	Topic	Reading*		Assignment
1	24-Aug	1.Class introduction	Notes 1		
	26-Aug	2.Data and Intro to SAS & GIS (SAL)	Notes 2-3		
2	31-Aug	3.Computation in SAS and Excel (SAL)	RB 1	H1	
	2-Sep	4.1 & 4.2.Visualizing data-I, II (univariate, bivariate, & multivariate plots; SAL))	Notes 4.1-4.2 (CH2**)		
3	7-Sep	No class (Labor Day)			
	9-Sep	5.Descriptive statistics (SAL)	Notes 5 (CH 3)		
4	14-Sep	6.1.Statistical inference (I)	Notes 6.1 (CH 6)		H1 due
	16-Sep	6.2.Statistical inference (II)	Notes 6.2 (CH 7)		
5	21-Sep	7.Statistics for spatial data	Notes 7	H2	
	23-Sep	8.1.Spatial autocorrelation (I)	Notes 8.1 & RB 3		
6	28-Sep	8.2.Spatial autocorrelation (II)	Notes 8.2 & RB 3		
	30-Sep	No class (CCS Conference)			
7	5-Oct	**Exam 1 (contents in hmwk 1 & 2)**			
	7-Oct	Proposal presentation (50 minutes)			Proposal due
8	12-Oct	9.1.Simple regression analysis; 9.2.Simple regression analysis	Notes 9.1 (CH 9); 9.2-10	H3	
	14-Oct	10.Matrix algebra	Notes 10 & RB 2		
9	19-Oct	Topic 10 continued; 11.Multiple regression analysis (MRA)	Notes 11 (CH 10)		H3 due
	21-Oct	12.Issues in MRA	Notes 12 (CH 11)		
10	26-Oct	13.Extensions of MRA	Notes 13 (CH 12)	H4	
	28-Oct	14.Advanced topics in MRA	Notes 14		Revised proposal due
11	2-Nov	15.1.Logistic regressions-I	Notes 15.1 (CH 13.1)		
	4-Nov	15.2. Logistic linear regressions-II	Notes 15.2 (CH 13.1)	H5	H4 due
12	9-Nov	15.3. Logistic linear regressions-III	Notes 15.3		
	11-Nov	No class (Veteran's Day)			
13	16-Nov	16.1.GWR-I	Notes 16.1 & RB 4		H5 due
	18-Nov	**Exam 2 (contents in hmwk 3-5)**			
14	23-Nov	16.2.GWR-II	Notes 16.2 & RB 5	H6	Letter due
	25-Nov	No class (campus open)			
15	30-Nov	17.Cluster analysis	Notes 17		
	2-Dec	18.Factor analysis	Notes 18		
16	7-Dec	Topic 18 cont'd and course overview			H6 due
	9-Dec	**Final project presentation (9:30 --10:45)**			Report due

*Readings should be read before you come to class
Readings in parentheses are optional (not required but helpful)
Notes—The notes the instructor posted online
CH—Clark and Hosking: Statistical Methods for Geographers (optional)
RB—Readings Book (Also available from Azetc store)