

**Geography 3020 – Spatial Data Analysis
Spring Semester 2007**

Course taught by: Thomas Kontuly, Professor, Department of Geography, University of Utah,
telephone: 581-3610; e-mail: kontuly@geog.utah.edu

Fulfills: Quantitative Intensive BS course, Quantitative Reasoning (Stat/Logic) course

Objective of the course

This course will introduce students to spatial statistical concepts used for the analysis of geographically - referenced data. Unique statistical problems are faced when analyzing geographically - referenced data and classical statistical techniques are often found inadequate for solving geographic problems. Beneath any classical statistical analysis of geographically - referenced data lurks the pitfall of spatial autocorrelation, which awakens many problems that lie dormant in classical statistical situations. This realization that geographically - referenced data are special has given rise to an increased integration of spatial statistical concepts into classical statistical frameworks. The main purpose of this course is to provide this integration.

Other Information

Last day to drop (delete) this class: January 17, 2007

Last day to withdraw from this class: March 2, 2007

Persons with disabilities requiring special accommodations to meet the expectations of this course are encouraged to bring this to the attention of the instructor as soon as possible. Written documentation of the disability should be submitted during the first week of the semester along with the request for special accommodations. To do so, contact the Center for Disabled Student Services, located in room 162, Union Building, 581-5020.

Tutoring is available through the ASUU Tutoring Center in the Student Services Building, Room 330. Cost is \$6.00 per hour. Students are given a list of tutors to contact so that they may schedule a day, evening or weekend appointment. Students who qualify for a Pell Grant may also qualify for free tutoring. For more information call 581-5153 or check the following web site: www.sa.utah.edu/tutoring/.

ACADEMIC MISCONDUCT SYLLABUS STATEMENT

- * Academic misconduct will not be tolerated. Penalties may include failure of an assignment, the entire course, and/or the filing of formal charges with appropriate university authorities. Academic misconduct includes, but is not limited to, cheating, misrepresenting one's work, and plagiarism:
 - * Cheating involves the unauthorized possession or use of information in an academic exercise, including unauthorized communication with another person during an exercise such as an examination.
 - * Misrepresenting one's work includes, but is not limited to, representing material prepared by another as one's own work or submitting the same work in more than one course without prior permission of all instructors.
 - * Plagiarism means the intentional unacknowledged use or incorporation of any other person's work in one's own work offered for academic consideration or public presentation.
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Syllabus

Geography 3020 - Spatial Data Analysis

Spring Semester 2007
Office: 270 G OSH (581-3610)

Class Times: MW 10:45 AM - 11:35 AM
Office Hours: MW 12:45 PM – 2:30 PM

Required Readings

D. Ebdon. 1985. Statistics in Geography: A Practical Approach. New York: Prentice-Hall. (E) – a copy of the required pages on reserve at the Marriott Library.

J. C. McGrew, Jr. and C. B. Monroe. 2000. An Introduction to Statistical Problem Solving in Geography. Boston: McGraw Hill. (M & M) – a copy of the required pages on reserve at the Marriott Library.

W. A. V. Clark and P. L. Hosking. 1986. Statistical Methods for Geographers. New York, NY. John Wiley & Sons. (C&H) – a copy of chapters 9, 10 & 11 on reserve at the Marriott Library.

Course Outline

Dates and Topic

Required Readings

January 8

Introduction to the class and labs

January 10

Scientific Method. Descriptive & Inferential Methods. Central Tendency. Dispersion. Skewness & Kurtosis.

E pp. 1-2, 22-28
E pp. 2-5, 22-31;
M & M pp. 37-51

January 15 – no class – holiday

January 17

Spatial Statistics: Central Tendency & Dispersion – Mean Center and Standard Distance

E. pp. 128-141

January 22

Mean Center and Standard Distance-continued

E. pp. 128-141

January 24

Standard Distance-continued. Standard Deviational Ellipse

E. pp. 128-141

January 29

Probability. Normal Distribution

E pp. 5-10;
M & M pp. 65-69, 75-78.

January 31 Hypothesis Testing	M & M pp. 115-123
February 5 Spatial Relationship: an Introduction to bivariate relationships – Chi Square Analysis	E pp. 65-71, 206
February 7 Spatial bivariate relationships – continued- Product Moment Correlation	E 90-97
February 12 Product Moment Correlation-continued	E 90-97
February 14 A nonparametric test. Spearman's Rank Correlation	E pp. 97-101
February 19 - no class – holiday	
February 21 Spatial Relationships: the Simple Linear Regression Model	E. pp. 106-114
February 26 Spatial Relationships: the Simple Linear Regression Model-continued	E. pp. 106-114
February 28 Analysis of Variance in Regression	E. pp. 75-78
March 5 Spatial Sampling. Sampling Methods & Estimates from Samples.	E. pp. 34-52
March 7 Spatial Sampling – continued Sampling Size. Point, Line, & Area Sampling	E. pp. 34-52
March 12 Nonlinear regression analysis	E pp. 120-125
March 14 Assumptions of the regression model	E pp. 111-115
March 19 – no class – Spring break	
March 21 – no class – Spring break	

March 26 Spatial Relationships: Multiple Regression Analysis	C&H-Ch. 9 & 10
March 28 Multiple Regression Analysis-continued	C&H-Ch. 9 & 10
April 2 Multiple Regression Analysis –continued outliers & multicollinearity	C&H-Ch. 11
April 4 Point Pattern Analysis - Nearest Neighbor Analysis	E. pp. 143-149,220-222
April 9 Nearest Neighbor Analysis-continued	E. pp. 143-149,220-222
April 11 Area Pattern Analysis: Categorical Data. Join Count Spatial Autocorrelation Technique	E. pp. 150-155, 219
April 16 Area Pattern Analysis: Interval Data. Moran Spatial Autocorrelation Technique – Point Data	E. pp. 155-163
April 18 Moran Spatial Autocorrelation-continued. Area data. Line data	E. pp. 155-163
April 23 Moran Spatial Autocorrelation-continued. Area data. Line data. Network data.	E. pp. 155-163
April 25 Spatial Weighting Functions	

Grade Contribution

Homework Assignments (approx. 14 in number)	100% of total grade
Total	<hr/> 100% of total grade