

**Master Syllabus**  
***Department of Geography***

**GEOG 250: Spatial Analytical Methods in Geography**

**Course Description**

This course serves as a basic introduction to the quantitative methods employed by geographers to describe, analyze and interpret geospatial datasets. Lecture topics will include basic descriptive statistics, hypothesis formulation and testing, sampling strategies, geographical association and correlation analysis, regression, and a multivariate statistics overview. (3 credit hours).

Prerequisite: MATH 125 or higher  
Restriction: Geography Majors

**Course Objectives**

This course serves as a basic introduction to the quantitative methods employed by geographers to describe, analyze and interpret geospatial datasets. Lecture topics will include basic descriptive statistics, hypothesis formulation and testing, sampling strategies, geographical association and correlation analysis, regression, and a multivariate statistics overview (e.g., cluster analysis). Emphasis will be placed on application of statistical methods to problems in geography rather than mathematical theory and derivation. Hence, lecture topics will be illustrated through examples of spatial and temporal relationships found in both physical and human geography.

The primary objectives of this course are:

- To introduce basic statistical methods used by geographers in research
- To learn how to apply statistical techniques to solve geographical problems involving spatial datasets
- To utilize both manual and computer-based analysis techniques (e.g., SPSS, Microsoft Excel) for the statistical analysis and display of geospatial data
- To provide knowledge regarding spatial analytical methods found in the geography discipline and its literature

**Course Rationale**

Quantitative methods have been increasingly part of geographic research and a thorough understanding of elementary statistics is essential for work and development in this field or other related sciences. Students will learn how to understand and apply the various basic and spatially oriented statistical methods to geographic data. This foundation will enable them to

employ this knowledge in more advance courses that involve a substantial research component. This class comprises one of the five courses that are part of the core geography curriculum and is required by all geography majors regardless of option.

### **Course Content and Format**

Students will be presented material in two ways: 1) a lecture-style format that will include class discussion on various geographical statistical problems; 2) a computer lab format where students will learn to apply statistical theory to a variety of geographical problems using a statistical software package. The following shows an example of a potential outline of topics for this course:

- I. Basic Statistical Concepts in Geography
  - A. Introduction: The Context of Statistical Techniques
  - B. Geographic Data: Characteristics and Preparation
- II. Descriptive Problem Solving in Geography
  - A. Descriptive Statistics
  - B. Descriptive Spatial Statistics
- III. The Transition to Inferential Problem Solving
  - A. Probability
  - B. Basic Elements of Sampling
  - C. Estimation in Sampling
- IV. Inferential Problem Solving in Geography
  - A. Elements of Inferential Statistics
  - B. Two-Sample and Dependent-Sample Difference Tests
  - C. Three-or-More-Sample Difference Tests: Analysis of Variance Methods
  - D. Goodness-of-Fit and Categorical Difference Tests
  - E. Inferential Spatial Statistics
  - F. Correlation
  - G. Regression

*Possible Textbooks:*

McGrew, J. C., Jr. and C. B. Monroe, 1999: *An Introduction to Statistical Problem Solving in Geography (2<sup>nd</sup> Edition)*. McGraw-Hill Science/Engineering/Math, pp. 264.  
 ISBN-13: 978-0697229717

Burt, J. E., G. M. Barber, and D. L. Rigby, 2009: *Elementary Statistics for Geographers*. The Guilford Press, pp. 653. ISBN-13: 978-1572304840

Walsh, A. and J. C. Ollenburger, 2000: *Essential Statistics for the Social and Behavioral Sciences: A Conceptual Approach*. Prentice Hall, pp. 320. ISBN-13: 978-0130193391

### **Methods for Evaluating Student Performance**

Forms of evaluation might include examinations, quizzes, assignments (including those utilizing statistical software packages such as SPSS), and a final project.

### **Evaluation of the Course**

Student evaluation of the course, administered anonymously.