Course Description:
This is the second course in statistics for those interested in spatial applications. After a brief review, the first section of the course will cover ANOVA. The second major topic is correlation between two variables. The primary focus of the course is on regression techniques. Regression is one of the most widely used statistical techniques, and this material will receive a relatively thorough treatment. The last couple weeks of the course will address techniques of spatial pattern analysis and some spatial aspects of regression. Examples of analysis in geographic research will be provided throughout the course.

Prerequisites:
An introductory course in statistics

Required Materials:

You will need a hand-held calculator for homework and exams. You may not use a cell phone or computer calculator for the exams.

Many of the exercises will require the use of statistical software. You are free to choose your own software. The R software environment will be introduced and in class examples will use this software. R is freely available for download (http://www.r-project.org/) and is available in the Geographic Information and Analysis Laboratory (GIAL), located in 145 Wilkeson. Class accounts will be provided to enable access to this lab.

Assignments and course materials will be posted on UBLearns.

Internet access will be required for some assignments.

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework and Participation</td>
<td>10%</td>
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<tr>
<td>Three Exams</td>
<td>90%</td>
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Homework:
Late homework assignments will not be accepted without a medical excuse and documentation. They should be done neatly and turned in personally at the beginning of class on the due date. Assignments will be distributed through UBLearns.
Exams:
Exams will consist of statistical problem solving and some short answer questions. Makeup exams will only be given with a medical excuse and documentation. You must contact me before the exam to arrange a makeup.

Attendance:
Attendance is mandatory. You should contact a classmate to get any class notes that you miss.

Academic Integrity:
Any academic misconduct (plagiarism, cheating on exams, and copying homework) will be penalized with a zero score on the given assignment or exam. I promise to do my best to evaluate each assignment and exam solely on its content and in an impartial manner.

Outline:
1. Introduction and review of probability and hypothesis testing
2. Common methods of statistical inference
   a. Analysis of variance (ANOVA)
   b. Correlation
   c. Regression
   d. Multiple Regression
   e. Generalized Linear Models

Learning Outcomes:
<table>
<thead>
<tr>
<th>At the end of the semester students will...</th>
<th>Assessment:</th>
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<tbody>
<tr>
<td>Be able to perform and understand statistical hypothesis testing.</td>
<td>All assignments and exams.</td>
</tr>
<tr>
<td>Perform ANOVA and non-parametric alternatives.</td>
<td>Assignment 2 and Exam 1</td>
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<tr>
<td>Perform Pearson and Spearman correlation analysis.</td>
<td>Assignment 3 and Exam 2</td>
</tr>
<tr>
<td>Perform simple linear regression.</td>
<td>Assignment 4 and Exam 2</td>
</tr>
<tr>
<td>Perform multiple regression.</td>
<td>Assignment 5 and Exam 3</td>
</tr>
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<td>Be familiar with spatial autocorrelation and how to characterize it graphically and mathematically.</td>
<td>Exam 3</td>
</tr>
<tr>
<td>Be familiar with variable selection and regression model diagnostics.</td>
<td>Assignment 5 and Exams 2 and 3</td>
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Course TA:
Scott Ptak
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