GEO-SCI591D Spatial Data Analysis
3 cr, Spring 2008

Course Location: Morrill III 126, Lab in Morrill IV South 271
Lecture Time: Tu 2:30PM - 5:15PM
Instructor: Dr. Qian Yu
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Office Hours: M 2:30-3:30pm W 1:30-2:30pm or by appointment

Purpose: The course covers a broad range of spatial data analysis methods from basic statistics to advanced computational techniques. The topics include point pattern analysis, spatial prediction based on deterministic methods and Geostatistical theory, spatial autocorrelation and regression, and raster analysis. The labs are based on ArcGIS and statistical software.

The goal of this course is to introduce students various quantitative methods, particularly multivariate regression and spatial analysis, used in geographical data and applications; to teach students to understand these concepts and to be able to apply them in geographical problems.

Format: 60% lectures and class discussions, 40% seminars, class exercises including computer lab and project. Take home exercises and lab practice will be assigned to students to get familiar with the concepts discussed in class.

Prerequisite
- Basic statistical knowledge
- Introductory level GIS and know how to use ArcGIS

Required textbook:

Lab software: ArcGIS and R.

References:

Course Evaluation: Assignment 35%, Class Participation 10%, Project (including presentation and report) 55%

Class schedule and reading
Available at http://www.geo.umass.edu/courses/geo591d/. It will be updated with classes progressing.
Notes and assignments in PDF will be published on the SPARK. https://webct.oit.umass.edu/
Notices and announcement will be published on SPARK Bulletins for update, schedule change and clarification questions.

**Class arrangement** (Tentative)

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<th>Date</th>
<th>Topic</th>
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<tr>
<td>Jan 29</td>
<td>Lecture 1. Concepts in spatial data and models</td>
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<tr>
<td>Feb 5</td>
<td>Lecture 2. Point Pattern Analysis: point pattern measure and test</td>
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<td>Feb 12</td>
<td>Lecture 3. Spatial Prediction: Point interpolation by deterministic methods Thiessen polygons, Trend surface, IDW, Splines, etc</td>
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<td>Feb 19</td>
<td>Monday schedule</td>
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<td>Feb 26</td>
<td>Lecture 4. Spatial Prediction: Geostatistics</td>
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<td>Mar 4</td>
<td>Lecture 5. Stationarity, Exploring spatial variation by variogram model, Kriging, etc</td>
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<td>Mar 11</td>
<td>Lecture 6. Area objects and spatial autocorrelation, GLS and spatial autoregressive models</td>
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<td>Mar 25</td>
<td>Lecture 7. Moran's I, Geary’s C</td>
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<td>Apr 1</td>
<td>Lecture 8. Raster analysis: Global and local functions</td>
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<td>Lecture 10. Watershed modeling in ArcGIS</td>
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<td>Lecture 11. Modeling in ArcGIS Model builder</td>
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<td>Lecture 12. Projects</td>
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<td>May 6</td>
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