GEOG 488/588/591
Introduction to Geographic Information Systems

CRN: 41470/41494/44234
Winter 2012

Lecture: TTh at 6:00-7:50pm in Cramer Hall 413
Lab: W 1500-1650, T 0900-1050, F 1400-1550 Cramer Hall 469

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Office: 424-C Cramer Hall
Office Hours: TTh 8-8:30pm, Cramer Hall 413 (after class) or by appointment
Course Folder: I:/Students/Instructioners/geogAdjuncts/Franczyk
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Course Objectives
GEOG 488/588 is an introductory course covering the theory and application of geographic information systems (GIS). The course includes an overview of the general principles of GIS and practical experience in its use. The practical component involves the use of the desktop GIS software package ArcGIS 10. Both the theoretical and practical components of the course are important. Without a theoretical understanding of GIS methods, you will make poor geographic modeling decisions and when necessary you will not be able to migrate to a new or different GIS software package. Without a practical understanding of GIS software, your theoretical knowledge cannot be put to use.

Text and Readings
The text for this course is "GIS Fundamentals 3rd Edition," written by Paul Bolstad. The book that will be used for the computer lab exercises is "Getting to Know ArcGIS Desktop 2nd Edition (updated for ArcGIS 10)" written by ESRI, 2010. This book comes with a CD of exercise data. You can download a trial version of ArcGIS 10 to load on your home computer from www.esri.com/esripress. Be sure to check the software and hardware requirements listed on the back of the book. Both books are required.
Lectures & Quizzes
The weekly in-class meetings will be a mix of lecture and Q and A to reinforce key concepts. Students may email me with questions at any time and I will answer within 24-hours. Please CC Neil so that he might answer you as well. Before the class period, the lecture power point will be available in .pdf format in the course folder (see page 1) and online at D2L. Eight weekly quizzes will be given throughout the quarter, starting the second week. They will not be given in class but will be available on D2L on a Friday and due by the following Tuesday.

Computer Lab Exercises
Each week of the term has an assignment that uses ArcGIS software. Each assignment will be a mix of tutorials from the Getting to Know ArcGIS Desktop book plus some additional exercises where you apply what you learned in the tutorial. These exercises provide a way to acquire skills using ArcGIS and allow you to apply the course concepts to real data. The lab exercises are independent study. You can perform these exercises on a home computer using the trial software or you can use the labs in the geography department. You will be given access to the computer lab in Cramer Hall 469 which you can use any time (except when other classes are being held). You can download a trial version of ArcGIS 10 to load on your home computer from www.esri.com/esripress. Be sure to check the software and hardware requirements listed on the back of the lab book. When you load the software on your computer, be sure to say yes to “evaluating extensions,” specifically Spatial Analyst. This trial version of the software does not include all the tools you have available in the lab version.

Project
All students must complete a final project in which they investigate a GIS application in depth. The project is intended to provide a deeper understanding of GIS through an investigation of a particular research problem. You will need to acquire the spatial data and the project should involve some type of spatial analysis using the GIS software package you have been using in class. That means you must do more than just make maps. It is suggested that you use secondary GIS data sources available online to do your project. While you are welcome to digitize or do a GPS survey to create your own spatial dataset, doing so is very time-consuming and is not the purpose of this project. Performing a spatial analysis is the purpose of this project. The grade for your project is based on the cohesiveness and logic of your research question, and the appropriateness of the methods and techniques. The complexity and comprehensiveness of your project will not be criteria for judging the quality of your project.
**Undergraduate students** will be given several pre-defined projects to choose from - the project will be like a lab exercise with very few instructions. Students should let me know which one of the pre-defined projects they have chosen by the beginning of week 5.

**Graduate students** will work on self-defined projects individually or in groups of no more than two. There are three stages to the project:

1. Submit a one or two page project proposal by the beginning of week 5. It should include a research question, a detailed description of the spatial and attribute databases you will use, and a conceptual description of the methods you will use. **Each student should discuss the proposal with the instructor before turning it in.**

2. Schedule your presentation for either day during the final week of class.

3. Oral presentations. Every presentation must include the following sections: an Introduction, Datasets Used, Analysis Methods, Results, and Conclusions. Turn in a printed Power Point presentation.

**Grading**

488:
- Lab Assignments 50%
- Class Attendance & Participation 5%
- Weekly Quizzes (8) 30%
- Project 15%

588/591:
- Lab Assignments 40%
- Class Attendance & Participation 5%
- Weekly Quizzes (8) 30%
- Project 25%

**Academic Integrity**

You are responsible for the content and integrity of the academic work you submit. The guiding principle of academic integrity shall be that your submitted work, examinations, and projects must be your own work. Note that cutting and pasting sources from the Internet is considered plagiarism. If you need help determining what is or is not plagiarism, please talk to the instructor.
<table>
<thead>
<tr>
<th>Date</th>
<th>Tuesday Topic/ Readings</th>
<th>Thursday Topic/ Readings</th>
<th>Lab</th>
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<tr>
<td>Jan 10/12</td>
<td>Course Overview Intro to GIS (Ch. 1, Bolstad)</td>
<td>Applications (Ch. 1, Bolstad)</td>
<td>Lab 1: Introduction to ArcGIS</td>
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<tr>
<td>Jan 17/19</td>
<td>Data Models (Ch. 2, Bolstad)</td>
<td>Cartography, Map Production, and Geovisualization (Ch. 4, Bolstad)</td>
<td>Lab 2: Symbology and Classification</td>
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<td>Jan 24/26</td>
<td>Data Sources &amp; Metadata (Ch 7, p. 166-168, Bolstad)</td>
<td>Projections and Georeferencing (Ch. 3, Bolstad)</td>
<td>Lab 3: Projections, Data Sources, and Data Acquisition</td>
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<td>Jan 31/</td>
<td>Data Models (continued) (Ch. 2, Bolstad) Project Discussion</td>
<td>Geographic Databases (Ch. 8, Bolstad)</td>
<td>Lab 4: Queries, Selecting Features by Location, Joins and Relates</td>
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<td>Feb 07/09</td>
<td>The Nature of Geographic Data (Ch. 14, Bolstad) Project Outline Due</td>
<td>Uncertainty (Ch. 14, Bolstad)</td>
<td>Lab 5: Building a Geodatabase, Creating Features, and Editing Features and Attributes</td>
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<td>Feb 14/16</td>
<td>Vector Analysis Techniques (Ch. 9, Bolstad)</td>
<td>Vector &amp; Raster Analysis Techniques (Ch. 10, Bolstad)</td>
<td>Lab 6: Preparing Data for Analysis and Vector Spatial Analysis</td>
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<td>Feb 21/23</td>
<td>Raster Analysis Techniques (continued)</td>
<td>GIS Data Collection (Chs. 5 &amp; 6, Bolstad)</td>
<td>Lab 7: Raster Spatial Analysis</td>
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<td>Feb 28/</td>
<td>Spatial Modeling (Ch. 13, Bolstad) Project Scheduling</td>
<td>Spatial Statistics and Optimization Techniques (Ch. 12, Bolstad)</td>
<td>Lab 8: Geocoding Addresses and Making Maps</td>
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<td>Mar 01</td>
<td>ArcGIS Extensions (Pages 157-175, Bolstad)</td>
<td>GIS Software (Pg 15-18, Bolstad)</td>
<td>Work on Project</td>
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<td>Mar 06/08</td>
<td>GIS Software (continued)</td>
<td>Student Presentations</td>
<td>Work on Project</td>
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<td>Mar 13/15</td>
<td>Student Presentations</td>
<td>No Class!</td>
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** The timed quizzes will be available on D2L on Friday and due by the following Tuesday starting the second week of class.