

Instructor: Jake K. Carr
0126 Derby Hall
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Office hours: M&F 8:00 to 9:00 AM - or by appointment

Course Objectives

The objective of this course is to develop a strong foundation in the techniques of spatial data analysis. More specifically the goals are: (1) to provide students with an understanding of how GIS is applied in social science and business research; (2) to familiarize students with advanced GIS modeling, spatial statistic, and scripting techniques; (3) to provide students with hands-on experience in working with various data sources and tools through a python scripting project related to their own research interest.

This course will rely heavily on lectures which will focus on the practice of spatial data analysis. Students are expected to read the required materials before class and participate in the discussion. Take home assignments will reinforce the topics introduced in the lectures. There will be a set of tutorial lab sessions throughout the term intended to develop programming skills in the open source software package called Python.

Course Reading & Lab Materials

Required Course Text:

1. *Spatial Data Analysis: Theory and Practice* (Third Edition) by Haining, Cambridge University Press, New York, 2004.

Lab exercises are extracted from the following (not required):

2. *GIS Tutorial for Python Scripting* by Allen, ESRI Press, Redlands, CA, 2014.
3. *Python Scripting for ArcGIS* by Zandbergen, ESRI Press, Redlands, CA, 2013.

Additional lecture & lab material will be drawn from (not required):

4. *GIS and Spatial Analysis for the Social Sciences: Coding, Mapping and Modeling* by Parker and Asencio, Routledge, New York, 2008.
5. *Elementary Statistics for Geographers* (Third Edition) by Burt, Barber, and Rigby, The Guilford Press, New York, 2009.
6. *Spatial Statistical Data Analysis for GIS Users* by Krivoruchko, ESRI Press, Redlands, CA, 2011.

Grading

The final course grade will be evaluated based on the following distribution:

- Class participation (10%)
Assignments (30%)
Lab exercises (30%)
Class project and presentation (30%)

Grades will be determined based on the following scale:

A: 90-100; B: 80-89; C: 70-79; D: 60-69; F: below 60.

Class Project

Students are required to formulate a project (which accounts for 30% of the final grade) through choosing a research problem and carrying out analysis using GIS techniques. The emphasis will be on creating a custom ArcMap scripting tool to carry out the analysis. You are welcome to work in teams (no more than three students in one group). Groups will present their toolbox in the final week of the semester. The toolbox materials and a written summary report are due at 5PM on December 15 (Monday). More information to come.

Academic Misconduct

Academic misconduct in any form will not be tolerated. This includes, but is not limited to, cheating and plagiarism. Students are referred to the definitions of academic misconduct found here: <http://oaa.osu.edu/procedures/1.0.html>. Plagiarism is the representation of another's works or ideas as one's own: it includes the unacknowledged word for word use and/or paraphrasing of another person's work, and/or the inappropriate unacknowledged use of another person's ideas. All cases of suspected misconduct, in accordance with university rules, will be reported to the Committee on Academic Misconduct.

Students also need to keep and handle their own lab work appropriately to avoid being copied by someone else. All the students are responsible for removing their own lab work from public-access hard drives and store the data in their own media (e.g., jump drive). Those who fail to protect their own work and result in copied lab work will also be treated as involvement in plagiarism.

Students with Disabilities

Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office for Disability Services at 614-292-3307 in room 150 Pomerene Hall to coordinate reasonable accommodations for students with documented disabilities.

Important Notice

GEOG 5220 is the prerequisite for the class. Speak with me if you have not taken the prerequisite prior to this semester.

Course Topics

Python Programming

Intro to Spatial Data Analysis (Ch. 1)

The Nature and Representation of Spatial Data (Ch. 2 & 4?)

Exploratory Spatial Data Analysis (Ch. 5 & 6)

Probability, Statistical Significance and Hypothesis Testing (Ch. 8)

Point Pattern Analysis (Ch. 7)

Analysis of Continuous Spatial Variables (Ch. 9? & 10)

Ordinary and Spatial Regression (Ch. 11)