THE UNIVERSITY OF CHICAGO
Harris Public Policy

GIS Applications in the Social Sciences
38520-01
Spring 2023
Tuesday, 3:30-6:20 PM
Keller 1002

Course Description:

Geographic Information Systems (GIS) refers to tools and techniques for handling, analyzing, and presenting spatial data. GIS has become a powerful tool for social sciences applications over the past thirty years, permitting lines of scientific inquiry that would not otherwise be possible. This course provides an introduction to GIS with a focus on how it may be applied to common needs in the social sciences, such as economics, sociology, and urban geography, as distinct from physical or environmental sciences. Students will learn basic GIS concepts as applied to specific research questions through lectures, lab exercises, and in-class demonstrations. Examples of the kinds of topics we will pursue include how we can use GIS to understand population trends, crime patterns, asthma incidence, and segregation in Chicago. This course is designed to be "hands-on" and so demos and labs will be featured in nearly every session. We will primarily use ESRI ARC software, as the skills you learn will be directly transferable to other common packages, but will also demo Geoda.

Course Objectives:
- To understand basic concepts in GIS, cartography, and spatial data
- To be able to use GIS to create maps and conduct basic spatial analyses, with a focus on ESRI ArcGIS
- To understand how GIS can be used to facilitate or enhance analytical tasks and projects in the social sciences
- To use GIS in an actual applied research setting

Course Text:
There is no single text, and so readings will be made available on Canvas on a weekly basis.

Assignment	Date Assigned	Due Date
Final Project Group		4/4/23 (class 3)
Lab 1- Voting and Demographics	4/4/23 (class 3)	4/11/23 (class 4)
Lab 2- Buffering and Spatial Joins	4/18/23 (class 5)	4/25/23 (class 6)
Project Proposal		4/25/23 (class 6)
Midterm (Take home)		5/2/23 (class 7)
Lab 3- Map Design	5/2/23 (class 7)	5/9/23 (class 8)
Lab 4- Arc Statistical Capes	5/9/23 (class 8)	5/16/23 (class 9)
Final Group Presentation		5/16/23 (class 9)

Grading
- Participation: 10% of grade.
- 4 Lab Reports: 40% of grade.
- Midterm Exam: 20% of grade.
- Final Group Presentation: 30% of grade.
- Grading scale: A >92%; A- 90-92%; B+ 87-89%; B 83-86%; B- 80-82%; C+ 77-79%; C 73-76%; C- 70-72%; D 60-69%, F - <60%

Students may take my class pass/fail. In order to "pass", a student must **do all homework assignments**, the **midterm**, contribute to the **group project**, and **participate** in class. Lab assignments are due by the specified due date and will have ten percentage points (10%) deducted for each day they are late without advance permission due to an unavoidable personal conflict. The midterm will be based primarily on the material presented in class lectures and labs, as enriched by readings. Two weeks' notice is required for rescheduling exams or labs for unavoidable personal conflicts. Copying assignments is not permitted and considered plagiarism. Any student who believes they may need assistance should inform the Office of Student Disability Services by the end of the first week of class. Once you have received an accommodation letter, it should be presented to the course instructor immediately. https://disabilities.uchicago.edu/

Course Calendar

Week 1: Overview of GIS, how GIS is used in the social sciences, why spatial data matter.
Week 2: Measurement, coordinate systems, map scale, map errors, thematic maps, overlay
Week 3: Topology, data structures, Census data and GIS, relational databases, joins, buffering
Week 4: Data input, editing, geocoding
Week 5: Spatial autocorrelation, local indicators of spatial autocorrelation (LISA)
Week 6: Big data, data mining, social media, GPS, remote sensing
Week 7: Midterm; interpolation, web GIS, community participation GIS
Week 8: Public health applications, spatial/temporal, the future, limitations
Week 9: Final presentation