



Harris School of Public Policy  
University of Chicago  
PPHA 38520-2

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### GIS Applications in the Social Sciences

Spring 2025

Monday, 3:00 – 5:50PM

Keller 0001

## **Information about this course**

### **Background and Goals**

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 serves as 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 ArcGIS Pro and QGIS, as the skills you learn will be directly transferable to other common packages and GIS applications.

### **Prerequisites**

None, and the course assumes no previous training in GIS or geography

### **How this class will work**

Each class will have a lecture component during the first half of our meeting period, followed by a demonstration exercise (not graded) or computer-based lab exercise (graded, with report due one week afterward) during the second half, all of which is in-person. We will have one midterm examination in-class and a final group project, designed to synthesize material and concepts from the lab exercises. Participation is graded on contribution throughout the class, including class discussion. Teaching assistant(s) will help with technology during lab exercises, and they can

support students with questions about assignments and group projects. All assignments and additional readings will be posted to Canvas.

## **Grading policies and procedures**

### *Grade Components*

- 5 lab assignment reports: 50% of grade
- Midterm examination: 20% of grade
- Final group presentation: 25% of grade
- Participation: 5% of grade

### *Grading Scale and Policies*

#### Grade Minimum Score

A	93%
A-	90%
B+	87%
B	83%
B-	80%
C+	77%
C	73%
C-	70%
D	60%

All composite scores lower than 60% will receive a failing grade.

Students may take this class pass/fail. In order to obtain a “pass” grade, a student must complete ALL homework assignments, the midterm, contribute to the group project, and participate in class. Lab assignments are due by the specified due date. The midterm will be based on material presented in lectures, labs, and readings. Two weeks’ notice is required for rescheduling exams or labs for unavoidable personal conflicts. Copying assignments from another student is not permitted, and will be considered plagiarism. Any student who believes they 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 immediately to the course instructor.

### *Late Policy*

Lab assignments will be marked down by 10% for each calendar day they are late. Assignments that are more than one week late will not be accepted.

### *Course calendar*

Week 1: Overview of GIS, how GIS is used in social sciences, and why spatial data matter

Week 2: Measurement, coordinate systems, map scale, spatial errors, thematic maps, overlays

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

Week 6: **MIDTERM EXAM.** Big data, data mining, social media, GPS, remote sensing

Week 7: Interpolation, web GIS, community GIS

Week 8: Public health applications, spatial/temporal datasets, future and limitations

Week 9: **FINAL PRESENTATIONS**

### **Instructor Office Hours**

Weekly instructor office hours will be held from 1:00 to 2:40PM (before class) on Mondays at the Crerar Library GIS Hub, which is located on the first floor, in the MADD center. Additional office hours are held on Tuesdays from 10:30-11:30AM, at Regenstein Library's Center for Digital Scholarship. Students should also feel welcome to email their TA or instructor for assistance outside of regular office hours.

### **General Resources Available to Students**

- [Harris Academic Support Programs and Handbook](#)
- [Student Wellness](#)
- [UChicagoGRAD](#)

### **Harris School and University of Chicago Policies**

- [Harris School Policies](#)
- [University General Policies](#)
- [University Academic Policies](#)
- Policy on audio and video [recordings](#)