

## *GIS Applications in the Social Sciences*

38520- 01

Spring 2019

*Instructor: Ned English*

*TAs: TBD*

### *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.

### *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. Additional readings will be suggested for enrichment.

<i>Assignment</i>	<i>Date Assigned</i>	<i>Due Date</i>
Final Project Group		4/16/19 (class 3)
Lab 1- Voting and Race/Ethnicity	4/16/19 (class 3)	4/23/19 (class 4)
Lab 2- Buffering	4/30/19 (class 5)	5/7/19 (class 6)
Project Proposal		5/7/19 (class 6)
Midterm		5/14/19 (class 7)
Lab 3- Map Design	5/21/19 (class 8)	5/28/19 (class 9)
Lab 4- Arc Statistical Capes	5/28/19 (class 9)	6/4/19 (class 10)
Final Group Presentation		6/4/19 (class 10)

### *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%, B - 91%-84%, C - 83%-76%, D - 75%-68%, F - <67%*

Lab assignments will due by the specified due date, and will have one letter grade deducted for each day they are late without advance permission due to an unavoidable personal conflict. Exams will consist of the material from your textbooks as well as any readings and/or material presented in class lectures and labs. Two weeks' notice is required for rescheduling exams or labs for unavoidable personal conflicts. Copying assignments is not permitted and considered plagiarism.

### *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

Week 8: Interpolation, web GIS, community participation GIS

Week 9: Public health applications, spatial/temporal, the future, limitations

Week 10: Final presentation