

Spatial Thinking, GIS, and Related Methods

Development Sociology 3140

Spring 2021

Lecture: 3:45-4:35pm Mondays and Wednesdays

Lab: 2:40-4:35pm Fridays

Instructor

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or by appointment

Teaching Assistant

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Office Hours: Zoom, Monday 10am-12noon
or by appointment

IMPORTANT: This class will be offered remotely. You will need to be able to do labs and projects on your own computer. We will use QGIS, an open-access application that you can download and install for free. Your device will need a minimum 8 GB RAM and 25 GB of free local drivespace.

Instruction will be mainly oriented to Windows systems. QGIS is available for Mac, and Mac users are welcome to register, but the instructors may be limited in our ability to troubleshoot.

Everything happens in space. Knowing where people are located and events occur in space provides clues to understanding processes traditional social analysis techniques may not reveal. In this course we will develop a conceptual understanding of how social processes are patterned in space and learn how to use tools for presenting and analyzing social patterns across space. In-class lectures and activities will provide conceptual and technical foundations for spatial analysis. Lab sessions and assignments will give students a practical introduction to using GIS software to map and analyze spatial patterns.

By the time we are done, you will be able to

- Explain conceptual issues and choices involved in making maps and understanding phenomena that take place across space.
- Use GIS software to create informative maps and justify your choices in displaying information on those maps.
- Gather data, conduct an analysis, and present findings regarding a spatial phenomenon.

Note: We are constantly on the lookout for materials that are current and helpful to you. As a result, this syllabus may change at the instructors' discretion.

Course Components

Lectures

Course lectures emphasize thinking about space and how human activities are spatially situated, introduce key concepts for GIS, present GIS case studies, and include time for discussion. Students who attend, take notes, and ask questions in class and in office hours tend to excel!

- Readings** Most readings come from *GIS Fundamentals*, 6th edition, by Paul Bolstad. We will post additional readings on Canvas. You are strongly encouraged to read the text *before* we meet in lecture. *If you use an e-book or an earlier edition, it is your responsibility to find the sections that correspond to the pages assigned.*
- Map/Tool Share** Once in the semester each student will share a mapping application they have found outside course materials: either a map or a GIS tool. For maps, you will explain what the map shows and discussing the choices it represents. For tools, you'll share how the tool works and what it helps you do. Details will come in a handout.
- Quizzes** Occasionally, we will have quizzes in class. Quizzes may focus on lecture and reading material from the previous week. They may also address key concepts or techniques covered earlier. There may or may not be advance notice. Your lowest quiz grade (including 0 credit for quizzes you miss) will be dropped.
- Labs** During lab sessions, you will apply GIS concepts and techniques using QGIS (available at <https://www.qgis.org/en/site/forusers/download.html>; version 3.16 suggested). Lab assignments are due at 11:59pm the following Wednesday. Late labs will lose 10% each day afterward.
- Final Project** For your final project, you will identify a question or issue that the tools we learn in this course can address. You will apply several of these tools to conduct an analysis that addresses that question, writing a report and creating map representations that illustrate what you did. You will present your findings to the class. Details will come in a handout.

The Numbers

NOTE: DO NOT rely on the automatic calculation in Canvas, which will not accurately reflect your grade. To calculate your grade, use the figures below. We will periodically provide estimates of your current total grade on Canvas.

Item	Grade
Map/Tool Share	5
Quizzes	20
Labs	45
Final Project	30
Total	100%

Making a Good Learning and Teaching Environment

We want to foster a classroom environment that is as conducive as possible to your learning. That requires that all students have a fair chance to pay attention and take part in dialogue and that we can communicate with you without impediment. We have put together these class policies based on our experiences of what does and does not help make this possible.

Course Citizenship. We seek to create a learning community in which issues are explored and class members come to better understand the opposing views on these issues. Therefore, in class discussions we will foster candid exploration of any topic relevant to the course. Students come to this course with a wide range of views. You should come to class mentally prepared to discuss pertinent topics with

people who take positions that differ from yours. Our goal is for all members of the class to feel that their knowledge, experiences, and insights are welcomed and valued, even when other people see things differently. As a course citizen, we expect that you will both calmly explain your views and reasoning and listen to the reasoning and views of those taking positions that you differ on. This requires that we all come from a starting point where we examine assumptions and, rather than taking current arrangements for granted, are open to thinking about the possibilities and limits of alternatives.

Communication. We are available and eager to help you succeed, so please do not hesitate to reach out to us in person or through email. When doing so, please communicate clearly and with courtesy. We will do our best to respond to emails within 48 hours. It will be easiest to reach us during work hours (8am-5pm weekdays). On nights and weekends we may be harder to reach due to personal and family commitments outside of work. Likewise, we will do our best to ensure that our messages to you are clear and leave you ample time to respond. We will provide notifications through email and Canvas; please check both regularly. *To ensure that we promptly identify and address your email, please include the text "DSOC 3140" in the header.*

Office Hours. We welcome you to talk with us about your questions, concerns, and interests. You can sign up for Zoom office hours using the calendar sign-up function in Canvas. If you need to meet outside scheduled office hours, email us to make an appointment. Office hours will not be devoted to tutorial for materials that students miss when not attending class. *If you have questions about content or assignments, please ask them during lecture so we can all benefit from clarification.*

Lecture Slides. We will post lecture slides on Canvas about once a week. These slides provide a broad outline; being attentive and taking notes in class will help you retain what we cover.

Labs & Computing

Lab & Computer Access. Scheduled labs will take place online. Due to current public health restrictions, we do not have access to labs in Mann Library, but if you need access to a laptop, you can make a request via this page: <https://olinuris.library.cornell.edu/services/laptops>

Data Backup. *You should have a backup system (USB memory stick or cloud storage) on which to back up all your class work.* If you use Box, it will help to set up Box Sync or have all your data in a single folder. You are responsible for the loss of any work that is not backed up.

Extra Credit Policy

Out of concern for fairness, we do not offer extra credit. An activity that merits grade credit necessarily requires time and effort. But not all students have time available. As a result, extra credit opportunities bring a bias in favor of students who can take extra time. Since this luxury isn't available to all, we aim to give everyone a reasonable chance to do well by meeting the evaluation criteria within this syllabus.

Meeting Your Needs

Students with Disabilities: Your access in this course is important to me. If you have, or think you may have a disability, please contact Student Disability Services for a confidential discussion: sds_cu@cornell.edu, 607-254-4545, <https://sds.cornell.edu>. Please request your accommodation letter early in the semester, or as soon as you become registered with SDS, so that we have adequate time to arrange your approved academic accommodations.

Once SDS approves your accommodation letter, it will be emailed to both you and me. Please follow up with me to discuss the necessary logistics of your accommodations. If you experience any access barriers in this course, such as with printed content, graphics, online materials, or any communication barriers, reach out to me or your SDS counselor right away. If you need an immediate accommodation, please speak with me after class or send an email message to me and SDS at sds_cu@cornell.edu.

Maps are an intensely – though not exclusively – visual medium. This presents special difficulties for ensuring accessibilities for students with visual disabilities. With the guidance of Student Disability Services and the Center for Teaching Innovation, we have worked to implement accessibility measures wherever we are able, given the limitations of available resources for tactile and haptic images in online instruction. This is a work in progress. If we are not adequately meeting your needs, please notify us, and we will work with you to ensure full accessibility.

If you are experiencing undue personal or academic stress at any time or need to talk with someone about a personal problem or situation, we encourage you to seek support as soon as possible. We are available to talk with you about stresses related to your work in our class. Additionally, we can assist you in reaching out to any one of a wide range of campus resources, including

- Your college's Academic Advising or Student Services Office
- Cornell Learning Strategies Center at 255-6310, <http://lsc.cornell.edu>
- Cornell Health at 255-5155, <https://health.cornell.edu/>
- Peer Support - Empathy Assistance & Referral Service at 255-EARS, <https://www.earscornell.org/>

Academic Integrity

Students enrolled in this course are expected to abide by the University's Code of Academic Integrity. If you have not already done so, I encourage you to familiarize yourself with the code so that you understand clearly what constitutes plagiarism and cheating. Plagiarism and cheating of any kind on an examination or assignment will have serious consequences, including a possible automatic "F" for the course. The Code of Academic Integrity and information on "Acknowledging the Work of Others" can be found at <http://cuinfo.cornell.edu/aic.cfm>.

Plagiarism will not be tolerated. All required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism, as well as our own manual review. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the [Usage Policy posted on the Turnitin.com site](#).

Schedule

Below is the anticipated schedule of lectures, labs, and assignments. *Readings may be changed or added, in which case we will give advance notice in class or by email.* All lectures, labs and relevant data will be downloadable from the DSOC 3140 Canvas course site.

Date	Class #	Topic	Materials
Week 1			
8-Feb	1	Getting Started. Intro: What's a map?	
10-Feb	2	Maps as Models, Maps as Propositions	Krygier & Wood 2009, This Is Not the World. Miller 2018, A Map of Radical Bewilderment.
12-Feb	3	Lab 1: Intro to Lab & QGIS	Bolstad Ch 1
Week 2			
15-Feb	4	Introduction to Map Making	Bolstad Ch 4 pp 147-156, 181-193
17-Feb	5	Data Structures: Vector and Raster	Bolstad Ch 2 pp 39-66 (optional: read the rest)
19-Feb	6	Lab 2: Creating Map Displays	Bolstad Ch 9 385-393 (Classification); Krygier & Wood selections
Week 3			
22-Feb	7	Making Maps with Sonia Ahmad	
24-Feb	8	Geodesy and Datums	Bolstad Ch 3 pp 87-115
26-Feb	9	Lab 3: Exploring Data Structures	
Week 4			
1-Mar	10	Projections and Coordinate Systems	Bolstad Ch 3 pp 116-137
3-Mar	11	Data Collection: GPS	Bolstad Ch 5
5-Mar	12	Lab 4: Projections and Coordinate Systems	Krygier & Wood selection; https://bl.ocks.org/syntagmatic/ba569633d51ebec6ec6e
Week 5			
8-Mar	13	Data Creation	Bolstad Ch 4 pp 156-180; Ch 6 pp 246-250, 273-274. OPTIONAL: rest of Ch 6; Ch 7
10-Mar		NO CLASS	
12-Mar	14	Lab 5: Data Creation	
Week 6			
15-Mar	15	Attribute Data Structures	Bolstad Ch 8 pp 331-349 (opt: revisit Ch 9 pp 384-393)
17-Mar	16	Metadata and Accuracy	Bolstad Ch 4 pp 188-190, Ch 14
19-Mar	17	Lab 6: Data Attribution	
Week 7			
22-Mar	18	Data Query and Description / SQL	Bolstad Ch 9 pp 373-384, 394-397
24-Mar	19	Mapping Flood Risk	3 Articles on Flood Risk & Mapping
26-Mar	20	Lab 7: Basic Analytical Tools	
Week 8			
29-Mar	21	Distance and Buffer	Bolstad Ch 9 pp 398-403, Ch 10 pp 471-475
30-Mar	22	Map Overlay	Bolstad Ch 9 pp 404-419
2-Apr	23	Lab 8: Overlay and Buffer	
Week 9			
5-Apr	24	Raster Data Model	Bolstad Ch 10 pp 462-470
7-Apr	25	Overlay for Problem Analysis	Bolstad Ch 10 pp 445-461
9-Apr	26	Lab 9: Risk Analysis & Suitability Mapping	Bolstad Ch 13 pp 577-593

Week 10			
12-Apr	27	Critical Cartography, Counter-Mapping	Halder & Michel 2018 (Not an Atlas editorial); assigned <i>This is Not an Atlas</i> section
14-Apr	28	Network Analysis	Bolstad Ch 9 pp 420-425
16-Apr	29	Lab 10: Network Analysis	
Week 11			
19-Apr	30	Counter-Mapping 2	Hebert & Brock 2017
21-Apr	31	Guest Speaker: Jamon Van Den Hoek	
23-Apr	32	Lab 11: Getting Started with Your Data	
Week 12			
26-Apr		NO CLASS	
28-Apr	33	Mapping Environmental Injustice 1; Dealing with Incomparable Data Layers	Downey 2006
30-Apr	34	Lab 12: Moran's I and Spatial Regression	Voss et al. 2006
Week 13			
3-May	35	Mapping Environmental Injustice 2 Guest Speaker: Raoul Liévanos	Liévanos 2015
5-May	36	Mapping Environmental Injustice 3	Lee & Ahtone 2020; Douglas 2020
7-May	37	Lab 13: Cartography Tools + project work	
Week 14			
10-May	38	Presentations	
12-May	39	Presentations	
14-May	40	Presentations; New Horizons in Mapping	Mah 2016