Draft syllabus; updated syllabus to be provided in class.

Spatial Thinking, Geographic Information Systems, and Related Methods

Global Development 3140

Fall 2022
Lecture: 10:10am Mondays and Wednesdays, Warren B73
Lab: 2:40-4:35pm Wednesdays, Mann Library B30B

Instructor	Teaching Assistant
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Office Hours: Mondays 11am-1pm or by appointment	Office Hours: TBD

Everything happens in space. Knowing where people are located and events occur in space gives clues to understanding processes traditional social analysis techniques may not reveal. In this course we will work on understanding of how all sorts of things about social life are situated in space and learn how to use tools for presenting and analyzing 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 a different 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	We will have occasional quizzes in class or on Canvas. Quizzes may focus on lecture and reading material being covered that 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 3.24 suggested). Lab assignments are due at 11:59pm the following Monday. Late labs will lose 5% each day afterward.
GIS notebook	The GIS notebook may be a physical notebook with hand-written notes or a word processor document. Over time, you will record commands, tools, tips, tricks, or procedures that you find useful either for conceptualizing or carrying out the lab assignment. By the end of the course, it will serve as a personal QGIS user manual.
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.

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 Share	5
Quizzes	10
Labs	40
GIS Notebook	20
Final Project	25
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 want this to be a place where everybody is able to share their reasoning and experiences so that together we can come to fuller understanding. This is hard to achieve. To do it, we need to facilitate discussion thoughtfully, and you need to participate mindfully. As a course citizen, we expect you to make a good faith effort to listen and express yourself in ways that build other people up. That includes making it known when something said in class strikes you as hurtful or harmful. It also includes being willing to let your own assumptions be questioned. At any time, please let us know if you think we could do a better job facilitating this.

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 "GDEV 3140" in the header*.

Office Hours. We will hold in-person office hours during the times listed. If you need to meet outside scheduled office hours, email us to make an appointment. *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 in Mann B30B. We will primarily use open-source software that you can add to your own device for free, including QGIS and GeoDA. QGIS is also available on computers in labs within Mann Library and at other locations on campus.

Data Backup. *You should have a backup system (memory stick, external hard drive, 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 GDEV 3140 Canvas course site.

Date	Class #	Topic	Materials
Week 1			
22-Aug	1	Getting Started. Intro: What's a map?	
24-Aug	2	Maps as Models, Maps as Propositions	Krygier & Wood 2009, This Is Not the World. Miller 2018, A Map of Radical Bewilderment.
24-Aug	3	**Lab 1: Intro to Lab & QGIS**	Bolstad Ch 1
Week 2			
29-Aug	4	Introduction to Map Making	Krygier & Wood selections. (OPTIONAL: Bolstad Ch 4 pp 147-156, 181-193)
31-Aug	5	Data Structures: Vector	Bolstad Ch 2 pp 39-50
31-Aug	6	**Lab 2: Creating Map Displays**	Bolstad Ch 9 385-393 (Classification); Krygier & Wood selections
Week 3			
5-Sep		NO CLASS	
7-Sep	7	Data Structures: Raster	Bolstad Ch 2 pp 51-66 (optional: read the rest)
7-Sep	8	**Lab 3: Exploring Data Structures**	
Week 4			
12-Sep	9	Geodesy and Datums	Bolstad Ch 3 pp 87-115
14-Sep	10	Projections and Coordinate Systems	Bolstad Ch 3 pp 116-137
14-Sep	11	**Lab 4: Projections and Coordinate Systems**	Krygier & Wood selection; https://bl.ocks.org/syntagmatic/ba569633d51ebec6ec6e
Week 5			
19-Sep	12	Data Creation	Bolstad Ch 4 pp 156-180; Ch 6 pp 246-250, 273-274. OPTIONAL: rest of Ch 6; Ch 7
21-Sep	13	Data Collection: GPS	Bolstad Ch 5 (STOP at Optical and Laser Coordinate Surveying)
21-Sep	14	**Lab 5: Data Creation**	
Week 6			
26-Sep	15	Attribute Data Structures	Bolstad Ch 8 pp 331-349. Revisit Ch 9 pp 384-393)
28-Sep	16	Metadata and Accuracy	Bolstad Ch 4 pp 188-190, Ch 14
28-Sep	17	**Lab 6: Data Attribution**	
Week 7			
3-Oct	18	Data Query and Description / SQL	Bolstad Ch 9 pp 373-384, 394-397
5-Oct	19	Map Overlay	Bolstad Ch 9 pp 404-419
5-Oct	20	**Lab 7: Basic Analytical Tools**	
Week 8			
10-Oct		NO CLASS	
12-Oct	21	Distance and Buffer	Bolstad Ch 9 pp 398-403, Ch 10 pp 471-475
12-Oct	22	**Lab 8: Overlay and Buffer**	
Week 9			
17-Oct	23	Space, Place, and Social Life	Molotch et al. 2000

19-Oct	24	Raster Data Model	Bolstad Ch 10 pp 462-470
19-Oct	25	**Lab 9: Working with Rasters & More**	
Week 10			
24-Oct	26	Overlay for Problem Analysis	Bolstad Ch 10 pp 445-461
26-Oct	27	Mapping Environmental Injustice 1: Dealing with Incompatible Data Layers	Downey 2006
26-Oct	28	**Lab 9: Risk Analysis & Suitability Mapping**	Bolstad Ch 13 pp 577-593
Week 11			
31-Oct	29	Mapping Flood Risk	NPR, NYT game of inches, Redfin
2-Nov	30	Network Analysis	Bolstad Ch 9 pp 420-425
2-Nov	31	**Lab 10: Network Analysis**	
Week 12			
7-Nov	32	Critical Cartography & Counter-Mapping	Hebert & Brock 2017; Holloway 2007
9-Nov	33	Critical Cartography & Counter-Mapping	Halder & Michel 2018 (Not an Atlas editorial); assigned *This is Not an Atlas* section
9-Nov	34	**Lab 11: Project work**	
Week 13			
14-Nov	35	LISAs and Spatial Regression	Voss 2006
16-Nov	36	Mapping Environmental Injustice 2, with Guest Speaker	Alvarez 2021
16-Nov	37	**Lab 12: LISAs and Spatial Regression**	
Week 14			
21-Nov	38	Mapping Environmental Injustice 3	Lee & Ahtone 2020; Douglas 2020
23-Nov		NO CLASS	
Week 15			
28-Nov	39	Presentations	
30-Nov	40	Presentations	
30-Nov	41	**Presentations during lab time**	
Week 16			
5-Dec	42	New Horizons in Mapping	Mah 2016