

# Socio-Technical Mapping and the Built Environment

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## Course Information

### Course Description

This course introduces students to the social and technical histories of built environments and the impacts (past and present) of socio-cultural biases on the shaping of those environments. Using readings, group discussions, research and spatial mapping tools, students will develop skills in exploring ways that built environments can either facilitate or constrain access to resources, including health. Previous experience with GIS is not required.

### Course Materials & Books

No textbook is required. GIS course resources available for download (free):

- [ArcGIS Online](#) and [The ArcGIS book and Instructional Guide](#)

### Course Format

This course can be offered in-person or in on-line format, either synchronously or asynchronously. For all formats, readings, discussion postings, individual and group projects, presentations and recorded class content will be shared via Brightspace or Canvas (as relevant).

### Program Learning Outcomes

Students' knowledge and skills will be developed in relation to the following course outcomes:

- Understanding of major socio-cultural movements that have shaped the U.S. urban landscape;
- Understanding of impacts of these movements on access disparities within communities;
- Understanding of links between disparities in access and disparities in health; and
- Ability to discuss infrastructure, access, health and disparity in cultural exploration.

## Course Learning Outcomes

Students will:

- Develop hands-on familiarity with geo-spatial mapping tools (GIS) and types of downloadable publicly-available data that can be used to evaluate access disparities across multiple geospatial scales;
- Gain skills in interpreting, presenting and combining multiple types of information in ways that use maps, graphs and visualizations (StoryMaps) to tell nuanced story of place; and
- Develop understanding of how social forces create measurable and mappable differences in health and access across geographic and geospatial scales.

## Coursework & Grading

### Course Grade Breakdown

Assessment Name	Value
Class Readings and Discussion Participation	15%
Team StoryMaps (2 group exercises)	15%
GIS Exercises and Quizzes (3 individual exercises; 2 quizzes)	15%
Individual Final StoryMap Project – Draft	10%
Individual Final StoryMap Project – Final Submission	20%
Final StoryMap Project Presentation	15%
Personal Reflections Journal	10%
<b>Total:</b>	<b>100%</b>

### Assessment Descriptions & Requirements

#### Perspective Readings | Discussion

Readings that build on class content will be assigned and discussed throughout the semester via Brightspace or Canvas (as relevant). Responses to discussion posts should draw on materials and examples found through each students' development of individual Final StoryMap projects. For each Discussion, students will need to respond to at least two (2) classmate posts with a follow-up response that shows thoughtful consideration of the original post.

## GIS and StoryMaps

This course is about learning to find, use, combine and interpret the spatial mapping data that are available on-line. We will build our understanding of these data using ArcGIS, practicing with on-line assignments and skills-building through developing StoryMaps. There will be two (2) short quizzes and three (3) GIS practice exercises assigned over the course of the semester that will draw from information covered in class or available as self-paced on-line exercises.

There will be two (2) group StoryMap map-making assignments over the semester to practice course concepts and one (1) individually created StoryMap focused on neighborhood-scale infrastructural frameworks and access disparities in a selected city. Group StoryMaps will be turned in as assignments during the semester. Individually-created StoryMaps will be shared during Finals week, either in-person or via on-line recorded presentation.

## Additional Out of Class Assignment

Students will keep a personal reflections journal. Journals are not graded and do not need to follow a specific format, but contents will be incorporated into course Discussion throughout the semester. This is a course about integrating different types of information into knowledge; spending time reflecting on your (our) perceptions about what we discuss in class and how we understand why the built environment is structured as it is improves our ability to engage constructively and thoughtfully in the shaping of our society.

## **Writing Style & Formatting**

Written assignments and StoryMaps should be well-structured and citations should be included when referencing works (such as the weekly readings on which you will be posting discussions). Writing should strive for helping classmates follow thinking and rationales. Likewise, the role of thematic maps is to help improve spatialized understanding. Maps should be clear in content and objectives.

## **Final Examination/Final Project**

There is no Final Exam for this course. Final StoryMaps will be presented during Finals week. Presentations will either be in-person or recorded and posted on Brightspace or Canvas.

## Class Schedule

Week & Date	Topics & Content for the Week	Checklist Items
Week 1	<p><b>Introduction and Course Structure</b></p> <p><b>GIS: Introduction to Cartography and Map Making</b></p> <p><b>Read:</b></p> <ul style="list-style-type: none"> <li>● No reading for Week 1</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation materials.</li> <li>● Brightspace post – Introduce yourself to your classmates.</li> <li>● Confirm ArcGIS access</li> </ul>
Week 2	<p><b>Underpinnings and Natural Environments</b></p> <p><b>GIS: Mapping Societal Spatialization – Tools and Data Sources</b></p> <p><b>Read:</b></p> <ul style="list-style-type: none"> <li>● Ueland and Warf (2006)</li> <li>● <a href="#">The Great Mississippi Flood of 1927</a></li> <li>● Case Study – Portland, ME</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Post discussion response to W2 readings by Fri. pm</li> <li>● Organize teams for Group StoryMap #1 – choose city</li> </ul>
Week 3	<p><b>Underpinnings and Natural Environments (cont.)</b></p> <p><b>GIS; Introduction to StoryMaps   Case Study: Miami FL</b></p> <p><b>Read:</b></p> <ul style="list-style-type: none"> <li>● Case Study: Pittsburgh, PA</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Respond to two (2) classmate posts for W2 readings.</li> <li>● Select individual Final StoryMap city</li> </ul>
Week 4	<p><b>Infrastructure and Historical Framing</b></p> <p><b>GIS: Data Presentation, Data Interpolation and Bias</b></p> <p><b>Read:</b></p> <ul style="list-style-type: none"> <li>● Prener (2021)</li> <li>● Case Studies: St. Louis, MO and New Orleans, LA</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Post discussion response to Wk4 reading by Friday pm.</li> <li>● Complete GIS practice exercise #1</li> </ul>

<p><b>Week 5</b></p>	<p><b>Infrastructure and Historical Framing (cont.)</b></p> <p><b>GIS: Case Study: Racialization of Space (Flint, MI)</b></p> <p><b>Read:</b></p> <ul style="list-style-type: none"> <li>● Case Study: Flint, MI</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Respond to two (2) classmate posts on Wk4 reading.</li> <li>● GIS quiz #1</li> </ul>
<p><b>Week 6</b></p>	<p><b>Patterns and Overlays</b></p> <p><b>GIS: Views, Tables and Maps</b></p> <p><b>Read:</b></p> <ul style="list-style-type: none"> <li>● Detroit: <a href="#">(1)</a> <a href="#">(2)</a> <a href="#">(3)</a></li> <li>● Case Study: Detroit, MI</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Post discussion response to Wk 6 readings by Fri. pm</li> </ul>
<p><b>Week 7</b></p>	<p><b>Patterns and Overlays (cont.)</b></p> <p><b>GIS: Vector Layers and Raster Data</b></p> <p><b>Read:</b></p> <ul style="list-style-type: none"> <li>● Case Study: Jackson, MS</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Respond to two (2) classmate posts on Wk6 reading.</li> <li>● Organize teams for Group StoryMap #2 – choose city</li> </ul>
<p><b>Week 8</b></p>	<p><b>Exploring Demographics</b></p> <p><b>GIS: Group StoryMap #1 Due – Presentation of Results</b></p> <p><b>Read:</b></p> <ul style="list-style-type: none"> <li>● Massey and Tannen (2015)</li> <li>● Case Study: Milwaukee, WI</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Post discussion response to Wk 8 reading by Fri. pm</li> <li>● Complete GIS practice exercise #2</li> </ul>
<p><b>Week 9</b></p>	<p><b>Spring Break Week</b></p>	<p><b>Spring Break Week</b></p>
<p><b>Week 10</b></p>	<p><b>Social Determinants of Health</b></p> <p><b>GIS: Geoprocessing – Examining the Interaction of Mapped Layers</b></p>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Post discussion response to Wk 10 reading by Fri. pm.</li> </ul>

	<p>Read:</p> <ul style="list-style-type: none"> <li>● <a href="#">ProPublica: The Black American Amputation Epidemic</a></li> </ul>	
<b>Week 11</b>	<p><b>Human Ecology</b></p> <p><b>GIS: Guest Presenter (TBD)</b></p> <p>Read:</p> <ul style="list-style-type: none"> <li>● [TBD - by Guest Presenter]</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Respond to two (2) classmate posts on Wk10 reading.</li> <li>● GIS quiz #2</li> </ul>
<b>Week 12</b>	<p><b>Vulnerability Indices and Health Mapping</b></p> <p><b>GIS: <u>Draft Individual StoryMap Due</u></b></p> <p>Read:</p> <ul style="list-style-type: none"> <li>● Goovaerts (2019)</li> <li>● Switzer and Teodoro (2017)</li> <li>● Case Study: Chicago, IL</li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Post discussion response to Wk 12 reading by Fri. pm.</li> </ul>
<b>Week 13</b>	<p><b>Vulnerability Indices and Health Mapping (cont.)</b></p> <p><b>GIS: Group StoryMap #2 due - Presentation of Results</b></p> <p>Read: No assigned reading</p>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Respond to two (2) classmate posts on Wk12 reading.</li> <li>● GIS practice exercise #3 due</li> </ul>
<b>Week 14</b>	<p><b>Resistance Spaces and Solution Spaces</b></p> <p><b>GIS: No assignment</b></p> <p>Read:</p> <ul style="list-style-type: none"> <li>● <a href="#">Ron Finley</a> and <a href="#">TED Talk</a></li> </ul>	<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Catch up on anything you need extra time on!</li> </ul>

<b>Week 15</b>	<b>Resistance Spaces and Solution Spaces (cont.)</b>  <b>GIS: <u>Final</u> Project StoryMaps due</b>  <b>Read:</b> <ul style="list-style-type: none"> <li>● <a href="#">Infrastructure Removal</a></li> <li>● <a href="#">Rochester, NY</a></li> <li>● <a href="#">I-395 Removal</a> - Detroit</li> </ul>	<b>Checklist:</b> <ul style="list-style-type: none"> <li>● Read/review instructor notes and presentation material.</li> <li>● Catch up on anything you need extra time on!</li> </ul>
<b>Finals Week</b>	<b>Final StoryMap Presentations</b>	<b>Final StoryMap Presentations</b>

## Policies & Expectations

### Attendance & Late Work

Attendance will be gauged by consistency of engagement with class discussion posts and mapping assignments. For class discussion posts, I am less focused on the ‘rightness’ of what you post than on the consistency and seriousness of engagement with the topics and with each other’s posts. It is important that Discussion posts are made by stated deadlines so that classmates are able to post required responses. Late work without prior notice to the instructor will result in a zero grade for that assignment. If you know you will be missing assignments, please discuss with me beforehand so that we can find a workaround for that assignment.

### Classroom Community Expectations

Promoting and valuing diversity enriches learning and broadens everyone’s perspectives. Inclusion and tolerance can (and should) lead to respect for others and their opinions and is critical to maximizing the learning that we expect in this course. Our own closely held ideas and personal comfort zones may be challenged. The results, however, create a sense of community and promote excellence in the learning environment.

In this course, we will address a range of topics that can be difficult to discuss. For this reason, please approach our course materials and our class discussions with an open mind. Always express agreement, disagreement, and debates with classmates in a civil manner. Similarly, be willing to listen to peers and faculty when they disagree with you or present a different viewpoint. There is a zero tolerance policy for harmful behavior or speech in this class.

## **Socio-Technical Mapping and the Built Environment – GIS Mapping Assignments**

For these assignments, please submit your final map including screen clips/captures of embedded content (e.g., pop-ups, conversion tables, legends) as appropriate.

Please title the submission files as [YOUR LAST NAME]\_[MAP TITLE w/EMBEDDED CONTENT (as appropriate)]; example: Merritt\_Medicare Costs Per Capita\_2012\_w/popup.

Choose one from the following for Assignment #1:

### **Site a New Hospital**

<https://learn.arcgis.com/en/projects/site-a-new-hospital/>

### **Create a Policy Map to Address Health Conditions**

<https://learn.arcgis.com/en/projects/get-started-with-map-viewer/arcgis-online/>

### **Customize a Climate Resilience Index**

<https://learn.arcgis.com/en/projects/customize-a-climate-resilience-index/>

Choose one from the following for Assignment #2:

### **No dumping: Drains to the Ocean**

<https://learn.arcgis.com/en/projects/no-dumping-drains-to-ocean/>

### **Where does healthcare cost the most?**

<https://learn.arcgis.com/en/projects/where-does-healthcare-cost-the-most/>

### **Fight Child Poverty with Demographic Analysis** (creation of the app is optional)

<https://learn.arcgis.com/en/projects/fight-child-poverty-with-demographic-analysis/arcgis-online/>

Choose one from the following for Assignment #3:

### **Identify landslide risk areas in Colorado**

<https://learn.arcgis.com/en/projects/identify-landslide-risk-areas-in-colorado/>

### **Policy Mapping: Safe Streets to Schools**

<https://learn.arcgis.com/en/projects/policy-mapping-safe-streets-to-schools/>

### **Perform a site suitability analysis for a new wind farm** (creation of the app is optional)

<https://learn.arcgis.com/en/projects/perform-a-site-suitability-analysis-for-a-new-wind-farm/>



## Socio-Technical Mapping and the Built Environment – StoryMap Assignments

### Group StoryMap #1

Ueland and Warf (2016) hypothesize a spatial correlation between race and altitude, concluding that in Southern cities (their focus area), topography is racialized. Does your group agree? Consider some examples of how topography could be (can be/is) racialized and create a StoryMap exploring this question for a city of your choosing.

### Group StoryMap #2

Certoma and Tornaghi (2015) hypothesize that urban agriculture & gardening can function as forms of political activism by challenging how urban space is used. Specifically, they argue that urban gardening directly challenges the neoliberal tendency to plan city life in ways that *erase public spaces and commons; privatize leisure and free time activities; and subjugate urban dwellers to exploitative food regimes*. Create a StoryMap that explores the question of use, placement and benefit of spaces of urban food production for a city or neighborhood of your choosing.

### Individual Final StoryMap Project

Neighborhood Mapping – Walk through the socio-technical history of the neighborhood you've researched applying the concepts we've developed in class. Your final deliverable should include discussion of two public health concerns (examples: Pb contamination in soil or drinking water; TTHM in drinking water; food apartheid; housing quality) with focus at both the neighborhood and the city scale. As always with presenting technical data, be specific about who your audience is and frame the StoryMap content appropriately.

Questions to consider in developing StoryMap project:

- Transportation – Identify where rail lines and highways are placed. Do they define neighborhood boundaries and/or create impediments to free movement? How might infrastructure placement impact community health?
- Structural – Does historical redlining overlay on geography? Is there a relationship between geography, historical redlining and housing quality?
- Geotechnical – Is there evidence of infill? How might land use history and land reclamation impact ground stability for construction (past, present and future)?
- Water Resources – Is there obvious susceptibility to flooding + other climate impacts?
- Environmental – Are there local concerns regarding chemical exposures in soil, water and air? What are the origins of potential exposures? Are they site-specific (e.g., hazardous waste siting) or more general (e.g., significant proximity to highway

## Socio-Technical Mapping and the Built Environment – StoryMap Assignments

infrastructure impacting air quality)? Is there evidence that % impervious surface varies by neighborhood? Is there evidence of neighborhood-scale heat islands?

- Public Health – Are there concerns about drinking water quality? Exposure to lead (Pb) from house paints and soils? Are there elevated incidence of diabetes and/or hypertension? Is homelessness a critical concern?
- Community Change – Is there evidence of demographic changes within or around the neighborhood? How are those changes manifest? What evidence is there of gentrification and demographic transition?
- Contextual Ranges – Spend some time with the SVI information – identify contrasting neighborhoods with respect to health metrics. What are some factors associated with and/or likely responsible for differences in SVI scores? Does wealth = health? In the city you're evaluating, where does wealth reside?