PUBADM 651 Geographic Information Systems (GIS) Policy Workshop

Spring 2021 February 27th and 28th, 2021 | Amit Patel [he/him]

Course Information

Credit Hours: 1 | Online Course: NO | REMOTE | February 27th – 28th (Weekend Policy Workshop) | Blackboard

Instructor Information

[Amit.Patel@umb.edu](mailto:Amit.Patel@umb.edu) | 718.866.5757 | McCormack Hall 3-425 | Office Hours: 9 to 10 am on Sunday, February 28th, 2021 and By Appointment between March 1st and March 10th, 2021

Teaching Assistant Information

Heather MacLean [she/hers] | [heatheramaclean@gmail.com](mailto:heatheramaclean@gmail.com) | Office Hours: 9 to 10 am on Sunday, February 28th, 2021 and By Appointment between March 1st and March 10th, 2021

Course Overview

Location, location, location. A cliché from realtors can easily make its stride to the world of decision-makers in a variety of contexts including in business, planning, public policy, and public administration. With an advent of advanced computing and increasingly available geographic data about important aspects of civic life, Geographic Information Systems (GIS) have become an essential tool for public service professionals. This policy workshop covers core concepts and tools in GIS that are most commonly used in public affairs and illustrates how they could be used in urban planning, public policy, public administration and related fields.

Both maps and mapping techniques have changed the humanity historically, but recent advancements in GIS are one of the most influential changes that we have seen in not only how we make sense of the world around us but also navigate it effectively and efficiently. Think about life without navigation system in your car or smartphone’s ability to find a nearby Uber ride for you. Public service profession is keeping pace with this rapidly changing technological environment. The mapping tools, techniques, and technology are becoming common and crucial resources for public agencies around the world. The wide-ranging applications include delivering emergency services, monitoring the spread of infectious diseases, studying effects of environmental contamination, finding the best location for the next train station, to name a few. I am sure you will find GIS as one of the most powerful tools for thinking, problem-solving, and storytelling, as you make important decisions in your public service career.

This course assumes no prior knowledge of GIS. We will begin with the basics of maps and mapping, and advance to sophisticated spatial analysis techniques that are commonly used in solving complex public challenges of today’s world.

Course Materials

All the required readings are posted on the course website.

Steinberg, Steven J., and Sheila L. Steinberg. (2005). Introduction to Geographic Information Systems in: *Geographic information systems for the social sciences: investigating space and place*. Sage Publications, 2005.

Steinberg, Steven J., and Sheila L. Steinberg. (2005). GIS Basics in: *Geographic information systems for the social sciences: investigating space and place*. Sage Publications, 2005.

Nyerges, Timothy L., Robert McMaster, and Helen Couclelis. "Geographic information systems and society: A twenty year research perspective." The SAGE Handbook of GIS and Society (2011): 3-21.

I have also recommended some texts below for participants who may want to learn more about GIS after the workshop. Please note that they are **NOT** required readings.

**Recommended Texts:**

Gorr, Wilpen L. and Kristen S. Kurland. 2019. GIS Tutorial for ArcGIS Desktop 10.8. Redlands, CA: ESRI Press. ISBN: 978-1589486140 [Note: Useful for those who want to learn ArcGIS Desktop software]

Krygier, John and Denis Wood. 2016. Making Maps: A Visual Guide to Map Design for GIS, Third Edition. New York: The Guilford Press. ISBN: 978-1-46250-998-0

Kollectiv Orangotango+. 2018. This Is Not an Atlas: A Global Collection of Counter-Cartographies. Bielefeld, Germany: transcript Verlag. ISBN [print]: 978-3-8376-4519-4; ISBN [pdf]: 978-3-8394-4519-8. Web [licensed under Creative Commons Attribution 4.0]: <http://www.transcript-verlag.de/shopMedia/openaccess/pdf/oa9783839445198.pdf> [Note: Great collection of readings if you hold transformative worldview with a passion for social justice]

O'Brien, Oliver. "Open source GIS software." Geocomputation: A Practical Primer (2015): 281.

Steinberg, Steven J., and Sheila L. Steinberg. (2005). Topics for Sociospatial Reearch in: *Geographic information systems for the social sciences: investigating space and place*. Sage Publications, 2005. [Note: Useful for researchers and doctoral students]

McKinnon, Innisfree. "Expanding cartographic practices in the social sciences." The SAGE handbook of visual research methods (2011): 452-473. [Note: Useful for researchers and doctoral students interested in debate about hegemonic mapping vs. democratization of mapping will find this text interesting]

Kwan, Mei-Po. "Feminist visualization: Re-envisioning GIS as a method in feminist geographic research." Annals of the association of American geographers 92.4 (2002): 645-661. [Note: useful for researchers and doctoral students interested in epistemology especially for people interested in critical discourse]

**Software:**

ArcGIS Online by ESRI: <https://umb.maps.arcgis.com/home/index.html>

**Recommended Data Sources [Additional Sources on Course Website]:**

Boston Area Research Initiative data library (<https://dataverse.harvard.edu/dataverse/BARI>)

Child Opportunity Maps (<http://www.diversitydatakids.org/data/childopportunitymap>)

Mass GIS (<https://www.mass.gov/orgs/massgis-bureau-of-geographic-information>)

Policy Map – Access through Healey Library (<https://www.policymap.com/>)

Eviction Lab: <https://evictionlab.org>

Schedule at a Glance

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| --- | --- | --- | --- |
| Time | Session | Topic | Assignments Due |
| **Day 1: Saturday, February 27th 2021** | | | | |
| 9:00 – 9:55 AM | 1 | Breakfast Roundtable | BYOB |
| 9:55 – 10:00 AM | 5 Minutes Movement Break 1 | | |
| 10:00 – 10:25 AM | 2 | Introduction to GIS |  |
| 10:25 – 10:30 AM | 5 Minutes Movement Break 2 | | |
| 10:30 – 11:20 AM | 3 | Introduction to ArcGIS Online | ArcGIS Online Screenshots |
| 11:20 – 11:30 AM | 10 Minutes Coffee Break 1 | | |
| 11:30 AM – 12:30 PM | 4 | Basics of Working with Maps | Tutorial 1: Making a Map of China |
| 12:30 – 1:30 PM | Lunch Break | | |
| 1:30 – 2:25 PM | 5A | Pattern Analysis I | Tutorial 2: Fight Child Poverty |
| 2:25 – 2:30 PM | 5 Minutes Movement Break 3 | | |
| 2:30 – 2:55 PM | 5B | Pattern Analysis I Contd |  |
| 2:55 – 3:00 PM | 5 Minutes Movement Break 4 | | |
| 3:00 – 3:50 PM | 6A | Pattern Analysis II | Tutorial 3: Cost of Healthcare |
| 3:50 – 4:00 PM | 10 Minutes Coffee Break 2 | | |
| 4:00 – 4:25 PM | 6B | Pattern Analysis II Contd |  |
| 4:25 – 4:30 PM | 5 Minutes Coffee Break 2 | | |
| 4:30 – 5:00 PM | 7 | Story Maps Exploration |  |
| **Day 2: Sunday, February 28th, 2021** | | | | |
| 9:00 – 10:00 AM | Office Hour with Amit and Heather | | |
| 10:00 – 10:25 AM | 8A | Making Decisions with Maps I | Tutorial 4: Food Inspections |
| 10:25 – 10:30 AM | 5 Minutes Movement Break 1 | | |
| 10:30 – 11:20 AM | 8B | Making Decisions with Maps I Contd |  |
| 11:20 – 11:30 AM | 10 Minutes Coffee Break 1 | | |
| 11:30 AM – 12:30 PM | 9A | Making Decisions with Maps II | Tutorial 5: Safe Streets to Schools |
| 12:30 – 1:30 PM | Lunch Break | | |
| 1:30 – 1:55 PM | 9B | Making Decisions with Maps II Contd |  |
| 1:55 – 2:00 PM | 5 Minutes Movement Break 2 | | |
| 2:00 – 2:55 PM | 10A | Story Map Work Session I |  |
| 2:55 – 3:00 PM | 5 Minutes Movement Break 3 | | |
| 3:00 – 3:30 PM | 10B | Story Map Work Session II |  |
| 3:30 – 3:40 PM | 10 Minutes Coffee Break 2 | | |
| 3:40 – 4:15 PM | 10C | Story Maps Exhibition |  |
| 4:15 – 4:20 PM | 5 Minutes Movement Break 4 | | |
| 4:20 – 5:00 PM | 11 | Way Forward |  |
| **Final Deliverable Due: 5 PM on March 12th, 2021** | | | | |

Learning Objectives

Upon completion of this course, participants will learn principles and applications of Geographic Information Systems (GIS) to support professional practice in public administration, public policy, urban planning and related disciplines. In particular, students will become familiar with skills required to: (a) become educated consumers of applied research and practice in spatial analysis and GIS, (b) supervise and collaborate with technical experts on projects requiring spatial analysis and GIS, and (c) initiate proof-of-concept analytic tasks using commonly available tools and methods in spatial analysis and GIS.

Participants will be able to demonstrate the following high-level skills:

* Identify problems that could be solved with spatial analysis and GIS
* Create, acquire and analyze spatial data from secondary sources
* Contribute to solving problems with a spatial component using multiple methodological, disciplinary and analytic lenses
* Acquire basic GIS and spatial analytic skills

Participants will acquire the following specific GIS and spatial-analytic skills:

* Choose data models, software applications and visualization strategies most appropriate to the problem at hand
* Demonstrate qualitative understanding of problems with spatial components
* Build spatial datasets and perform spatial analysis using publicly available spatial data repositories
* Implement preliminary solution approaches using proprietary and publicly available GIS software

In terms of Network of Schools of Public Policy, Affairs, and Administration (NASPAA)’s Accreditation Standards, this course contributes to the core competencies 1, 2, and most importantly, 5 stated below:

1. Lead and Manage in Public Governance

2. Participate in and contribute to the public policy process

5. Communicate and interact productively with a diverse and changing workforce and citizenry

Teaching Style and Pedagogical Approach

The course combines hands-on exercises with graduate seminar style discussion and has minimal lecturing. The course takes place over a single weekend and provides three weeks of reflection time with the help of several assignments.

I will present main themes of the session in a nutshell using interactive discussion format. I will be asking provocative questions that are meant to generate debate and discussion; consequently, the success of this course will heavily rely on your participation in the synchronous sessions. While I plan to cover the major themes, lecturing will be minimal. This class is a graduate seminar and takes the form of a structured discussion.

The in-class exercises will provide you an opportunity to put principles in practice through hands-on experience. We will also use them as an opportunity to guide class discussions and critically think about ways to advance diversity, equity, and inclusion in your own personal and professional life.

The important feature of this course is that we will learn from practicing GIS in a guided workshop. We will use active learning format, where you will be on driving seat while we serve as facilitators. You will use policy area of your liking and engage in a substantive mapping exercise as a team of three and several guided tutorials. All in-class assignments are primarily geared towards providing practice.

Assignments

There will be three types of assignments in this course. Except one, all of them are in-class assignments.

*Tutorials (Individual):* There will be five in-class tutorials. They are designed to provide hands-on use of a GIS software to build skills in spatial analysis. All five of them are required assignments. While you will complete them individually, we will place you in small groups. We encourage discussion within the group and learning from each other, but you will work on your own computer and create your own maps. You will receive full points for demonstrating that you have competed the substantial portion of the tutorial.

*Story Map (Team):* The last in-class assignment, a group project, will integrate skills previously presented in order to formulate and solve a problem of the students’ choosing using spatial analytic methods. This assignment will be completed by teams of three students*.* The assignment will be due in the form of published story map at the end of the session 10B. You will also present your story map to exhibition visitors in session 10C.

*Case Study:* The final assignment, due two weeks after the weekend workshop, will be in the form of a short paper that will consist of: i) analyzing a case study of your own choosing that uses GIS to solve a problem of public interest, and ii) create a map that represents an application of the case study’s problem statement to a policy context of the participants’ own choosing. The instructor will provide several indicative case studies involving GIS that can help participants identify application areas for their final assignment. The case study is due at 5 pm on March 12th, 2021. Suggested length of this paper is 8 to 10 pages that includes maps and references, Times New Roman 12 points, double spaced with regular margins. The participants are encouraged to work in a team of two (maximum three). You are free to work on your project individually as well.

Grading Policy

The weight of each assignment on your final grade will be as follows:

1. Tutorials (5 Tutorials with 5% weight each) [In-class] **25%**

a. Tutorial 1 (5%)

b. Tutorial 2 (5%)

c. Tutorial 3 (5%)

d. Tutorial 4 (5%)

e. Tutorial 5 (5%)

2. Class Participation **15%**

a. Attendance (5%)

b. In-class Participation (5%)

c. Online Discussion (5%)

3. Story Map (Group work) [In-class] **30%**

a. Published Story Map (20%)

b. Story Map Oral Presentation (10%)

4. Case Study (Group work) [Due date: March 12th, 2021] **30%**

Participation consists of asking questions, engaging with classmates in tutorials, and making meaningful contributions to the group project.

Attendance consists of presence in all class sessions. Students will need written permission from the instructor to excuse an absence from any portion of the course

The final weighted score of assignments and class participation will be converted to a letter grade as follows:

|  |  |  |
| --- | --- | --- |
| **Letter Grade** | **Percentage** | **Quality Points** |
| A | 93-100% | 4.00 |
| A- | 90-92% | 3.75 |
| B+ | 87-89% | 3.25 |
| B | 83-86% | 3.00 |
| B- | 80-82% | 2.75 |
| C+ | 77-79% | 2.25 |
| C | 73-76% | 2.00 |
| F | 0-72% | 0.0 |
| **INC** | A grade of Incomplete (INC) is not automatically awarded when a student fails to complete a course. Incompletes are given at the discretion of the instructor. They are awarded when satisfactory work has been accomplished in the majority of the course work, but the student is unable to complete course requirements as a result of circumstances beyond his/her control. The student must negotiate with and receive the approval of the course instructor in order to receive a grade of incomplete. I will consider this grade only for medical and family emergencies. | N/A |
| IF | Received for failure to comply with contracted completion terms. | N/A |
| W | Received if withdrawal occurs before the withdrawal deadline. | N/A |
| AU | Audit (only by permission) | N/A |
| NA | Not Attending (student appeared on roster, but never attended class. Student is still responsible for tuition and fee charges unless withdrawal form is submitted before deadline. NA has no effect on cumulative GPA.) | N/A |

Code of Conduct and Academic Integrity

It is the expressed policy of the University that every aspect of academic life – not only formal coursework situations, but all relationships and interactions connected to the educational process – shall be conducted in an absolutely and uncompromisingly honest manner. The University presupposes that any submission of work for academic credit is the student’s own and is in compliance with University policies, including its policies on appropriate citation and plagiarism. These policies are spelled out in the Code of Student Conduct here: <https://www.umb.edu/life_on_campus/policies/community/code>. Students are required to adhere to the code of Student Conduct, including requirements for academic honesty, as delineated in the University of Massachusetts Graduate Catalogue and relevant program student handbook(s).

Accommodations

The University of Massachusetts Boston is committed to providing reasonable academic accommodations for all students with disabilities. This syllabus is available in alternate format upon request. If you have a disability and feel you will need accommodations in this course, please contact the Ross Center for Disability Services, Campus Center, Upper Level, Room 211 at 617.287.7430. http://www.umb.edu/academics/vpass/disability/ After registration with the Ross Center, a student can request accommodations at any time; we recommend that students inform the professor of the need for accommodations by the end of the Drop/Add period to ensure that accommodations are available for the entirety of the course.

## Anti-discrimination and anti-harassment policies

The University of Massachusetts Boston’s Office of Civil Rights and Title IX fosters a community committed to dignity and respect for all our members. For information about UMB’s anti-discrimination and anti-harassment policies and procedures, please visit <http://umb.edu/crtix>. If you would like information about support resources, please visit <http://umb.edu/titleix/resources>

## Basic Needs Security

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, lacks a safe and stable place to live, or may be in need of support in any other way, is urged to contact U-ACCESS about their services. They offer a food pantry, lunch 3 days a week, housing assistance, legal consultations, and many other services. You can reach them at u-access@umb.edu or check out their website at <https://www.umb.edu/uaccess>.

Detailed Schedule

The class meets on Saturday, February 27th and Sunday, February 28th. The second day is slightly shorter and begins late (by an hour). Both days have multiple 5-minute movement breaks, 10-minute coffee breaks, and a 1-hour lunch break. This configuration is primarily to avoid Zoom fatigue since we will be staring at the screen for all the sessions.

Day I, Saturday, February 27th, 2021

Session 1: 9:00 – 9:55 AM Breakfast Roundtable

Topics: Welcome, introductions, logistics, and syllabus review

In-class Activity: Geospatial Revolution Episode 1

Recommended: Geospatial Revolution Episode 2 – 4 (for viewing at your own time after the workshop)

\*\*\* 5-Minute Movement Break: 9:55 TO 10:00 AM \*\*\*

Session 2: 10:00 – 10:25 AM Introduction to Geographic Information Systems

Topics: Introduction to GIS and spatial analysis for planning, policy analysis and public service delivery. Data analysis and problem solving with maps

In-class Activity: GIS and YOU

\*\*\* 5-Minute Movement Break: 10:25 TO 10:30 AM \*\*\*

Session 3: 10:30 – 11:20 AM Introduction to ArcGIS Online

Topics: Introduction to web-based GIS Application ArcGIS Online; Main features of the application that are useful to make maps, analyze data, working with your own data, and sharing interactive maps

In-class Activity: Map in a minute exercise

\*\*\* 10-Minute Coffee Break: 11:20 TO 11:30 AM \*\*\*

Session 4: 11:30 AM – 12:30 PM Basics of Working with Maps

Topics: Working with maps and layers, workflow, organization; filtering and styling; making slides

In-class Activity: Tutorial 1 Making a map of China

Assignment Due: Screen-share of completed Tutorial 1

\*\*\* 1-HOUR LUNCH BREAK: 12:30 TO 1:30 PM \*\*\*

Session 5A: 1:30 PM – 2:25 PM Pattern Analysis I

Topics: Adding layers, enriching data, using symbols to present attribute data and creating web app;

In-class Activity: Tutorial 2 Fight Child Poverty

\*\*\* 5-Minute Movement Break: 2:25 TO 2:30 PM \*\*\*

Session 5B: 2:30 PM – 2:55 PM Pattern Analysis I Continued

In-class Activity: Tutorial 2 Fight Child Poverty Continued

Assignment Due: Screen-share of completed Tutorial 2

\*\*\* 5-Minute Movement Break: 2:55 TO 3:00 PM \*\*\*

Session 6A: 3:00 PM – 3:50 PM Pattern Analysis II

Topics: Choropleth mapping; Hot-spot analysis

In-class Activity: Tutorial 3 Cost of Healthcare

\*\*\* 10-Minute Movement Break: 3:50 TO 4:00 PM \*\*\*

Session 6B: 4:00 PM – 4:25 PM Pattern Analysis II Continued

In-class Activity: Tutorial 3 Cost of Healthcare Continued

Assignment Due: Screen-share of completed Tutorial 3

\*\*\* 5-Minute Movement Break: 4:25 TO 4:30 PM \*\*\*

Session 7: 4:30 PM – 5:00 PM Story Maps Exploration

In-class Activity: Story Maps

Day 2, Sunday, February 28th, 2021

\*\*\* Office Hour: 9:00 TO 10:00 AM \*\*\*

Session 8A: 10:00 – 10:25 AM Making Decisions with Maps I

Topics: Geocoding, Joining Data, Route Planning

In-class Activity: Tutorial 4 Food Inspections

\*\*\* 5-Minute Movement Break: 10:25 TO 10:30 AM \*\*\*

Session 8B: 10:30 – 11:20 AM Making Decisions with Maps I Contd

In-class Activity: Tutorial 4 Food Inspections Continued

Assignment Due: Screen-share of completed Tutorial 4

\*\*\* 10-Minute Movement Break: 11:20 TO 11:30 AM \*\*\*

Session 9A: 11:30 AM – 12:30 PM Making Decisions with Maps II

Topics: Clustering, proximity analysis interactive story maps, mapping for policy

In-class Activity: Tutorial 5 Safe Streets to Schools

\*\*\* 1-HOUR LUNCH BREAK: 12:30 TO 1:30 PM \*\*\*

Session 9B: 1:30 – 1:55 PM Making Decisions with Maps II Contd

In-class Activity: Tutorial 5 Safe Streets to Schools Contd

Assignment Due: Screen-share of completed Tutorial 5

\*\*\* 5-Minute Movement Break: 1:55 TO 2:00 PM \*\*\*

Session 10A: 2:00 – 2:55 PM Story Maps Work Session I

Topics: Team work on Story Maps in Area of Interest

\*\*\* 5-Minute Movement Break: 2:55 TO 3:00 PM \*\*\*

Session 10B: 3:00 – 3:30 PM Story Maps Work Session II

Topics: Team work on Story Maps in Area of Interest Continued

Assignment Due: Published Story Map (Group work)

\*\*\* 10-Minute Movement Break: 3:30 TO 3:40 PM \*\*\*

Session 10C: 3:40 – 4:05 PM Story Maps Exhibition

Topics: Teams visiting exhibitions

Assignment Due: Published Story Map (Group work)

\*\*\* 5-Minute Movement Break: 4:05 TO 4:10 PM \*\*\*

Session 11: 4:10 – 5:00 PM Conclusion

Topics: Limitations of GIS, Alternatives to ArcGIS Online, Further Coursework in GIS, GIS for Research

**\*\*\* Case Study (Final Deliverable) Due: 5 PM on March 12th, 2021 \*\*\***