

Term Information

Effective Term Summer 2025
Previous Value Autumn 2022

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

New course title

New course description

Edited course goals and topics

Add course to GE as GEN Theme: Lived Environments

What is the rationale for the proposed change(s)?

The Department of Geography currently offers GEOG 2200.01 (Mapping our World), which is a GEL data course and introductory course in spatial data and analysis and geographic information sciences for the department. This course also serves as a Geography minor option. We seek to redesign the course to meet GE Theme: Lived Environments and still meet departmental needs. This course change proposal is for a 3-credit GEN Theme course. In this redesign, we have used backward learning design to provide a unique geographic perspective on building perspective on how spatial thinking, analysis, and geographic map interpretation links to understanding scale and space in measuring and identifying variables factors which present human-interactions with space and their impact on how we design and observe our communities and lived environments.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

We seek to maintain the 3-credit version of the course to minimize programmatic implications, in the new GE categorization. The Lived Environments theme aligns well with the geographic perspectives of the department in human geography and geographic information sciences. We seek to retain the GEL designation.

Is approval of the request contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area	Geography
Fiscal Unit/Academic Org	Geography - D0733
College/Academic Group	Arts and Sciences
Level/Career	Undergraduate
Course Number/Catalog	2200.01
Course Title	How to Map Your World: Visualizing Space and Place
<i>Previous Value</i>	<i>Mapping Our World</i>
Transcript Abbreviation	How to Map World
<i>Previous Value</i>	<i>Mapping Our World</i>
Course Description	This course introduces students to the power of maps in spatial representation and spatial literacy through the creation of thematic maps and analysis of descriptive statistics, probabilities, and hypothesis testing. students will utilize geographic information technology to create a variety of thematic maps which aid in critically evaluating issues present in our global society.
<i>Previous Value</i>	<i>Introduction to the power of maps, covering spatial representation, visual literacy, and geographic information technology in a global society.</i>
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week, 12 Week, 8 Week, 7 Week, 6 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus, Lima, Mansfield, Marion, Newark, Wooster

Prerequisites and Exclusions

Prerequisites/Corequisites	None
Previous Value	
Exclusions	Not open to students with credit for 2200.02
Previous Value	Not open to students with credit for 2200.02 or 480.
Electronically Enforced	No

Cross-Listings

Cross-Listings	None
Previous Value	

Subject/CIP Code

Subject/CIP Code	45.0701
Subsidy Level	Baccalaureate Course
Intended Rank	Freshman, Sophomore, Junior, Senior

Requirement/Elective Designation

General Education course:
Data Analysis; Lived Environments
The course is an elective (for this or other units) or is a service course for other units

[Previous Value](#)

General Education course:
Data Analysis; Mathematical and Quantitative Reasoning (or Data Analysis)
The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Students will employ basic methods of spatial data-gathering, presentation, and interpretation;
- Students will interpret map symbology in order to analyze and critically evaluate the spatial structure of and relationships among spatial phenomena
- Students interpret and use basic statistical concepts, including descriptive statistics (mean, mode, median, range, standard deviation and variance), inferential statistics (probability and hypothesis testing), and spatial statistics (spatial
- Students will apply statistical ideas to seek explanations for unusual or interesting patterns on maps and understand their connection and impact on communities and lived environments
- Students will evaluate the impact of spatial data sampling and uncertainty on map use
- Successful students will use spatial data to explore a range of perspectives on the interactions and impacts between humans and one or more types of environment in which humans live and how we represent them in geographic perspectives and scale
- Successful use spatial analysis and maps to interpret a variety of perceptions, representations and/or discourses about environments and humans within them.

Previous Value

- *Students will employ basic methods of spatial data-gathering, presentation, and interpretation*
- *Students will interpret map symbology in order to analyze and critically evaluate the spatial structure of and relationships among spatial phenomena*
- *Students will demonstrate familiarity with some basic concepts of descriptive and inferential statistics and understand some unique properties of spatial statistics*
- *Students will apply statistical ideas to seek explanations for unusual or interesting patterns on maps*
- *Students will evaluate the impact of spatial data sampling and uncertainty on map use*

Content Topic List

- Introduction to geographic data
- Geovisual literacy
- The mapping process
- Methods of spatial data gathering, presentation, and interpretation
- Interpretation of map symbology
- Mapping with descriptive, inferential, and spatial statistics
- Application of statistical ideas for map analysis and evaluation
- Geographic perspectives and spatial data on lived environments and environment-human interactions

Previous Value

- *Introduction to geographic data*
- *Geovisual literacy*
- *The mapping process*
- *Methods of spatial data gathering, presentation, and interpretation*
- *Interpretation of map symbology*
- *Mapping with descriptive, inferential, and spatial statistics*
- *Application of statistical ideas for map analysis and evaluation*

Sought Concurrence

No

Previous Value

COURSE CHANGE REQUEST
2200.01 - Status: PENDING

Last Updated: Vankeerbergen, Bernadette
Chantal
04/26/2024

Attachments

- GEOG 2200.01_Course Change Cover Letter_April 2024.doc: GEOG 2200.01_Proposal Cover Letter
(Cover Letter. Owner: Godfrey, Ryan B)
- GEOG 2200.01_GE Theme Proposal_April 2024.pdf: GEOG 2200.01_GE Theme Proposal
(GEC Model Curriculum Compliance Stmt. Owner: Godfrey, Ryan B)
- GEOG_2200_10_New GE Proposed Syllabus_April 4 2024.pdf: GEOG 2200.01_Syllabus
(Syllabus. Owner: Godfrey, Ryan B)
- GEOG 2200.01_Lab Assignment 4 - Exploring eviction in Franklin County.pdf: GEOG 2200.01_Lab Assignment Example
(Other Supporting Documentation. Owner: Godfrey, Ryan B)
- GEOG 200.01_Lab 4 - Franklin County Evictions - Student Work Example.pdf: GEOG 2200.01_Lab Assignment Student Work Example
(Other Supporting Documentation. Owner: Godfrey, Ryan B)
- GEOG 2200.01_Final Paper Guidelines_April 2024.pdf: GEOG 2200.01_Final Paper Guidelines
(Other Supporting Documentation. Owner: Godfrey, Ryan B)

Comments

- Submitted for consideration for addition to the GEN Theme of Lived Environments to the existing GEOG 2200.01 course. By adding a GE category to an existing course, under consultation with ASCC, we did not request concurrence, as the course changes are limited in scope and serve to demonstrate the connection to the new theme category's goals and ELOs in selection of lab, assignment focus. *(by Godfrey, Ryan B on 04/20/2024 04:30 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Godfrey, Ryan B	04/20/2024 04:30 PM	Submitted for Approval
Approved	Houser, Jana Bryn	04/20/2024 05:27 PM	Unit Approval
Approved	Vankeerbergen, Bernadette Chantal	04/26/2024 10:50 AM	College Approval
Pending Approval	Jenkins, Mary Ellen Bigler Hanlin, Deborah Kay Hilty, Michael Neff, Jennifer Vankeerbergen, Bernadette Chantal Steele, Rachel Lea	04/26/2024 10:50 AM	ASCCAO Approval



March 29, 2024

Re: GEOG 2200 Course Change Submission

Dear Curriculum Committee

I am submitted a course change request for GEOG 2200 Mapping our World to add the course to the General Education Theme Lived Environments.

GEOG 2200 is an approved course under the General Education Legacy Program as a Data Analysis course, as well as serves as an introductory course for spatial analytics and geographic information systems in the Department of Geography. I am requesting that the course be considered for inclusion under the new General Education Theme Lived Environments to be effective Spring 2025.

This course meets the goals for the theme of Lived Environments through the lenses of data, statistics and environmental observation (not limited to the built, cultural, economic, and natural along with human interaction) as it relates to space and cartography. While maps are used widely in many different general education courses to observe and evaluate lived environments, this course is unique in that it teaches general education students how to create maps using real data, uses tools within a GIS platform to display the data with various methodologies, and then interpret those maps (including some statistical analysis). Thus, this course allows students to view and evaluate their own past, current and future environments in a new way, and answer the questions who, what, when, how and why do things exist within this space (where).

Please find the required enclosed materials, which have been approved by our department. Please contact me or the Department of Geography Undergraduate Chair, Jana Houser, if you have any questions.

Sincerely

Tammy E. Parece, PhD
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GEOG 2200.01 GE Proposal: Lived Environments Theme

ELO 1.1 Engage in critical and logical thinking.

This course builds skills necessary to critical and logical thinking about humans and their interactions and impacts on various environments in which humans live. Students' knowledge is developed and verified through 8 weekly quizzes and two exams. The quizzes allow students to practice the knowledge gained from lectures and the exams verify the synthesis of their knowledge. Through 6 labs assignments and a final project, students apply the skills learned by mapping spatial data, analyzing their results, and, for 50% of the lab assignments, apply statistical testing to evaluate their results. Students evaluate the results by providing conclusions and recommendations within their lab reports to support their analysis. Students are demonstrating their critical and logical thinking processes within their written lab reports. The course lectures and lab assignments present spatial problems along human centric variables critical to analysis on city design, use, allocation, and their implications to diverse populations. Through critically thinking how data present patterns to access to resources, spatial distribution of human-centric services and the factors which impact the design, navigation, and purpose of communities link the analyses to real-world problems that students can observe within their own surroundings.

Lab assignments are as follows:

- Lab 1 Analyzing Hospital Patterns in Clark County, Nevada. The intention of this lab assignment is to introduce students the ArcGIS Online platform (and basic thematic map reading and spatial analysis) to address access (or lack of access) to medical care for resident populations). Students download a table of hospital locations (including name, address, number of admissions, total annual charges, average charge and average daily charge). Students add the table to a GIS, use geoprocessing operations to map the locations of the hospitals. Students then create various thematic maps using the different data identified in the table (admissions, charges, etc.). Student describe the patterns seen within the map and develop a hypothesis as to why differences are seen between the hospitals, thus evaluating the hospitals service to local populations, location/distribution, and impacts access to healthcare, which could impact the health and vitality of a lived environment (for example, why one hospital's admission numbers are exponentially higher than another). Students use supplemental resources to help explain the patterns, as an example, using population numbers or incomes within census tracts to help explain the differences. Students consult the ancillary sources of their choice to help explain the patterns.
- Lab 2 Wind Farm Suitability Analysis for Colorado. Addressing energy needs is an essential part of evaluating area livability for populations, especially in rural areas of places such as Colorado who have growing populations. In this lab, students are provided a set of parameters to use when siting the farm, in a county with a population over 20,000, within 10 miles of existing 400-kilovolt capacity powerlines, within 5 miles of an existing windfarm, and within a wind power class with windspeeds ≥ 12.5 mph. Students download the data for all parameters and use different geoprocessing tools within the GIS platform, identify the locations that meet all the parameters identified.

After identifying suitably locations, the students are required to further evaluate the locations for connectivity to the company's corporate office in Denver Colorado and the suitability of the existing road systems to transport equipment to those identified locations. Within the introduction of their lab reports, students are required to provide the reasons why a new wind farm is needed. In their conclusions, students explain their final site selection and why this choice will meet the energy needs of the people residing in region.

- Lab 3 Story Maps. Within this lab assignment, students work in groups of 2 to explore OSU campus and identify 15 locations that would be important for OSU students to know when engaging with each other while on campus. Students collect the location information using GPS apps and details on each specific location. Students upload the information collected into a GIS platform and map a direct route between locations and set their maps to zoom into each location as they navigate through the map. Students import the map into a story map online platform, tying their map and related bookmarked locations. Students write an introduction and as navigation occurs through the story map, explain each location and how it relates to their overall theme. Examples of potential story maps include the best 15 locations to study on campus, the 15 oldest buildings on campus, 15 places to eat, 15 works of art, etc.
- Lab 4 Exploring Eviction Rates in Franklin County Ohio. This is the first lab assignment students complete after their introduction to descriptive statistics. Students use demographic data to explore and answer questions on how and why specific demographic characteristics are found within the same environment (at the census tract level). Within this lab, students download American Community Survey data for variables such as total population numbers, unemployment rates, eviction rates, percentages of different minority populations at the census tract level for Franklin County, Ohio. Students add the data to a GIS platform, joining all the tabular data into one file – Franklin County Census Tracts. Then using a relationship display, students are required to compare 3 types of relationships within the mapping symbology; median income to eviction rate is a required and the other 2 variables are students' choice (such as poverty rate to eviction rate or percent African American to eviction rate). Students then export the joined data into tabular form and import into Excel, then create scatterplots and trend lines comparing the 3 same sets of data. In students' results section of their report, they are required to first comment on the spatial patterns that they visualize within the relationship maps. Then students provide their results of the scatterplots and trend line, identifying if they support the relationships seen in the maps. Within their conclusion statements, students are required to comment on the reasons why the relationships are seen within their analysis. Students are encouraged to use ancillary information in this portion of their report. Many students refer to the redlining process that occurred in prior decades as to the reasons they are seeing specific spatial patterns.
- Lab 5 Creating an Earthquake Dashboard. In this lab, students are evaluating the impact of natural disasters on populations in two different highly populated and wealthy countries and are creating a mechanism with which people can interact to get more information. Students use active data from the United States Geological Survey on the occurrence of earthquakes around the world. They map the data, including magnitude and shake intensity. Students import this map into an online dashboard platform and then add additional details such as place, time and date of most recent occurrences, a

scatterplot of magnitudes over the past week and additional details such as: was an alert issued; did a tsunami warning occur. The dashboard created is interactive that can be used by anyone who wants to understand earthquake patterns, locations, impacts. In addition, the students download a table on earthquakes within the United States and calculate descriptive statistics for 6,000+ earthquakes that occurred over a 2-year period. Students also apply inferential statistics to compare earthquakes between the US and Japan. Use of Japan and the United States allows the students to evaluate the impacts of a natural disaster on an area that is a densely populated high-income country (Japan) with that of the less densely populated and high-income county (the United States). Students have created a Dashboard useful to the public but also completed a lab report analyzing their dashboard, how it can be used, and reporting on the statistical analysis comparing the two countries. Within their conclusions of their lab report, students report on how this data can be used by populations within those two countries to help make informed decisions about the spaces where they live.

- Lab 6 Analyzing Patterns of Traffic Crashes and Volumes. Within this assignment, students are evaluating the interaction of school locations (fixed data) with gross traffic data and actual vehicle collisions. Students first map locations of traffic collisions for Pasadena California and filter these crashes to only include pedestrian or bicycle accidents. The students then add 5 different school zones and identify those crashes that occur within ½ mile of each of the school zones, evaluating which school zones have higher exposure to this type of crash (where it could involve a student either walking or biking to school). Student then access a dataset that provides Traffic Counts for the entire US and filter this just to Pasadena California. They perform a geoprocessing operation that interpolates the locations into a density analysis – where the densest traffic patterns occur. Students interpret the findings, including the numbers of crashes and the density of the traffic. Students complete a comparative analysis to see if these traffic patterns are a contributing factor in the school zone accidents. Within their conclusions, they make recommendations for the City of Pasadena to reduce the students, who walk or bike to school, and their exposure to a potential traffic crash.

ELO 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or ideas within this theme.

Students complete the 6 lab assignments (identified under ELO 1.1), which relate to various topics on human interaction with the lived and natural environments evaluating the spatial patterns seen within their mapping assignments and in 3 assignments include statistical analysis to either support or contradict their conclusions. 5 of the 6 lab assignments require a written lab report with the following headings: Introduction, Data, Methods, Results, Conclusions and Recommendations, References. A template is provided for the student to use as follows:

Introduction: You are introducing your topic. What is the problem? State a hypothesis as to what you think you may find. In many instances the beginning of the lab tells you what you are evaluating.

Data: What data did you use to investigate? For Example: *The data for Clark County Nevada contained hospital names, addresses, admission rates, total hospital charges in 2015, average annual charge in*

2015 and average daily charge in 2015. I obtained this data from Nevada Compare Care Personal Health Choices in a spreadsheet format.

Do not state that the data was provided to you in ArcGIS or that it was provided by the instructor or TA. Do not tell us what you did with the data, that goes in the next section.

Methods: What did you do in GIS? What tools did you use and how did you analyze the data. Be very detailed about what you did. Did you do anything with the data in Excel? Do not discuss results or findings – that goes in the next section. No images should be included in this section. Images are results of your methods. Be sure to include paragraph breaks.

Results: What are the results? What do the results mean? Why is it the case? What is the story you want to tell the audience that you see within the map? For each of your methods outlined under the methods section, you need a result related to that method.

Embed screenshot(s) of your maps/other images here to demonstrate your point. When embedding maps, you also explain what the map is showing. Be sure the maps and legends are legible. Each image should have a Figure No underneath it and a brief title of that figure. When discussing the figure, you include the figure no. in text. For example, Figure 1 is the final map of the hospitals. Within Figure 1,

Conclusions and recommendations: What can you conclude from the analysis? What policy/strategies that should be implemented to solve the problem (if applicable)? Some questions to consider for Lab 1: How do your results impact resident populations? How does it impact tourist populations? Are there any disparities between hospital locations and services? Why do those disparities occur? Does your analysis promote additional questions that you would like to answer?

References: You must cite your sources, including your data sources. If you include information other than common knowledge, it also needs to be cited. For example, within this lab, if you state in your conclusions that there are more hospital admissions in downtown Las Vegas because of the number of people that drink too much and have accidents, then you need to cite the source of that information.

Reading the assignment instructions, or clicking on the appropriate links, gives you information on where the data was obtained. We recommend that you use APA format for your references. For example, data reference format for Lab 1 Assignment:

Nevada Compare Care Personal Health Choices. 2020. 2015 Case and Charge Information for Clark County, NV General Acute Care Hospitals. <https://www.nevadacomparecare.net/index.php>

ELO 2.1 Identify, describe, and synthesize approaches or experiences.

Students explore each of the course topics with a combination of lectures, quizzes, exams, lab assignments and a final project (lab assignments are identified in detail under ELO 1.1).

Lectures: course materials come from a variety of sources and students are provided access to these sources either through active online links or PDFs of reading materials. We have 11 topics containing materials from either peer-reviewed publications, professional organizations (such as Esri or the United States Geological Survey) and books. Each topic is introduced to the students through a verbal lecture including powerpoint slides. Students are engaged within the lectures through discussions of the topics as they are covered. Students are not required to purchase any textbooks; optional readings are provided. Exams and quiz questions come

straight from the lectures (pdf of lectures are provided in accordance with OSU's accessibility requirements).

8 Quizzes (5 points each) provide students an opportunity to synthesize and practice the topics learned in class. For example, 2 quizzes are related to mapping questions (one quiz on projection types and distortions; one quiz on types of maps), 1 quiz is related to GPS concepts; 1 quiz to different scales of census data; and 3 quizzes relate to statistical calculations (students are provided a sample set of numbers and are required to calculate descriptive statistics (Quiz 6), calculate probability and use a Z table (Quiz 7) and perform a hypothesis test (Quiz 8)).

Two exams (one on mapping and one on statistics) further confirm students' understanding of the topics and concepts covered. The mapping exam covers basic mapping concepts students must understand before they can create and interpret maps, including projections, coordinate systems, types of maps, qualitative and quantitative thematic maps. The statistics exam covers definitions of different types of statistics (mean, mode, average, probabilities, etc.) and includes actual problems to calculate these different variables and evaluate Z test, t test and correlation.

Lab Assignments: students are either provided or download geospatial data. This data is used to create a thematic map or maps. The students then write a written lab report as identified under ELO 1.2 and utilize their critical thinking skills to synthesize the data as it pertains to that specific population and their local environment. While the first 3 sections of the report (Introduction, Data and Methods) are describing their processes, the results and conclusions sections are the specific areas of the reports that the students demonstrate their critical thinking skills and data synthesis. Within the results section, students include images of their complete maps with their interpretation of what the maps shows. Any statistical analysis completed is also discussed within this section and how it relates to their interpretation of the maps. Under Conclusions and Recommendations, students describe what the results tell them about their hypothesis, either rejecting or failing to reject, what conclusions about their issues being presented, how their conclusions impact those populations within their environment, and what they would do different to expand their analyses. Three of the six lab assignments include statistical analysis. In each lab assignment, students are evaluating actual locations where people live and how the interactions within the environment (hospital locations, locations needing new energy sources, how income affects minorities and their ability to meet housing expenses, how OSU students can interact while on campus, the effects of natural disasters on populations, and traffic congestion and accidents near schools).

Final Project: Students propose a topic to analyze using thematic mapping tools and statistical tests. Students submit a proposal for approval. Within the final project instructions, possible topics include home ownership and correlation to income, an income analysis and eviction rates (Lab No. 4) but for another area of the US; parks and their proximity to different populations; traffic crash hotspots (Lab 6 but for another area of the US). Once approved, students find and download the data, prepare a map(s) and write a report using the same headings as the lab assignments. Students are provided with a guest lecture from OSU's GIS Librarian how to design a topic and search for available data.

ELO 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts.

The final project provides the students the ability to synthesize all skills and topics learned over the semester. Students propose, create and analyze a final project on a topic of their choice. Their analysis must include a spatial analysis application (mapping data) and a statistical evaluation (such as descriptive statistics). Students submit a proposal, which is subject to approval to ensure that their topic meets the requirements. Student must locate and find data that they will use in the analysis and then use the mapping techniques learned in the prior labs. Their final project report is the same format as the lab assignments but at least double in length. The GIS Librarian provides support and attends class prior to the proposal deadline to answer questions about locating and downloading data relative to specific topics. This analysis enables students to utilize the topics and skills they learned through lectures, quizzes, exams and lab assignments to observe and critically analyze elements of society/human interaction with space to their own daily interactions with their lived environment, whether that be their current environment on campus or the place in which they will live after graduation.

ELO 3.1 Engage with the complexity and uncertainty of human-environment interactions.

Three of the lab assignment address this ELO with regards to their lived environments and two are specifically related to human interaction with the natural environment.

Human/Environment Interaction – Lived Environments

- In Lab 1, Analyzing Hospital Patterns in Clark County, Nevada, students are evaluating the hospitals service to local populations, location/distribution, and impacts access to healthcare, which could impact the health and vitality of a lived environment.
- For Lab 3, Story Maps, students are evaluating and providing information to OSU student population on how to utilize different services available within the OSU campus.
- In Lab 6 Analyzing Patterns of Traffic Crashes and Volumes, student evaluate traffic patterns, collision information and locations of Pasadena California public schools. In their conclusions, students make recommendation to the City of Pasadena on implementation of policies or procedures to protect students who attend the schools.

Human Lived Environment, Interaction with Natural Environment

- Lab 2 Wind Farm Suitability Analysis for Colorado requires students to assess locations for a new Wind Farm in Colorado as noted under ELO 1.1. This assignment fits ELO 3.1 because it is evaluating multiple parameters needed to provide new energy sources (a new wind farm) for populations. The lived environment is where populations in excess of 20,000 are located and the natural environment using wind as an energy source.
- In Lab 5 Creating an Earthquake Dashboard, students have created a Dashboard useful to the public but also completed a lab report analyzing their dashboard and how it can be used by populations in looking at different earthquakes. The statistical analysis comparing the two countries provides students an opportunity to explore the impacts on two types of populations and how different earthquakes impact the two populations similarly or dissimilarly.

Additionally, depending on the topic chosen by the student for their final project, this ELO will also apply. For example, another possible topic is locating a new airport to service under-served populations.

ELO 3.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space.

This ELO is specifically addressed in Labs 2,5 and 6 and could be addressed by a specific topic chosen by a student in the final project.

- Lab 2 Wind Farm Suitability Analysis for Colorado provides the opportunity to evaluate a new location for a renewable energy source and sustainable living.
- Lab 5 Creating an Earthquake Dashboard provides students the opportunity to evaluate two different lived environments (Japan and the United States) with a comparative analysis of actual earthquake data collected by the United States Geological Survey.
- Lab 6 Analyzing Patterns of Traffic Crashes and Volumes provides students the opportunity to evaluate how traffic congestion can affect the environment directly around and within school zones and the threat traffic can have on students walking or biking to the specific schools. Students are asked to provide specific recommendations on changes to make these zones safer.
- Final project, this application to this ELO will depend on the topic chosen by the student for their final project. The final topics can address how any of the following topics impact populations living within the affected locations. Possible topics are 1) evaluating wildland fires, locations, extents 2) flood events 3) sea level rising from climate change and coastal cities.

ELO 4.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors.

Lab 4 Exploring Eviction Rates in Franklin County Ohio specifically addresses this ELO. Students are evaluating census tracts within Franklin County Ohio for correlation of multiple demographic variables, such as income and eviction rates. Students use their critical thinking skills to determine why correlations between different demographic variables and the possible causes of such spatial patterns. Students frequently see a pattern between higher percentages of African American populations, higher eviction rates and lower incomes, and many students tie these results to historical redlining in Columbus.

Additionally, depending on the topic chosen by the student for their final project, this ELO will also apply. For example, a possible topic applying the same type of analysis as Lab 4 but for a different locale and adding additional demographic variables within their analysis.

ELO 4.2 Describe how humans perceive and represent the environments with which they interact.

Lab 3 Story Maps addresses this ELO. Students map locations with a specific relationship and then create a story map using an online template to display and provide information about each location. This assignment addresses this ELO because the students decide on what part of OSU campus is important to them, thus would be important to other OSU students. Their

perception of importance depends on their individual life experiences both inside and outside of OSU.

ELO 4.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.

Each one of the lab assignments address this ELO in a unique way.

- Lab 1 Analyzing Hospital Patterns in Clark County, Nevada. Students explore real data to explain why all hospitals do not provide the same levels of services to all populations and what impacts the services provided within specific spaces (as an example - rural vs urban).
- Lab 2 Wind Farm Suitability Analysis for Colorado. Students explore real data to analyze placement of a new renewable energy source and explain the reasons for additional energy needs and sources for a sustainable environment.
- Lab 3 Story Maps. Students use their individual histories and experiences along with their ability to navigate the space in which they live and are educated. By working in a group of 2 students, students come to an agreement on what aspect of OSU campus has shared importance to both of them and how the spaces they identify would also be important to other students.
- Lab 4 Exploring Eviction Rates in Franklin County Ohio. The demographic spatial patterns within Columbus are very distinctive and show relationships between income, minority populations and eviction rates. Students use their critical thinking to determine or propose causes and correlation between these patterns and the spaces where these patterns occur.
- Lab 5 Creating an Earthquake Dashboard. Students are analyzing the impact of natural phenomena that could have disastrous effects on two populations. Students analyze their own environment here in the United States and then complete a comparative analysis with another high income, densely populated country (Japan).
- Lab 6 Analyzing Patterns of Traffic Crashes and Volumes. Students explore levels of safety within specific school zones. Student use real data for traffic congestion and crash events involving pedestrians and bicycles within school zones to evaluate levels of safety and make recommendations to increase safety in those places with highest levels where safety is lacking.

Additionally, depending on the topic chosen by the student for their final project, this ELO will also apply. For example, a possible topic is utilizing redlining information for the city of Columbus, Ohio (old maps from Sanborn shows redlined spaces of the past) and using current demographic data to see how populations living in these spaces have changed and the reasons behind why or why not.



SYLLABUS

GEOG 2200.01: How to map your world: Visualizing space and place

Spring 2025

3 credit hours – lecture based

11:05 -12:00 MWF, Derby XXX

COURSE OVERVIEW

Instructor and Teaching Assistant (TA)

Primary Instructor: Dr. Tammy E. Parece

Office: 1168 Derby Hall

Email: parece.1@osu.edu

Phone: 614-247-5994

Office hours:

- In my office: Monday 9:30 – 10:30 a.m.; Friday 10 – 11 a.m.
- On Zoom: Wednesday 1 – 2 p.m. Zoom link can be found under office hours in Canvas.

Teaching Assistant: TBD

If you are ill or have symptoms, please do not visit us in our offices, please email us and we can set up a zoom link for your participation during our office hours. To request an appointment outside of the above times, please send both the instructor and the TA an email with your availability up to a week ahead.

Prerequisites: None

Course Description

This course introduces students to spatial representation and spatial literacy through the creation of thematic maps and analysis of descriptive statistics, probabilities, and hypothesis testing. Thematic maps provide a visual illustration of spatial patterns, patterns that are not normally apparent within other data representations. For example, corporations, governments, the media, and researchers use maps and geographic information technology to understand and visualize data, including natural resources, flows of trade, historical events, property management, and spatial behavior and spread of diseases, among other things. As such, students will utilize geographic information technology to create a variety of thematic maps which aid in critically evaluating issues present in our global society. Students will apply a variety of statistical metrics and analysis (including descriptive and inferential statistics) to spatial patterns seen within their created maps.

In this course, we explore the foundations and definitions of spatial data, how and why maps are such a powerful tool to understand an increasingly complex world, and how modern technology is currently transforming the art and science of map-making. Using practical exercises and discussions, students will develop the knowledge, skills, and dispositions that constitute spatial literacy. The main goal is to give students a spatial literacy foundation (including spatial quantitative reasoning methodologies) so students can realize the value of geographic knowledge in today's world. Students will develop their critical thinking skills to analyze real-world, critical problems such as understanding demographic patterns, business locations, social and equity issues, transportation and infrastructure, natural disaster recovery and responses, and much more. At the conclusion of this course, students will be able to view and explain their environments and answer the who, what, when and why of space and place (the where).

Course Learning Outcomes

Upon successful completion of this course, students should be able to:

1. employ basic methods of spatial data-gathering, presentation, and interpretation;
2. interpret map symbology in order to analyze and critically evaluate the spatial structure of and relationships among spatial phenomena;
3. interpret and use basic statistical concepts, including descriptive statistics (mean, mode, median, range, standard deviation and variance), inferential statistics (probability and hypothesis testing), and spatial statistics (spatial correlation, hot spots, and interpolation);
4. apply statistical methods to explain spatial patterns on maps; and
5. evaluate the impact of spatial data sampling, uncertainty and scale on map use.

GENERAL EDUCATION

This course meets the requirements of the General Education Theme: Lived Environments. The intent of this course is to enable students to explore the two-way interactions and impacts of humans and their different environments – built, cultural, economic, and natural. This course exposes students to the data gathering, presentation and interpretation in the context of spatial and statistical maps.

GE Goals:

- **Goal 1:** Successful students will analyze an important topic or idea at a more advanced and in-depth level than the foundations. In this context, “advanced” refers to courses that are e.g., synthetic, rely on research or cutting-edge findings, or deeply engage with the subject matter, among other possibilities.
- **Goal 2:** Successful students will integrate approaches to the theme by making connections to out-of-classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.
- **Goal 3:** Successful students will explore a range of perspectives on the interactions and impacts between humans and one or more types of environment (e.g. agricultural, built, cultural, economic, intellectual, natural) in which humans live.
- **Goal 4:** Successful students will analyze a variety of perceptions, representations and/or discourses about environments and humans within them.

GE Expected Learning Outcomes:

- **ELO 1.1** Engage in critical and logical thinking.

- **ELO 1.2** Engage in an advanced, in-depth, scholarly exploration of the topic or ideas within this theme.
- **ELO 2.1** Identify, describe, and synthesize approaches or experiences.
- **ELO 2.2** Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts.
- **ELO 3.1** Engage with the complexity and uncertainty of human-environment interactions.
- **ELO 3.2** Describe examples of human interaction with and impact on environmental change and transformation over time and across space.
- **ELO 4.1** Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors.
- **ELO 4.2** Describe how humans perceive and represent the environments with which they interact.
- **ELO 4.3** Analyze and critique conventions, theories, and ideologies that influence discourses around environments.

LEGACY GENERAL EDUCATION: DATA ANALYSIS

This course meets the requirements of the Legacy General Education category *Data Analysis*. The intent of the Data Analysis GE is to enable students to deal with problems of data gathering, presentation, and interpretation. Students should develop an understanding of problems of measurement, be able to deal critically with numerical and graphical arguments, gain an understanding of the impact of statistical ideas in daily life and specific areas of study, and recognize the uses and misuses of statistics and related quantitative arguments.

GE Goals for Data Analysis: Students develop skills in drawing conclusions and critically evaluating results based on data.

Expected Learning Outcomes: Students understand basic concepts of statistics and probability, comprehend methods needed to analyze and critically evaluate statistical arguments, and recognize the importance of statistical ideas.

This course meets these goals and objectives by exposing students to the problems of data gathering, presentation, and interpretation, in the context of spatial, statistical maps.

HOW THIS COURSE WORKS

Mode of delivery: This class mode of delivery will be is in-person. All learning materials will be uploaded on Carmen Canvas. Additional components students will complete are:

- Readings
- General lectures
- Labs and exercises
- Quizzes and Exams

Credit hours and work expectations: This is a **3-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), an average student should expect around 3 hours per week of time spent on

direct instruction (instructor content, group and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average.

Communications with instructors: *Email us if you have questions related to class materials and assignments. Make sure you include a detailed description of the problem and attach a screenshot if applicable.* We encourage you to help your classmates out if you know the answers, but make sure you are not violating the code of student conduct (e.g., do not upload your assignment or show them the exact answer to complete their assignments).

Other questions can be directed to the instructors via Outlook email or Carmen email (always include both instructor and TA in your emails, in case one of us is unavailable). If using Outlook, make sure that you put "GEOG 2200" in the subject line. Students should use their name.# Ohio State email address.

COURSE MATERIALS AND TECHNOLOGIES

Textbooks

Optional texts – available at the bookstore, as an ebook, or on Amazon:

1. *Tyner, Judith A. 2015. The World of Maps: Map Reading and Interpretation for the 21st Century. Guilford Publishing.*

Other readings will be uploaded on Carmen Canvas.

Technology skills needed for this course:

- ArcGIS Online (no previous experience is required)
- Microsoft Excel
- Basic computer and web-browsing skills

Required software:

- Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. You must complete your registration for this if you are using your personal computer. If you have a Mac, you must be sure this registration is complete as we will be using Excel in this class. Full instructions for downloading and installation can be found at go.osu.edu/office365help.

Required equipment:

- While in the classroom, you must use the classroom computer to work on assignments or exams (unless specific permission is granted by Dr. Parece).
- You may use your personal device for taking notes.
- Other: a mobile device (smartphone or tablet) to use for BuckeyePass authentication

GRADING AND FACULTY RESPONSE

How your grade is calculated

All submissions are made via Carmen Canvas on the due date. Your due date is not an optional or suggested date, it is the last possible date you can submit an assignment and get a grade (with limited exceptions – see Late Submissions at the bottom of page 6).

CATEGORY	PERCENT OF FINAL GRADE	OCCURRENCE
Introductions Online	2%	Once
Quizzes	8%	8
Lab assignments	50%	6
Exam – Mapping	10%	1
Exam - Statistics	10%	1
Final paper (proposal, progress report and final paper)	20%	
Total	100%	

Grading scale

A	A-	B+	B	B-	C+	C	C-	D+	D	E
≥93%	90-92%	87-89%	83-86%	80-82%	77-79%	73-76%	70-72%	67-69%	60-66%	<60%

Note: Grades are not subject to negotiation and are not eligible for rounding up; an 89.9% is not a 90%.

Instructors' feedback and response time

- **Grading and feedback:** For assignments, you can generally expect feedback within 1 week, unless emergencies occur to one of the instructors.
- **Email:** We will reply to emails within **48 hours on school days when class is in session at the university.**

Attendance

Attendance will be taken each day.

Graded Assignments

All assignments, listed below, are required to be your own work. Do not share your work with others in this class. Use of generative artificial intelligence (AI) (e.g., ChatGPT) is not permitted in this course and use is subject to academic misconduct actions.

Failure to follow the instructions on any assignment could result in a grade reduction for that specific answer or it might result in an incorrect answer. Any assignment includes quizzes, exams, labs, and the final project. For example, if the directions state you need to round to 1 decimal place and you give no decimal points or provide 2 or more.

The schedule for this class is found at the end of this document.

Self-Introduction (2%)

During the first two weeks of class, you will participate in an online discussion. You introduce yourself to the class (1%) and respond to other students' introductions (1%); this will help you find a partner for the story map lab assignment.

Quizzes (8%)

Quizzes assist you in studying for the exams. Quizzes are 5 questions, online, untimed and open note/open book. See the attached schedule for weeks, topics and due date.

Lab assignments (50%)

You will have 6 lab assignments throughout the semester. These assignments consist of doing analysis and mapping within GIS and then submitting a written report with jpegs of your map(s). A template with specific section headings is used to complete each lab report (with the exception of the Story Map lab). The template is a word document downloadable from Canvas. Each assignment has a specific step-by-step instruction on creating a map(s) for that analysis, 3 of the lab assignments involve a mapping assignment and a related statistical analysis. Each assignment submission has an associate Rubric in Canvas for the points division. Turnitin and AI checks are enabled within Canvas for these submissions.

One lab (Story Map) involves collecting data on campus and we recommend that you work with a partner when collecting your data and completing the Story Map.

Two exams

The exams contain multiple choice, true/false, short answer, essay and numerical answer questions. See the course schedule for the dates and times of the exams. These are held during class periods.

- Map exam is closed-book, closed-note, and timed. (10% of grade)
- Statistics exam – timed and you are allowed a cheat sheet one page in length during the exam. You are allowed to use a calculator. (10% of grade)

Final project paper (20% of total grade)

You will turn in a short proposal (5 points), progress report (10 points), and final paper (100 points) for grading on Carmen Canvas. The theme of your paper is your choice, but it must involve mapping data and some statistical analysis of that data and will be at least 1500 words. The report form will use the same template as the labs. More detailed instructions for the paper are posted on Carmen Canvas, which include possible themes and details on assistance in finding data for your analysis. Turnitin and AI checks are enabled within Canvas for these submissions.

Late submissions

Late submissions for any assignments are not accepted in this course and result in a zero for that assignment.

You do have **1** opportunity to extend your deadline **for 1 calendar day** during the semester, applied to a lab assignment of your choice. No permission is required, use this opportunity wisely, it can only be used once.

Accommodations for religious holidays will be considered in accordance with OSU policies – see more

details below. Please provide information on the holiday and its date and the number of days requested in the extension.

Additionally, in case of personal and family emergencies, please notify us as soon as possible so that we can work out a submission timeline. Such extensions may or may not be granted, it is decided on a case-by-case basis at instructor discretion. Extensions are not granted after the fact, e.g., you can't ask for an extension on an assignment that was due two weeks before or wait until the end of the semester to submit assignments you missed. To request an extension for one of these emergency conditions, you must put the request in writing to Dr. Parece (cc to the TA) and the email must contain the following information:

- Course Name and Code (GEOG 2200 Mapping Our World)
- Reason for the extension request:
- The specific assignment:
- Specific extension requested:
- Attach documentation of the reason for the extension

Any emails requesting extensions without this information will be returned with a request to provide this information.

OTHER COURSE AND UNIVERSITY POLICIES

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

Turnitin has been enabled for the lab and final paper submissions (<https://www.turnitin.com/>). Turnitin is a plagiarism and AI verification platform. This check is set to automatically review your paper when you submit it on Canvas. Please note that any assignments with significant scores may result in reporting a code of conduct violation to OSU's Committee on Academic Misconduct (please see the Academic Integrity Policy below). Please note that when you use quotes or repeat the assignment instructions within your written report, it increases the Turnitin and AI score. Avoid these when at all possible.

To maintain a culture of integrity and respect, generative AI tools should not be used in this complete of course assignments including lab reports, quizzes, exams, and final paper unless specifically authorized by Dr. Parece.

Disability Services

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If you anticipate or experience academic barriers based on your disability

(including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion.

If you are isolating while waiting for a COVID-19 test result, please let me know immediately. Those testing positive for COVID-19 should refer to the [Safe and Healthy Buckeyes site](#) for resources. Beyond five days of the required COVID-19 isolation period, I may rely on Student Life Disability Services to establish further reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu.

Religious Accommodations

Ohio State has had a longstanding practice of making reasonable academic accommodations for students' religious beliefs and practices in accordance with applicable law. In 2023, Ohio State updated its practice to align with new state legislation. Under this new provision, students must be in early communication with their instructors regarding any known accommodation requests for religious beliefs and practices, providing notice of specific dates for which they request alternative accommodations within 14 days after the first instructional day of the course. Instructors in turn shall not question the sincerity of a student's religious or spiritual belief system in reviewing such requests and shall keep requests for accommodations confidential.

With sufficient notice, instructors will provide students with reasonable alternative accommodations with regard to examinations and other academic requirements with respect to students' sincerely held religious beliefs and practices by allowing up to three absences each semester for the student to attend or participate in religious activities. Examples of religious accommodations can include, but are not limited to, rescheduling an exam, altering the time of a student's presentation, allowing make-up assignments to substitute for missed class work, or flexibility in due dates or research responsibilities. If concerns arise about a requested accommodation, instructors are to consult their tenure initiating unit head for assistance.

A student's request for time off shall be provided if the student's sincerely held religious belief or practice severely affects the student's ability to take an exam or meet an academic requirement and the student has notified their instructor, in writing during the first 14 days after the course begins, of the date of each absence. Although students are required to provide notice within the first 14 days after a course begins, instructors are strongly encouraged to work with the student to provide a reasonable accommodation if a request is made outside the notice period. A student may not be penalized for an absence approved under this policy.

If students have questions or disputes related to academic accommodations, they should contact their course instructor, and then their department or college office. For questions or to report discrimination or harassment based on religion, individuals should contact the [Office of Institutional Equity](#).

Mental Health Statement

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State

University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling [614-292-5766](tel:6142925766). CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at [614-292-5766](tel:6142925766) and 24 hour emergency help is also available 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Statement on Title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu.

Inclement Weather

Should in-person classes be canceled, we will meet virtually via CarmenZoom during our regularly scheduled time. I will share any updates via [CarmenCanvas, email or other mode of communication].

Course Schedule

Disclaimer: This course syllabus provides a general plan for the course; deviations may be necessary. Such deviations may be made for individuals or for the entire class, as deemed appropriate by the instructor. Any changes that affect the entire class will be announced by the instructor with as much advance notice as possible.

Week & Dates	Topics and Assignments
Week 1 January 6 - 11, 2025	Monday: Introduction to class Wednesday: Introduction to cartography and geospatial technologies Friday: Lab time Online Self-introduction due 1/14, responses due 1/17 Quiz 1 due Friday, 1/10 Optional Readings: Tyner Chapter 3.
Week 2 January 12 - 18, 2025	Monday: Scale & Coordinate Systems Wednesday: Projections Friday: Lab time Quiz 2 due by 11 a.m. Monday 1/13 Lab Assignment 1 Hospital Usage due 1/21

	Optional Readings in Carmen Canvas: Kimmerling, et al. Chapters 1 – 4
Week 3 January 19 – 25, 2025	Monday: Martin Luther King Jr. Birthday, No class Wednesday: Thematic Map types, variables and measurements Friday: Introduction to Lab 2 & lab time Lab Assignment 2 Wind Farm Suitability Analysis due 1/31 Optional Readings: Tyner Chapters 8 – 11 in Carmen: Kimmerling Chapters 7 & 8
Week 4 January 26 – February 1, 2025	Monday: Finish Thematic Map Types Wednesday: Managing data in ArcGIS, geoprocessing tools (buffering, overlaying, dissolving boundaries) Friday: Lab time Quiz 3 Map Types in Class on Wednesday, 1/29 Lab Assignment 2 Wind Farm Suitability Analysis due 1/31
Week 5 February 2 – 8, 2025	Monday: Exam Review Wednesday: Exam on Maps Friday: Lab time
Week 6 February 8 – 15, 2025	Monday: Data collection 2: GPS, observational data. Wednesday: Formulation of groups and preparation for Lab Assignment 3 Creating a Story Map (due 2/21) Friday: Lab 3 Data collection (on campus, outside activity) Quiz 4 in class on Wednesday, 2/11 Optional Reading: Tyner Chapter 1
Week 7 February 16 – 22, 2025	Monday: Working with Census Data, ACS, Modifiable Areal Unit Problem (MAUP), Map uncertainty and accuracy Wednesday: Quiz and in class lab time for Story Map Assignment Friday: Lab time Quiz 5 in class 2/19 Lab Assignment 3 Story Maps due 2/21
Week 8 February 23 – March 1, 2025	Monday: Descriptive Statistics Wednesday: Descriptive Statistics Practice Problems; Introduction to Lab 4 Friday: Lab time Quiz 6 due on Friday, 2/29 Lab Assignment 4 Franklin County Eviction Rates due 3/7
Week 9 March 2 – 8, 2025	Monday: Probability, Distributions, Central Limit theorem Wednesday: Probability Practice Problems Friday: Finish Lab Assignment 4 Quiz 7 due on Friday, 3/7 Spring Break March 10 – 14, 2025

<p>Week 10 March 16 – 22, 2025</p>	<p>Monday: Hypothesis testing, gathering data, testing hypotheses Wednesday: Practice Hypothesis testing examples Friday: Lab time Quiz 8 due 3/21 Lab Assignment 5 Earthquakes Dashboard due 3/28</p>
<p>Week 11 March 23 – 29, 2025</p>	<p>Monday: Correlation, Spatial Autocorrelation, Outlier/cluster analysis Wednesday– Guest Speaker – finding data for your final paper Friday: Lab time Final Paper Proposal Due 4/3</p>
<p>Week 12 March 30 – April 5, 2025</p>	<p>Monday: Final Lecture: Hotspot Analysis, Kernel Density, Interpolation Wednesday & Friday: Lab time Lab 6 Analyzing Patterns of Traffic Crashes & Volumes around Public Schools due 4/11</p>
<p>Week 13 April 6 – 12, 2025</p>	<p>Monday: Exam Review Wednesday: Exam on Statistics Friday: Lab time or Final paper: work time Progress report for final paper due by 9 a.m. on April 14, 2025</p>
<p>Weeks 14, 15 & 16 April 13 – April 29, 2025</p>	<p>Final Paper: work time Final paper due April 23, 2025 Last Day of class: Monday, April 21, 2025</p>

GEOG 2200.01: Mapping Our World
Lab 4: Exploring eviction in Franklin County
Due March 7, 2025

Exploring eviction in Franklin County and submit a report of what you have done in this lab. In your report, use the template with required sections to describe the purpose of the exercise, key findings, and method used in this lab exercise. Be sure to state your null hypothesis and the alternate hypothesis in your introduction section. Items that you will include in this report are:

- Your observations of the spatial patterns on eviction in relation with other variables (e.g., minority, income, etc.). Which other variables is your choice, but you need to choose at least 2 additional.
- Embed your maps in your document with appropriate headings and descriptions within your text. Please note that these maps will appear under the results section of your report. The maps must be exports as you have done in previous assignments with North Arrows and legible legends.
- See **Part 2** – statistical analyses on the last page. You will need to include this information within your report. Include this information under methods and include the answers under results.

Contents

Introduction	1
Download ACS data from Social Explorer.....	2
Download Census Tract Boundary Files from US Census Bureau.....	5
Download file Eviction_by_tracts.csv from Carmen Canvas.....	5
Part 1 Display relationships on maps	5
Part 2 Testing hypotheses	7

Introduction

Eviction happens when a landlord removes tenants from their rental properties. Millions of Americans have been evicted from their homes due to housing unaffordability and inequality in urban areas. This negatively affects health and well-being of children and families across the US, causing community instability, depression, and a variety of illnesses. You can learn more about the eviction crisis in this short [Youtube video](#) and Matthew Desmond’s book “[Evicted](#)”.

In this lab, you will gather secondary data to explore the spatial patterns of eviction in Franklin County, OH. Then, based on what you learned about the relationships in Franklin County from your maps, you will use descriptive statistics to make inferences about these relationships in the US population.

You will use the following data:

- Demographics of Franklin County, OH. Source: American Community Survey.
- Eviction data (uploaded on Carmen Canvas). Source: Eviction Lab, Princeton University ([link](#)).
- Census tracts in Franklin County. Source: US Census TIGER shapefiles

Download ACS data from Social Explorer

1. Go to <https://www.socialexplorer.com/explore-tables>. You should have access to Social Explorer Premium if you use the OSU wifi network or OSU Libraries proxy.

We'll be working with the American Community Survey (ACS) 5-year estimates, 2012-2016 (because we only have eviction data for 2016). Click Begin Report.

American Community Surveys (5-Year Estimates) ^

ACS 5-Year Estimates (available down to the Census Block Group geography) data plus Social Explorer tables which include easy reports with age, sex, race, Hispanic origin, household relationship, place of birth, education, employment status, income, tenure, cost and value of housing, year structure built and other data.

American Community Survey (ACS) 2015--2019 (5-Year Estimates) NEW	Begin Report	More info
American Community Survey (ACS) 2014--2018 (5-Year Estimates)	Begin Report	More info
American Community Survey (ACS) 2013--2017 (5-Year Estimates)	Begin Report	More info
American Community Survey (ACS) 2012--2016 (5-Year Estimates)	Begin Report	More info

Select the data as shown below.

List Geographies **FIPS Codes**

Select a geographic type: [\(Show all geographies\)](#)

140 Census Tract ▼

Select a State:

Ohio ▼

Select a County:

Franklin County, Ohio ▼

Click Add and follow the following step:

Current Geography Selections:

===== Census Tract - 140 =====
All census tracts in Franklin County, Ohio

[Proceed to Tables ▶](#)

Click Proceed to Tables, then select the datasets below. Click *Add* (or double click on the dataset names), then *Show results*.

Current Table Selections:

===== Social Explorer Tables: ACS 2016 (5-Year Estimates) =====
A17005. Unemployment Rate for Civilian Population in Labor Force 16 Years and Over
A14006. Median Household Income (In 2016 Inflation Adjusted Dollars)

You will see the page below. Select the *Data Download* tab.

ACS 2016 (5-Year Estimates)

[Choose survey/year](#) ▶ [Geographies](#) ▶ [Tables](#) ▶ [Results](#)

ReportExcelData Download

Adjust \$ values for inflation to: ▼

Geographies **1 - 5 of 285** [Next](#) [Last >>](#)

Statistics	Census Tract 1.10, Franklin County, Ohio	Census Tract 1.20, Franklin County, Ohio	Census Tract 2.10, Franklin County, Ohio	Census Tract 2.20, Franklin County, Ohio	Census Tract 3.10, Franklin County, Ohio
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[SE:A10008. Households by Household Type](#)

Once in the data Download tab, you should see the following menu. Make sure to check the boxes as shown below.

Please set options before you download any data or import programs (these options affect both).

Adjust \$ values for inflation to:

Output options:

- TAB delimited files (STATA users should use this option to make import more efficient & accurate!)
- Output column labels in the first row
- Output ALL geographic identifiers
- Output percents (first variable in each table is the base)
- Output DBF friendly column names

Then click *Census Tract data (CSV)*:

Download data by geography type:

 **Census Tract data (CSV)**

Summary Level: 140

Geography Nesting: **State-County-Census Tract**

Selected: 284

Now you have a CSV downloaded to your computer, go ahead and open it with Excel.

2. Delete all columns started with Geo, **except for the first two columns (i.e., Geo_FIPS and Geo_GEOID).**
3. Change the column names: Each column name represents a variable that we will use for the mapping exercise. The variable name should be self-explanatory and contain no space.

	Old variable name	New variable name
Civilian Population in Labor Force 16 Years and Over	SE_A17005_001	pop16
Civilian Population in Labor Force 16 Years and Over: Employed	SE_A17005_002	employed
Civilian Population in Labor Force 16 Years and Over: Unemployed	SE_A17005_003	unemployed
Median Household Income (In 2016 Inflation Adjusted Dollars)	SE_A14006_001	income

4. Once you completed renaming the variables, delete the first row.
5. Calculate *unemployment rate* in Excel: (unemployment) *100 / (population above 16 years old). You can do the calculation for the first cell (e.g., I did “=E2*100/C2”). Once you finish the calculation for this cell, double click on the bottom right corner of this cell. The calculation will be automatically replicated for the rest of the cells in this column.

	F	G	H
loye income		pctunemp	
92	76220	3.75051	
22	89013		
49	80479		
38	99345		
129	36071		

Your result should look like this:

	A	B	C	D	E	F	G
1	Geo_FIPS	Geo_GEOID	pop16	employed	unemploy	income	pctunemp
2	39049000110	14000US39049000110	2453	2361	92	76220	3.75050958
3	39049000120	14000US39049000120	2195	2173	22	89013	1.0022779
4	39049000210	14000US39049000210	2155	2106	49	80479	2.2737819
5	39049000220	14000US39049000220	2527	2489	38	99345	1.5037594
6	39049000310	14000US39049000310	1753	1624	129	36071	7.35881346
7	39049000320	14000US39049000320	1463	1415	48	52475	3.2809296
8	39049000330	14000US39049000330	1228	1051	177	35757	14.4136808
9	39049000410	14000US39049000410	1733	1728	5	63088	0.28851702
10	39049000420	14000US39049000420	2328	2244	84	80132	3.60824742
11	39049000500	14000US39049000500	2717	2595	122	55699	4.4902466

6. Save as CSV format. Rename it Demography.csv.

Download Census Tract Boundary Files from US Census Bureau

7. Search for Tigerline Shapefiles on a web browser.
8. About the middle of the screen, you will see Years listed. Click on more and choose 2016.
9. Then click on FTP Archive
10. Scroll down and chose Tract from the List
11. The file downloads to your computer. This is all census tracts in Ohio.


Download file Eviction_by_tracts.csv from Carmen Canvas

Part 1 Display relationships on maps

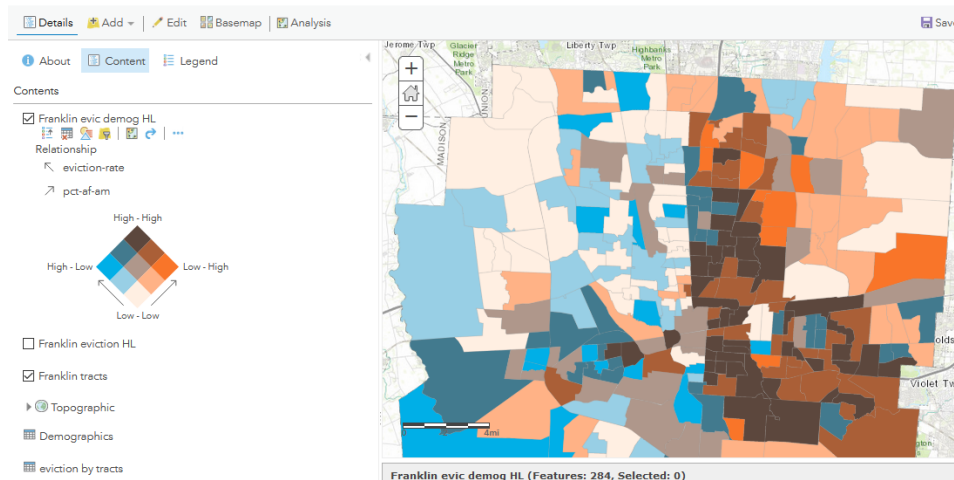
For all analyses, please make sure you uncheck “Use current map extent” before clicking “Run Analysis”.

12. Sign in your ArcGIS online with your OSU account. Open a new map and add the Ohio tracts shapefile (.zip) and the two csv files (eviction and demography).
13. The tracts file will take a minute or so to load. It may not show on the computer but is listed in your contents, so zoom into Ohio and it will display.
14. Now filter the tracts to Franklin County (CountyFP = 049)
15. Join Eviction.csv to the Tract layer using the GeoID field in the Tract layer (perform this analysis on the Franklin Tracts layer. Choose Analysis button on the right, then Tools, Join Features). Name the new layer “Franklin eviction_S24_2200_YourInitials”.

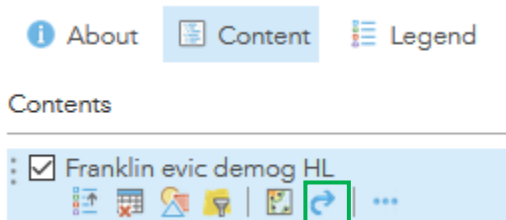
16. Join Demography.csv to “Franklin eviction _S24_2200_YourInitials” using the Geo_FIPS in the former table and the GeoID field in the latter layer. Name the new layer “Franklin evic demog _S24_2200_YourInitials”.

17. Click change Styles  under the *Franklin evic demog* layer. In step 1, choose eviction-rate. Click “Add attribute” and choose “pct-af-am” (percent of African Americans). In Step 2, select Relationship and change the color and symbols if you’d like.

Your map (before exporting) should look somewhat like this:



18. Now you’ll create another thematic map that shows the relationship between the employment rate and eviction rate. Click on the Rerun Analysis icon in the *Franklin evic demog* layer. Change the name of the output layer (e.g., put a number next to the old name). This is a way to duplicate this layer in ArcGIS Online.



19. Change the style of this map to show the relationship between median household income and eviction rate.

20. You can add other similar maps to display any association between eviction and other factors (e.g., unemployment, rent, property value, etc.).

21. Make sure you save the map regularly while performing the analyses.

22. You will need to use the print function to export both of your maps to jpegs. Be sure you check the options to include both the North Arrow and the legend.

Part 2 Testing hypotheses

Please note that this is included in your methods section and the resultant scatterplot in your results section. Now you've observed the relationships on the maps.

23. Download the data: Extract the *Franklin evic demog* layer to CSV and download it to your computer (go to Analysis > Manage Data > Extract Data).
24. Open this CSV file in Excel and save it as an Excel file (.xlsx). This will be used as your sample.
25. Create a scatterplot to show the relationship between median household income and eviction rate. Add a trend line. What are you observing with this data? You will also want to do a similar analysis with your second set of variables.
26. Next perform a second scatterplot analysis using your second set of variables.
27. What are some cautions when using such aggregated data (i.e., ACS data at Census tract level)? Think about descriptive statistics when answering this question.

Name: Real Student Example Used with Permission of Student

Course: GEOG 2200.01 Mapping our World

Date: 03/08/2024

Assignment Title: A look at eviction rates in Franklin County Ohio

Introduction:

For the purposes of this report, I am investigating eviction in Franklin County, Ohio. The objective is to explore correlations between multiple variables that may affect eviction. The questions I seek to gain answers to are, "What geographic locations in Franklin County experience the highest eviction rates?" and "Is there a relationship between property income and eviction rates?". In addition, "Is there a relationship between a specific minority and eviction rates? And lastly, "Are there any other variables that show a relationship with an increase in eviction rates?" My initial hypothesis is that census tracts closer to downtown may see higher eviction rates. In addition, I propose that lower-income properties would show a higher correlation with eviction rates. Lastly, I do not have a concrete hypothesis about if a specific minority in Franklin County experiences higher eviction rates, but I am very intrigued to discover any statistically significant findings! Through this report, I seek to test my hypothesis and come up with results that will be validated by real data sources.

Data:

The secondary data that was used in this report was retrieved from entities that make data publicly available. The American Community Survey (ACS) publishes data annually. The data collected is very similar to Census data, which is collected every 10 years. For this report, I used ACS data on a 5-year estimate from 2012–2016 for all census tracts in Franklin County, Ohio. This spreadsheet contains the FIPS codes, GEOIDs, population of each tract as of 2016, number employed or unemployed, median household income, and a variety of other data columns. The US Census Bureau publishes census tract boundary data for every year in the form of a Tigerline Shapefile. I used Census Tract Boundary data from 2016. This file contains the data for the polygons that make up census tracts for the US in ArcGis Online. Lastly, eviction rate data was pulled from Eviction Lab provided by Princeton University. This spreadsheet contains data on poverty rate, percent of race per census tract, eviction rate, median gross rent, and many other data columns. The full datasets for each of these respective sources can be viewed in their entirety in the References section.

Methods:

There was a total of three data sources used in this report and 2 of which came in the form of a spreadsheet. The ACS data described in the Data section was downloaded from the website Social Explorer. To attain the desired data, several actions had to be made on the website. I chose 5-year estimates from 2012-2016 for census tracts in Franklin County, Ohio. I then chose to include additional datasets of Unemployment Rate and Median Household Income in 2016 within Franklin County, Ohio. To export the data adequately, several categories had to be marked such as inclusion of column headers and adding an extra row for column names. Once this was complete, the data was exported to a CSV file. The data in its current state was not usable, i.e., dirty. To cleanse the data, many columns had to be deleted except for Geo_FIPS and Geo_GEOID. Then column header names were changed to better represent the data with which it was displaying. Lastly, a new column was made for a new variable, unemployment rate. Unemployment rate was calculated through an Excel function which used the unemployment variable already in the file and population above 16 years old, also already in the Excel file. The formula was $(\text{unemployment}) * 100 / (\text{population above 16 years old})$. The TIGERline file was downloaded from the US Census Bureau and was not further manipulated. In addition, the eviction data was downloaded as a CSV file and was not further manipulated.

Now that all the data was ready to be utilized, it was time to import it into ArcGIS Online. To do so I opened a new map and uploaded the three data sources to the map. To filter the map to just show Franklin County, I used the filter feature to only show the census tracts within Franklin County, Ohio. This was accomplished by setting CountyFP within the TIGERline layer to 49. With the filter in place, it was time to merge eviction data to the TIGERline tract layer. This was done by using the Analysis tool and then utilizing the Join Features option. This newly created layer shows the eviction rates throughout all of Franklin County. The next thing to complete is joining the newly created layer to the cleansed ACS file (which shows demography). I joined these two layers through the method I used above initially. This new layer shows Franklin County eviction rates displayed through demographic information.

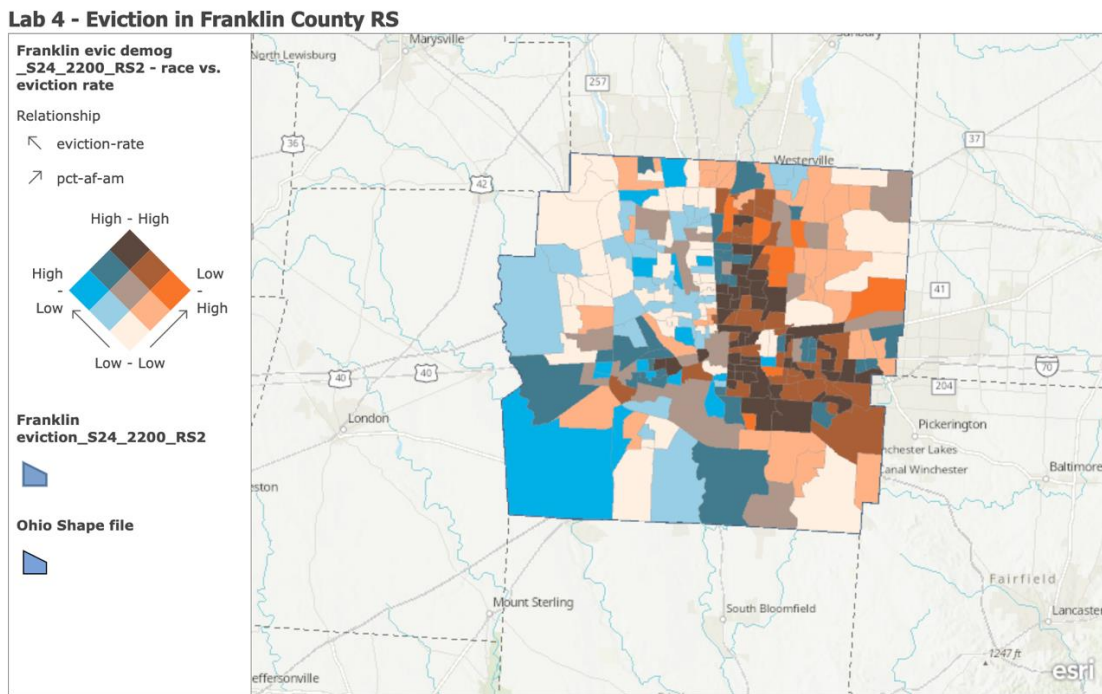
With the multiple files merged to display rich information, it is time to configure the style of the map(s). The first thing I completed was manipulating the style of the map to show Relationships between eviction rates and percent African American within census tracts. The map now can show the relationship between eviction rates and specified minorities. To further answer my initial hypothesis, I re-ran the analysis studying median household income vs. eviction rate and poverty rate vs. eviction rate in 2016 in Franklin County, Ohio. Once these maps were completed, they were exported for visualization.

One way to test my hypotheses is by using statistical hypothesis testing. With the data being used in this report being continuous, regression analysis can be used to show the relationships between two continuous variables. To do this, I exported the Franklin County Demographic Eviction Rate layer to a CSV file. I then made multiple scatterplots using median household income, poverty rate, and percent of African American in census tract vs. eviction rate separately.

After all of the preparation was complete, data could be analyzed to show statistically significant relationships between variables being studied.

Results:

The resulting maps and scatter plots that were created showed definite resolution into the relationships present between variables. The first relationship that I studied, eviction rate vs. percent of African Americans, is of utmost important to sociocultural researchers. The map in Figure 1A displays a heat gradient of the two respective variables in 2016 within Franklin County. From visual inspection, it appears there is a large concentration of African Americans in Eastern Franklin County, East of The Ohio State University’s campus. In addition, there is higher eviction rates in Eastern Franklin County. Visual inspection provides a large amount of qualitative information to the viewer but limits the statistical analysis completed on quantitative data. To utilize this viewing frame, the scatterplot for eviction rate vs. percent of African American is shown in Figure 1B.



Esri, CGIAR, USGS | Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS

Figure 1A. Map displaying the relationship between eviction rate and percent of African Americans 2016

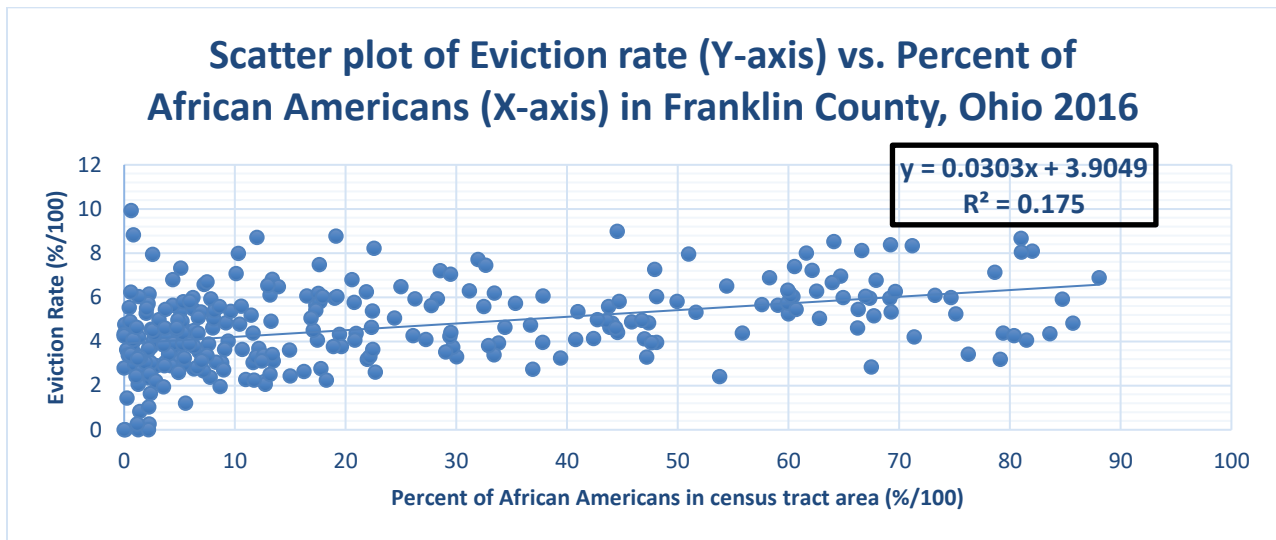


Figure 1B. Scatterplot displaying the relationship between eviction rate and percent of African Americans 2016

The scatterplot shows data points that represent eviction rates for percentage of African American in census tracts in Franklin County in 2016. The x-axis represents percentage of African Americans in census tract and the y-axis shows the eviction rate. The graph also displays the equation of the trendline and Coefficient of Regression, R^2 . The Coefficient of Regression displays the statistical significance between two continuous variable's relationship. R^2 ranges from -1 to 1. A negative value for R^2 means a negative correlation and a positive value means a positive correlation. The closer the value is to 1, the stronger the relationship present. Applying this to the current graph, the R^2 is closer to 0.175, meaning there is a positive relationship present, as one increases, the other increases. However, the relationship present is weak to moderate. For reference, there is an example of weak and strong regression analysis graphs below in Figure 1C.

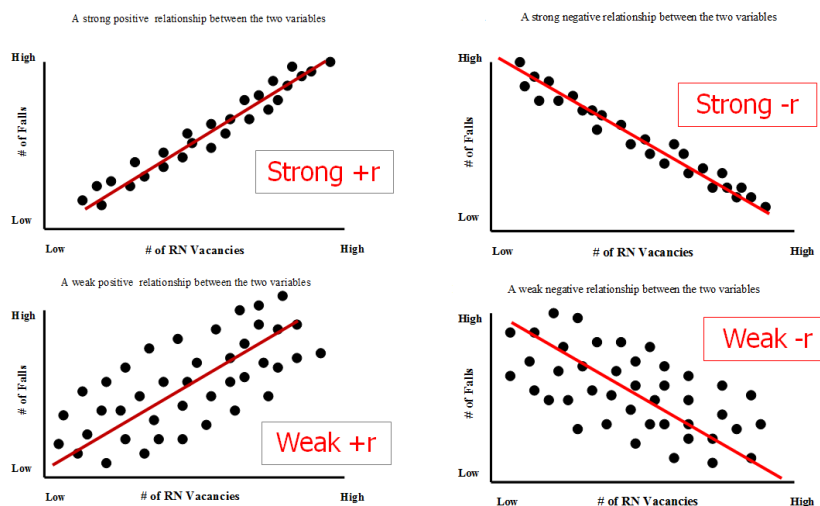
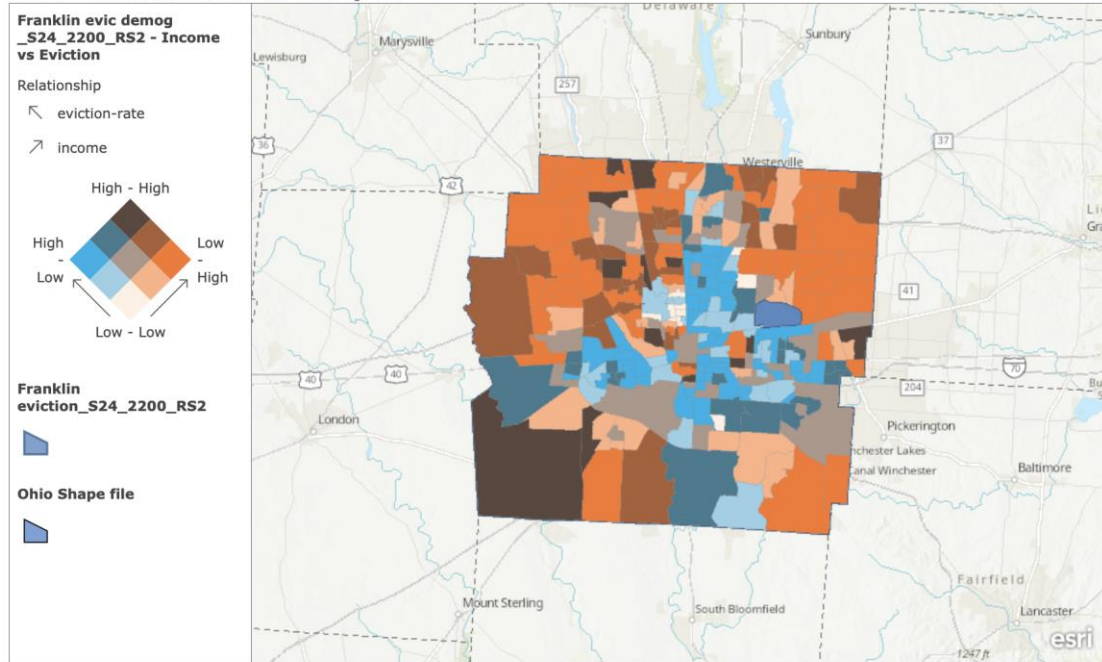


Figure 1C. Scatterplots displaying potential relationships (Oceanhac)

The weak to moderate positive relationship present in this scatterplot means that there is weak to moderate evidence that an increase in percentage of African Americans correlates to higher eviction rates. This is the exact importance of conducting statistical analysis. It allows fuller resolution into the hypotheses at hand. To test more hypotheses, this approach was used with more variables.

In Figure 2A, there is a map showing median household income vs. eviction rate in Franklin County. There appears to be a slight ring of colors in Franklin County, with lower median income households being located outside of the metro area. Figure 2B shows the scatterplot for the relationship between eviction rate vs. poverty rate.

Lab 4 - Eviction in Franklin County RS



Esri, CGIAR, USGS | Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS

Figure 2A. Map displaying the relationship between eviction rate and median household income in census tracts 2016

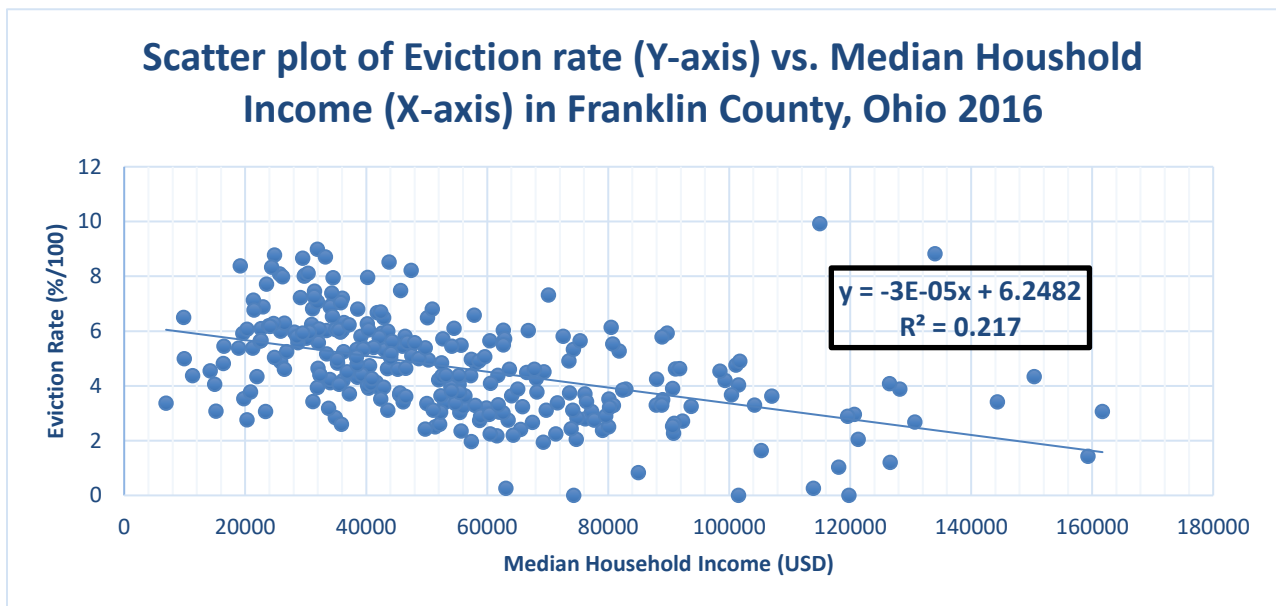


Figure 2B. Scatterplot displaying the relationship between eviction rate and median household income 2016

Figure 2B shows a negative weak to moderate relationship between the two variables. There is weak to moderate evidence that as median household income increases, eviction rate decreases.

To further test hypotheses, I looked at eviction rate vs. poverty rate. The map in Figure 3A shows a high concentration of dark colors in the center of Franklin County. This means there is a higher amount of higher eviction rates AND poverty rate is higher in these areas. Figure 3B shows the scatterplot of the relationship between the two variables.

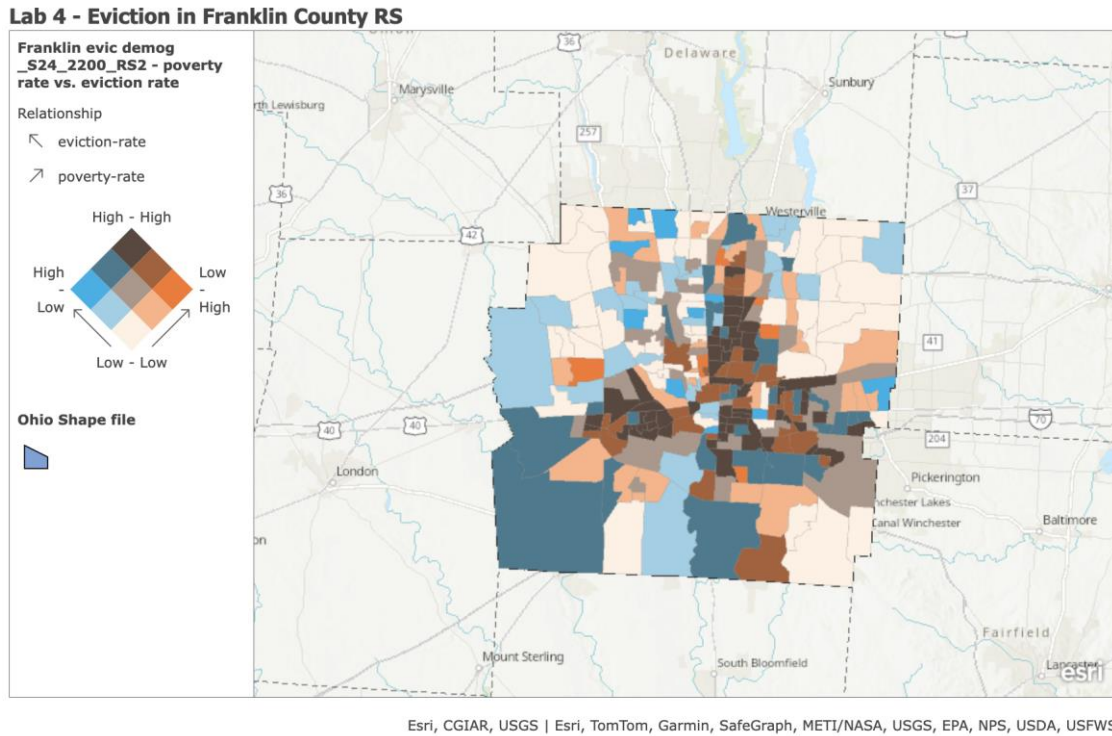


Figure 3A. Map displaying the relationship between eviction rate and poverty rate 2016

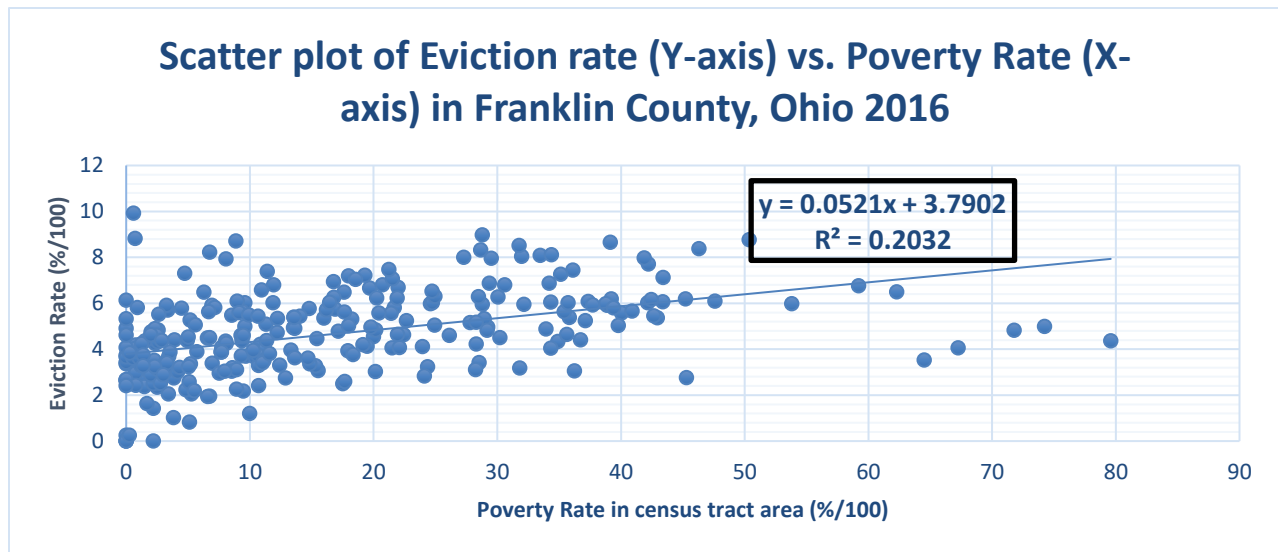


Figure 3B. Scatterplot displaying the relationship between eviction rate and poverty rate 2016

Figure 3B shows there is a weak to moderate positive relationship between eviction rate and poverty rate in Franklin County, Ohio in 2016. In other words, there is weak to moderate evidence that as eviction rate increases, poverty rate increases as well. The maps and scatterplots created show there are statistically significant relationships between variables of study.

Conclusions and recommendations:

Whenever aggregate data is used, there should be an acknowledgement of the possibility that the dataset does not reflect a normal distribution. Since the datasets used in this report were not assumed to be normal, we used median data. When distributions are skewed right or left, the mean and mode do not adequately represent the center of the distribution. This is why the median is used. After analyzing the relationship between eviction rate and multiple variables, there did not appear to be any direct correlations.

The most statistically significant relationship present was median household income vs. eviction rate. In Franklin County in 2016, households with a higher median income showed lower eviction rates. The results showed that eviction rates were higher closer to the center of Franklin County, Ohio, in 2016. In addition, although there were areas in Franklin County that showed higher concentrations of African Americans with high eviction rates, it is not statistically correct to state that African Americans or any minority showed higher eviction rates. Lastly, another variable that I studied was the poverty rate, but it came out not to have a statistically significant relationship with the eviction rate. Overall, this report shows the benefits and limitations of both thematic maps that display relationships between variables and statistical analyses such as regression analysis.

References:

Result support references:

Positive association scatter plot. (n.d.). Oceanhac. <https://oceanhac.weebly.com/positive-association-scatter-plot.html>. Accessed 5 Mar. 2024.

Data spreadsheets reference:

US Census Bureau. 2016. Demographics of Franklin County, OH. *American Community Survey* [Dataset]. Accessed on March 2024. <https://www.socialexplorer.com/explore-tables>

US Census Bureau. 2016. Census Tract Boundaries Data. Census tract TIGERline [Dataset]. Accessed on March 2024. <https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html>

Eviction Lab, Princeton University. 2016. US Eviction Data. Eviction rate [Dataset]. Accessed on March 2024. <https://evictionlab.org/map/?m=modeled&c=p&b=efr&s=all&r=counties&y=2018&lang=en>

GEOG 2200.01 Mapping Our World

Final Paper Guidelines

20% of Final Grade

In the paper, you should present a map-centered argument in an area of your interest (e.g., international relations, politics, geology, criminology, philosophy, biology, anthropology, business, law, history, environmental science). Pick a topic you already know so that you can contribute with your existing knowledge, but it can also be something you have to research from scratch. You could for example compare some existing examples of map use and make a recommendation based on some evidence (If you use this option, the maps must be available in ArcGIS Living Atlas, you cannot use a map from the web). You use a combination of mapping and statistical methods that you learned in this course. Make sure to cite all sources.

A multi-stage project

Having multiple small milestones is the key to completing a project. Do not leave it until the last minutes.

This final paper will account for 20% of your total grade. You will submit 3 documents at different times in this semester. The components are as follows:

- Proposal: (for feedback purposes) due April 3
- Progress check: (for feedback purpose) due by 9 a.m. on April 14
- Final submission due April 25
- Late submissions are not accepted

Grading Breakdown:	Proposal.....	5 points
	Progress Check.....	10 points
	<u>Final Report.....</u>	<u>100 points</u>
	Total	115 points

Objectives

The Term Paper is a major deliverable that helps you develop/demonstrate your knowledge about mapping and statistical/spatial analysis. The paper assesses your understanding of basic methods of spatial data gathering, mapping, data analysis, presentation, and interpretation. It also asks you to demonstrate the value of geographic knowledge and how it can be used to analyze real-world, critical problems.

The goals of this paper are to assess...

- Your understanding of basic methods for spatial data-gathering, presentation, and interpretation.
- Your ability to interpret maps to analyze and critically evaluate the spatial structure of and relationships among spatial phenomena.
- Your ability to apply statistical ideas to seek explanations for unusual or interesting patterns on maps.
- Your ability to evaluate the impact of spatial data sampling and uncertainty on map use.

In completing this paper, you should...

- demonstrate your familiarity with basic methods of spatial data-gathering, presentation, and interpretation such that you can analyze and critically evaluate the spatial structure of and relationships among spatial phenomena in a selected area of interest;

- gain some experience researching and extracting information to understand a topic in enough depth to be able to share your knowledge with others; and
- gain some experience in writing for a professional audience. The paper should not be too technical.

Requirements, submission, and grading

Final Paper Proposal due April 3 (5 points)

You should provide a preliminary topic and outline of your paper. It can be as short as one page with bullet points and/or narrative. Your proposal will include the following:

- Question(s) you are planning to answer.
- What is your study area?
- Data you are planning to use. Make sure the data have spatial attribute and can be mapped (e.g., csv format with a spatial field, or shp/gpx format). Include the links and describe the data. You may not yet have all the data located.
- Methods you will employ to answer the question(s) above. Your methods have to be spatial and/or statistical (e.g., buffering, merging multiple datasets, correlation, hypothesis testing, cluster, detecting outliers, hotspot analysis, interpolation, etc.). You may not know all these methods yet or which one is suitable.
- Expected findings.

Be as specific as possible. I will give detailed comments to each submission; the more details you give me, the more suggestions that I can provide.

Progress check due April 14 by 9 a.m. (10 points)

The purpose of this submission is to ensure you are on the right track and that you allocate enough time to finish your paper. It is acceptable that your paper takes a slightly different direction from what you proposed, but the first section of the paper that you turn in here is your original proposal, under the heading: **Original Proposal**. If then you have decided to change your proposal, the next section will state: **New Proposal**.

It is recommended that you use the template format for submitting your progress report. You need to include more than just your proposal. You need to show that you have made progress in your analysis and write up. Note in each section what additional work needs to be completed for that section. Your introduction, data and reference sections (at a minimum) should be complete at this point (this means you should already know what data you want and where you got it).

You will get feedback on your performance and potential improvements.

Requirements: Show reasonable progress, if all you turn in is your original proposal or a new proposal without showing any progress, you will receive ½ credit for this portion of the project.

Final paper requirements due April 25:

Original Proposal: You need to copy and paste your original proposal into this section. This must be included at the top of your final paper. If during your progress report, you had a new proposal that also needs to be a section. Don't include any of the data or references, just the proposal itself.

Introduction: What is the topic or problem that you will address? Provide project goals and objectives, study scope and characteristics of the study area.

Study Site: Identification of your study site and a reference map of this location. Reference map is a map that shows where your study site is within the confines of a larger area. The map needs to be exported as a jpeg (as all other maps) and inserted onto your word

document in this section, along with a description of your site.

Data: what data, the data source, data acquisition

Methods: applied manipulation procedures, ArcGIS functionalities

Results: discussion of what conclusions or arguments can be made based on the presented material including justification.

Conclusions and/or recommendations: Speculate and make recommendations for future work and include any advice to the audience that may seem relevant.

References: Cite all sources that you used in the paper.

Maps and other Graphics: these should be included under the results section (or noted as an appendix and appropriately numbered in the text).

Your paper should be at least 1000 words (not including references, maps, tables, and/or charts to illustrate your points).

See the rubric in Canvas for the final paper grading parameters.

Examples of topics

Below are some examples of topics. You can propose any topic of interest and consult with me to make sure the topic and research question are feasible for a class project.

- Eviction Rates in city X at census tract level (similar to Lab 4 but not Franklin County)
- Home ownership and income in city X (at census tract level)
- Maternal mortality hotspots in the US
- Parks distribution and proximity to nearby populations in city X
- Traffic crash hotspots (similar to Lab 6 but not in Pasadena)

Data sources

- **US Census and ACS:** <https://www.socialexplorer.com/>
- **TIGER shapefiles** for all US Census boundaries and lines: <https://www.census.gov/cgi-bin/geo/shapefiles/index.php>
- **City open data portal:** Search “City_name + open data” in Google. For example, Columbus data are stored in <https://public-morpc.hub.arcgis.com/>. You can find transportation, land use, demographic, and other types of data there.
- **Customized search** on Google: if you want to find airport locations (with spatial attribute to map them), type “US airports shapefile”. For parks in Chicago, try “Chicago park shapefile.”
- **ArcGIS Living Atlas maps:** In your ArcGIS map, you can search for layers from Living Atlas or ArcGIS Online (Click Add, and in the dropdown menu, you’ll replace “My Content” with one of the two above options).

Note: it’s common that the data are available as online interactive maps that are not downloadable. In this case you need to find other sources.

Finding geospatial data (by Josh Sadvari, OSU GIS librarian, with modification)

1) What

- Briefly describe your research topic. What type of analysis are you planning?
- What data will you need to address this topic or carry out this analysis? Ask yourself things like:
 - What types of data am I seeking (e.g., statistics, boundaries, locations)?
 - What format will those data likely be in (e.g., text, table, vector)?
 - What attribute information do I need?

2) Where

- Ask yourself things like:
 - What geographic area(s) am I studying?
 - What spatial scale/resolution am I planning to use for my analysis, and is this realistic?

3) Who

- Ask yourself things like:
 - Who is likely to care about this research topic and dataset?
 - What government agencies, educational institutions, non-profits, research centers, commercial entities, or other organizations may collect and distribute these data?

4) How

- Ask yourself things like:
 - How were the data collected? Is information about the collection methodology easily accessible and from a reliable source?
 - Are the data GIS-ready? If not, how will I prepare them for use in my project?
 - Are the data likely to be publicly/freely accessible, or might there be a cost?
 - Are there limitations on how the data can be used in my research?
 - How must I cite these data if I use them in my own work?