



SYLLABUS

GEOG 6286

GIS Applications in Social Science and Business Contexts
Spring 2026 – Distance Learning, Asynchronous Online

COURSE OVERVIEW

Instructor

Instructor: Sandy Wong

Instructor credentials: PhD

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Course description

This course provides an overview of **GIS applications in social science and business contexts**. GIS are powerful tools that we can use to visualize, analyze, and interpret spatial data. Students will leverage GIS to reveal patterns that allow us to better understand, inform, and address complex societal issues in such fields as urban planning, public health, and business analytics. In this course, through a blend of theoretical knowledge and practical exercises, students will gain proficiency in GIS software and tools, develop skills in spatial data collection and processing, and learn techniques for integrating and analyzing diverse datasets. The course begins with an introduction to key topics, including census geography, accessibility, mobility, optimization, and machine learning. Then, we transition to a term project in which students pick one social or business problem to examine and generate deliverables across the research design process, including reviewing the literature, collecting and processing data, analyzing data, and producing written and oral results. By the end of the course, students will be able to use GIS to investigate social and business challenges, and present their findings.

Course learning outcomes

By the end of this course, students should successfully be able to:

- Explain various spatial analysis methods and their application for analyzing societal problems.
- Collect, process, analyze, and visualize GIS data from different sources.
- Develop basic data processing tools using programming languages.
- Critically evaluate the use of geographic data and methods to investigate social science and business questions.
- Conduct and present GIS research for a business or social science project.

HOW THIS COURSE WORKS

Mode of delivery: This course is 100% online. There are no required sessions when you must be logged in to Carmen at a scheduled time.

Pace of online activities: This course is divided into weekly **modules** that are released every Thursday, with the exception of the first week when the first module will be released on the first day of class. Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame, if applicable.

Credit hours and work expectations: This is a **3-credit-hour course**. According to [Ohio State policy](#), students should expect around 3 hours per week of time spent on direct instruction (instructor content 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.

Attendance and participation requirements: Because this is an online course, your attendance is based on your online activity and participation. Research shows regular participation is one of the highest predictors of success. With that in mind, I have the following expectations for everyone's participation:

- **Participating in online activities for attendance: AT LEAST ONCE PER WEEK**
You are expected to log in to the course in Carmen every week. (During most weeks you will probably log in many times.) If you have a situation that might cause you to miss an entire week of class, discuss it with me *as soon as possible*.
- **Office hours and CarmenZoom meetings: OPTIONAL**
All live, scheduled events for the course, including my office hours, are optional.
- **Participating in discussion forums: AT LEAST ONCE PER WEEK**
As part of your participation, each week you can expect to post at least once as part of our substantive class discussion on the week's topics.

COURSE MATERIALS AND TECHNOLOGIES

Textbooks

REQUIRED

We will read journal articles and book chapters, all of which are available electronically through OSU's Library. Book chapters will come from the following book:

- Wang, F. & Liu, L. (2023). *Computational Methods and GIS Applications in Social Science*. Third Edition. Boca Raton, LA: CRC Press.

Course technology

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at <https://it.osu.edu/help/hours>, and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** <https://it.osu.edu/help>
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu
- **TDD:** 614-688-8743

BASELINE TECHNICAL SKILLS FOR ONLINE COURSES

- Basic computer and web-browsing skills
- Navigating Carmen: for questions about specific functionality, see the [Canvas Student Guide](#).

REQUIRED TECHNOLOGY SKILLS SPECIFIC TO THIS COURSE

- [CarmenZoom virtual meetings](#)
- [Recording a slide presentation with audio narration](#)
- [Recording, editing, and uploading video](#)

REQUIRED EQUIPMENT

- **Computer:** A PC or Mac computer with camera, microphone, keyboard, earbuds/headset. 256 GB hard drive storage (512 GB recommended) and 8 GB RAM (16 GB recommended).

- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for technology and internet access at the Technology and Digital Innovation [IT for Students website](#).

REQUIRED SOFTWARE

- **Python & Jupyter Notebook:** Students will install [Miniconda](#) and [Jupyter Notebook](#).
- [Microsoft Office 365:](#) All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found at go.osu.edu/office365help.

CARMEN ACCESS

You will need to use [BuckeyePass](#) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](#) help article for step-by-step instructions.
- Download the [Duo Mobile application](#) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and IT support staff will work out a solution with you.

GRADING AND FACULTY RESPONSE

How your grade is calculated

ASSIGNMENT CATEGORY	POINTS
Weekly lab exercises	30
Weekly quiz questions	10

Weekly discussion board participation	10
Term project	50
Total	100

See course schedule below for due dates.

Late assignments

Please refer to CarmenCanvas for due dates. Due dates are set to help you stay on pace and to allow timely feedback that will help you complete subsequent assignments. The late penalty is 20% per day, including weekend days.

Grading scale

93–100: A
 90–92.9: A-
 87–89.9: B+
 83–86.9: B
 80–82.9: B-
 77–79.9: C+
 73–76.9: C
 70 –72.9: C-
 67 –69.9: D+
 60 –66.9: D
 Below 60: E

Instructor feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-HELP** at any time if you have a technical problem.)

- ▶ **Preferred contact method:** If you have a question, please contact me first via message on **CarmenCanvas**. I will reply to messages within **24 hours between 9am-5pm on days when class is in session at the university**.
- **Class announcements:** I will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](#) to ensure you receive these messages.

- **Discussion board:** I will check and reply to messages in the discussion boards once mid-week.
- **Grading and feedback:** For assignments submitted by the due date, I will try to provide feedback and grades within **ten days of the due date**. Assignments submitted after the due date may have reduced feedback, and grades may take longer to be posted.

OTHER COURSE POLICIES

Discussion and communication guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style:** While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. A more conversational tone is fine for non-academic topics.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.
- **Backing up your work:** Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Academic integrity policy

POLICIES FOR THIS COURSE

- **Quizzes:** You must complete the quizzes yourself, without any external help or communication.
- **Written assignments:** Your written assignments, including lab exercises, discussion posts, and term project, should be your own original work. In formal assignments, you should follow APA style to cite the ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in—but no one else should revise or rewrite your work.
- **Reusing past work:** In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on

past research or revisit a topic you've explored in previous courses, please discuss the situation with me.

- **Falsifying research or results:** All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results or your library research look more successful than it was.

GENERATIVE ARTIFICIAL INTELLIGENCE TOOLS

Given that the learning goals of this class are to use coding and apply GIS, in this course, students are welcome to explore innovative tools and technologies for data processing and analysis, and for troubleshooting coding issues, including generative artificial intelligence (GenAI). Students are permitted to use GenAI tools for most course assignments that involve coding, except for quizzes and for generating fake datasets and results. Your written assignments, including lab exercises, discussion posts, and term project, should be your own original work.

If I suspect that you have used GenAI on an assignment for which it is prohibited, I will ask you to explain your process for completing the assignment in question. Submission of GenAI-generated content as your own original work is considered a violation of Ohio State's Academic Integrity policy and [Code of Student Conduct](#) because the work is not your own. The unauthorized use of GenAI tools will result in referral to the [Committee on Academic Misconduct](#).

OHIO STATE'S ACADEMIC INTEGRITY POLICY

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's [Code of Student Conduct](#), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's [Code of Student Conduct](#) and this syllabus may constitute "Academic Misconduct."

The Ohio State University's [Code of Student Conduct](#) (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's [Code of Student Conduct](#) is never considered an excuse for academic misconduct, so I recommend that you review the [Code of Student Conduct](#) and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages ([COAM Home](#))
- *Ten Suggestions for Preserving Academic Integrity* ([Ten Suggestions](#))
- *Eight Cardinal Rules of Academic Integrity* (www.northwestern.edu/uacc/8cards.htm)

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Statement on Title IX

All students and employees at Ohio State have the right to work and learn in an environment free from harassment and discrimination based on sex or gender, and the university can arrange interim measures, provide support resources, and explain investigation options, including referral to confidential resources.

If you or someone you know has been harassed or discriminated against based on your sex or gender, including sexual harassment, sexual assault, relationship violence, stalking, or sexual exploitation, you may find information about your rights and options at [titleix.osu.edu](#) or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu. Title IX is part of the Office of Institutional Equity (OIE) at Ohio State, which responds to all bias-motivated incidents of harassment and discrimination, such as race, religion, national origin and disability. For more information on OIE, visit [equity.osu.edu](#) or email equity@osu.edu.

Academic Freedom

The Ohio State University is committed to the “freedom of faculty to … discuss in classrooms, in their own manner, any material that is relevant to the subject matter as defined in the course syllabus” (rule [3335-5-01](#).B.2). Consistent with the principle of academic freedom, this course encourages open inquiry, critical questioning, and respectful debate. By ensuring the right to express thoughts, challenge assumptions, and pursue knowledge freely, academic freedom not only enriches individual growth but also upholds the integrity of higher education as a site of discovery.

Intellectual Diversity

Ohio State is committed to fostering a culture of open inquiry and intellectual diversity within the classroom. This course will cover a range of information and may include discussions or debates about controversial issues, beliefs, or policies. Any such discussions and debates are intended to support understanding of the approved curriculum and relevant course objectives rather than promote any specific point of view. Students will be assessed on principles applicable to the field of study and the content covered in the course. Preparing students for citizenship includes helping them develop critical thinking skills that will allow them to reach their own conclusions regarding complex or controversial matters.

Grievances and Solving Problems

A student who encounters a problem related to his/her educational program has a variety of avenues available to seek resolution. (Note: the procedures for grade grievances are explicitly covered in the faculty rules) Typically, a student is advised to resolve any dispute, disagreement, or grievance as directly as possible, engaging with the person or persons most closely involved. The faculty and staff of the departments and colleges are available to work with students in this regard. If this step does not produce acceptable results, the student should follow a logical stepwise progression to address the academic concerns.

According to University Policies, if you have a problem with this class, you should seek to resolve the grievance concerning a grade or academic practice by speaking first with the instructor or professor. Then, if necessary, take your case to the department chairperson, college dean or associate dean, and to the provost, in that order. Specific procedures are outlined in Faculty Rule 3335-8-23. Grievances against graduate, research, and teaching assistants should be submitted first to the supervising instructor, then to the chairperson of the assistant's department.

Your mental health

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 find yourself feeling isolated, anxious or overwhelmed, please know that there are resources to help: ccs.osu.edu. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24 hour emergency help is also available through the 24/7 National Prevention Hotline at 1-(800)-273-TALK or at suicidepreventionlifeline.org. The Ohio State Wellness app is also a great resource available at go.osu.edu/wellnessapp.

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 [Civil Rights Compliance Office](#). Policy: [Religious Holidays, Holy Days and Observances](#)

Weather or other short-term closing

Following [Policy 6.15](#) (Weather or Other Short-Term Closing):

Should in-person classes be canceled, I will notify you as to which alternative methods of teaching will be offered to ensure continuity of instruction for this class.

Communication will be via CarmenCanvas. Unless otherwise announced by the university, online or distance-learning classes will occur as scheduled.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

The university strives to make all learning experiences as accessible as possible. 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. **SLDS contact information:** slds@osu.edu; 614-292-3307; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This online course requires use of Carmen (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- [CarmenCanvas accessibility](#)
- Streaming audio and video

- CarmenZoom accessibility
- Collaborative course tools

COURSE SCHEDULE

Week	Dates	Topics, Readings, Assignments, Deadlines
1	Jan 12	Course Introduction, Census Geographies & Demography <u>Anselin 2010, Jurjevich et al. 2018</u> Exercise 1, Lecture Quiz (Due Jan 22)
2	Jan 20	Accessibility <u>Wang & Liu 2023 Chapter 5, Saxon et al.</u> Exercise 2, Lecture Quiz (Due Jan 29)
3	Jan 26	Mobility <u>Chen et al. 2016, Wang & Liu 2023 Chapter 2</u> Exercise 3, Lecture Quiz (Due Feb 5)
4	Feb 2	Optimization <u>Li et al. 2022, Bao et al. 2020</u> Exercise 4, Lecture Quiz (Due Feb 12)
5	Feb 9	Machine Learning/GeoAI <u>Hu et al. 2024; Liu & Biljecki 2022</u> Exercise 5, Lecture Quiz, Term Project Deliverable 1: Pick a project and location (Due Feb 19)
6	Feb 16	Annotated Bibliography Exercise 6 (Due Feb 26)
7	Feb 23	Annotated Bibliography continued Term Project Deliverable 2: Annotated Bibliography (Due Mar 5)
8	Mar 2	Research Designs & Collecting Data Term Project Deliverable 3: Research Design Plan

Week	Dates	Topics, Readings, Assignments, Deadlines
		Term Project Deliverable 4: Collect Data (Due Mar 12)
9	Mar 9	Cleaning & Processing Data <u>Wilson et al. 2017</u> Term Project Deliverable 5: Clean/Process Data (Due Mar 26)
10	Mar 23	Analyzing Data Term Project Deliverable 6: Analyze Data (Due Apr 2)
11	Mar 30	Writing Up and Visualizing Results in a StoryMap Term Project Deliverable 7: StoryMap (Due Apr 9)
12	Apr 6	Final Presentations Term Project Deliverable 8: Recorded Video Presentation (Due Apr 16)
13	Apr 13	Final Projects Peer Review of Term Project (Due Apr 23)
14	Apr 20	Peer Review of Term Project continued