GEOG 6223: Web GIS

The Ohio State University
Autumn 2026

Course URL: http://carmen.osu.edu
Time: Online
Location: Online

Instructors
Prof. Ningchuan Xiao | xiao.37@osu.edu

Office hours

Day	Room	Time and zoom link	Passcode	Instructor
Tuesday	1160 DB	4 - 5 PM	264551	Dr. Xiao
Thursday	1160 DB	4 - 5 PM	264551	Dr. Xiao

The Internet has fundamentally changed the way of computing. The combination of geographical information technologies and the Web has become ubiquitous in applications from daily travel planning to complex natural resource management. In this class we learn how to enable mapping and GIS operations in a web-based environment. The major goal of this course is to help students understand the design and implementation of web-based GIS for different purposes. We will survey a variety of enabling web-based techniques for spatial data management and processing, geographical knowledge representation, and mapping. A wide range of web-based GIS applications will be discussed.

Course learning outcomes

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

- Understand the enabling techniques for web-based applications
- Design, implement, and deploy web-based GIS for different purposes using different techniques
- Analyze web-based GIS applications
- Utilize online data sources for mapping and visualization
- Develop your own datasets for online mapping and visualization

Course materials

The following is required for this class:

Dorman, Michael, 2020. *Introduction to Web Mapping*. Chapman and Hall/CRC.

Tutorials and lecture notes will be made available through the course schedule page on Carmen. We will also use online sources for some of the topics.

Schedule

The overall course contents are divided into a few major topics:

Weeks 1-4: Fundamentals of Web development
Weeks 5-10: Serving geospatial data on the web
Weeks 11-15: Interactivity and other advanced topics

A detailed schedule can be found on the course page on Carmen. Students should check the course page frequently as it will be updated whenever new materials are made available. Important notes regarding the course will also be posted on the course page.

Videos

I will make various small videos explaining course content. All these videos will be posted on carmen in the beginning of each week. Please check the carmen page frequently for the availability of the videos.

Course technology

Necessary equipment

- Computer: current Mac or PC with high-speed internet connection.
- Webcam: built-in or external webcam, fully installed
- Microphone: built-in laptop or tablet mic or external microphone

Necessary software

The following are very useful software packages. We will only install the following when we need to.

- Web browser. I will mainly use Google Chrome for most, if not all, of the tasks. But other web browsers like Safari and Firefox are also good options.
- Visual Studio Code or other editors.
- Node.js https://nodejs.org/ can be used to run JavaScript programs outside the browser and install packages via npm (e.g., for web GIS libraries like Turf.js or server-side tools).
- Geoserver: students will install this open-source, free software system to manage and publish their geospatial data sets

Other course technology

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at https://ocio.osu.edu/help/hoursLinks to an external site., and support for urgent issues is available 24x7.

- Self-Service and Chat support: http://ocio.osu.edu/selfserviceLinks to an external site.
- Phone: 614-688-HELP (4357)
- Email: 8help@osu.edu
- TDD: 614-688-8743

Grading and Assignments

The following is a breakdown of the weights (in percent) for each category of the assignments. Each category is described below.

Assignment category	Weight (%)
Module practice	25
Mini projects	25
Coding quizzes	15
Final projects	25
Participation	10
Total	**100**

Course organization and assignment information

Course contents are organized into modules. There are a total of 14 modules, and I will try to align modules with calendar weeks. See the detailed schedule on Carmen for the specific tasks.

- **Module practice.** To finish each module, we will have a number of questions related to the major theme in that module. These assignments are typically due in on week.
- **Mini projects.** I will have a number of relatively small projects throughout the semester. These will focus on the application of some major technologies used in this course. The number of such projects may change, but I would expect to have between three and five. Students must demonstrate that they complete these projects by themselves. Submissions may be peer-reviewed by other students.
- **Coding quizzes.** There may be an online and open-book quiz at the end of a module. The questions are related to the topics in the current module, but may also be cumulative. This

quiz is timed and will be automatically graded. These are relatively small questions. The quiz for the first module will also include questions regarding the course syllabus.

- **Final projects.** In the middle of the semester, students will propose a project related to the topics covered in this class.
- **Participation.** Participation in peer-reviews will be required for a number of assignments (such as the mini projects). There will also be several surveys in the semester. Students may also be asked to post and respond to online discussion boards for some selected topics.

Grading scale

Grades will not be rounded up. THe following scale is used to assign the final grade for this class.

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

Faculty feedback and response time

The following list outlines the intended availability of the instruction team throughout the course. (Remember that you can call 614-688-HELP at any time if you have a technical problem.)

Grading and feedback For the exercises, students should be able to see the grade and feedback in a week after the due dates. For large tasks such as a homework assignment, the time frame to expect feedback is generally up to 2 weeks.

E-mail E-mails will be replied within 48 hours, and we aim for 24 hours during school days.

Office Hours In addition to the office hours listed in the syllabus, students may request other times to meet with the instruction team. Please give at least 24 hours notification and it will only be available during school days.

Course Policies

Do your own work. Collaboration is healthy and often necessary, but each student should definitely finish the work individually. Please see below for more information about academic misconduct. This policy also applies to the use of generative AI such as ChaptGPT. We will treat these as tools that can help us learn, but they are not going to replace us writing the code. There will be numerous situations in this class when we need to explain why the code works, which will only come from a natural understanding of programming.

Late assignments. Late submissions may be accepted up to a week past the due date. Each day after the due date will incur a 10% penalty. The total penalty will be up to 50%. Five to seven days late will only receive 50% credit of the grade you would have received if it was submitted on time. If you contact me ahead of time for deadline adjustments you will not incur any penalty. Please note this may not apply to every assignment. The final project, for example, has a firm deadline that cannot be changed. Please refer to Carmen for due dates.

Due date and make-ups. Due dates for all assignments will be clearly stated on Carmen. If you need any extensions, you must ask for it **prior to** the due date. Extensions will not be granted if requested after the due date. This applies to all assignments.

Deliverables. All deliverables must be submitted on Carmen as specified in the assignment instructions. There will be absolutely **no email submissions**. Email submissions of work for this class will not be accepted and will not be acknowledged.

Communication. The only official way to communicate with me is through my OSU email address as listed on the top of the syllabus. I cannot guarantee that I will reply messages through any other methods.

Other Policies

The university maintains a web page at https://ugeducation.osu.edu/academics/standard-syllabus/standard-syllabus-statements where students can find the following policies:

- Academic Misconduct
- Artificial Intelligence and Academic Integrity
- Religious Accommodations
- Disability Statement