

SSJ 30262: Web Mapping & Open Source GIS

Instructor: Yanan Wu (YanaWu@clarku.edu)

Office Location: Jeff 220

Office Hours: Monday&Wednesday: 3:00 – 4:00 PM

Lectures: Physics/Math, 3rd Floor, Room 310

Monday: 9:00 – 10:50 AM

Tuesday: 16:15 PM – 17:30 PM

Labs: Physics/Math, 3rd Floor, Room 310

Thursday: 16:15 PM – 17:30 PM

Throughout this syllabus, **bold light blue text** indicates an active hyperlink. -----

Course Description

Upon completing this course, students will have the ability to critically evaluate, create, and publish web maps using online tools and identify different technical solutions according to user needs. This will be accomplished through weekly exercises designed to understand web maps better and build up a library of different data sets, which can be used in future projects.

The course is organized around:

- Web mapping, open-source GIS, and "digital geographies" more broadly.
- Understanding the social implications of creating and working with online tools.
- Hosting online tools such as GitHub (HTML & CSS), Google Earth Engine (Python), Leaflet (via R) allow for online maps without needing to manage server-side configuration.

Learning Objectives

Student evaluation during this course will depend on understanding and applying five fundamental (non)technical skills in your assignments and assessments.

By the end of the course, students will:

✓ Technical Skills

- Understand different ways to create "web maps" and geographic content online for various scenarios in international development or business.
- Ability to create online pieces (host and publish basic web maps with varying interactivity) for your portfolio and develop an online presence for your projects moving forward.
- Have familiarity with the architecture of the Internet and the ways different technological or policy dependencies may affect your projects.

✓ Non-technical skills

- Understand and engage with broader debates about critical GIS, the Internet and society, and digital geographies.
- Demonstrate the ability to critically read and summarize technical and academic material in written form.

Student Responsibilities

Each student is responsible for the following:

- Completely reading the syllabus and understanding course requirements;
- Staying informed and up-to-date on all course-related work each and every week;
- Reading announcements and participating in forums;

- Posting and answering questions about the course and assignments to the course forum for the benefit of other students.

Course Format

Mondays will consist of lecture format only. This is where the instructor will introduce this week's topic, readings, and slides. All materials will be posted to Canvas before the start of class, with the exception of Weeks 1.

Tuesday lecture will consist of partial lecture time and code demonstration time. This will be a great time to bring questions regarding the week's content or the assignment.

Thursday's Lab session will introduce the assignment, and provide an opportunity to begin working through it together. A weekly assessment will also be delivered at the beginning of lab. Week 1's assessment will cover the Syllabus content.

Technical Requirements

This course will incorporate a suite of software packages to explore a number of different web mapping applications. In addition to setting up the appropriate software, students can download the course textbooks (on Canvas), and ensure they have adequate data storage for assignments and backups.

Free online learning source

[Haverbeke, M. \(2024\). Eloquent javascript: A modern introduction to programming.](#)

Software

- R**
[Download](#) and installation
- R Studio**
[Download](#)
- [GitHub](#)**
Sign up for an account online.
- [Visual Studio Code](#)**
Download the appropriate installer for your operating system.

- [Anaconda](#)
Download Anaconda
- [Git](#)
Download Git

Office Hours

The instructor holds student office hours twice a week on a weekly basis, and students are encouraged to regularly attend. The instructor reserves the right to assist multiple students simultaneously during scheduled in-person or virtual meetings – especially if students have similar questions.

Communications Protocol

It is neither practical nor efficient to respond to technical questions via email. To ensure that questions are answered in a timely manner and to benefit all students, the following communication protocols for the course have been established.

Technical Difficulties

Direct questions about software issues, student accounts, Canvas, and Zoom to the ITS Help Desk at (508) 793-7745.

Emailing the Instructor

For questions about grading or confidential matters, contact the instructor and schedule a time to meet via Zoom or in person. The instructor will not discuss grades or grading via email. Students must schedule a time to meet via Zoom. Use “**SSJ-Web mapping**” as the subject of the email, and please include in the message a description of the purpose of the meeting.

The instructor responds to emails within two business day (but usually same day) and from Monday through Friday between the working hour.

This means the instructor will not be available over the weekends or in the evenings. Please adhere to the suggested schedule provided in the syllabus, show up to Office Hours, and schedule any one-on one meetings to avoid any last second assignment issues or submissions.

Accountability

The instructor highly encourages taking measures to ensure both student and instructor are held accountable. In addition to mid- and end-of-semester instructor evaluations, students are invited to request all one-on-one meetings are held in a public or all-party, consensual audio-recorded space. Otherwise, the instructor will request that students follow up via email with a recap of any one-on-one conversations that are not confidential in nature. This recap should include a detailed summary of what was discussed, as well as bullet points covering any action items that the student, or instructor, are expected to complete with a clear deadline for each item.

Course Requirements and Policies

Class Participation

Lecture attendance is mandatory. All students are expected to attend all classes and lab sessions on time and remain in class for the duration of each class period.

Exams

The course includes one midterm project and final project, which must be taken on the designated day unless prior arrangements have been made. An unexcused absence on the day of the exam will result in a grade of zero.

Labs

This course has 11 lab assignments. It is each student's responsibility to make sure the corrected files are submitted before the due date. Additional files will not be accepted once the assignment has been graded. For any graded assignment, if the student does not agree with the grade received, the instructor must be notified within one week after the assignment is graded. Any request made more than one week after the grading date will not be considered, no matter whose negligence.

Extra Credits

The instructor reserves 30 extra credit points (3% of total grade) for those students who actively respond to the questions from other students posted on Discussion Forum. The instructor will strive to respond to questions within two business day, i.e., 48 hours excluding weekends.

Use the Discussion Forum to address any non-confidential questions regarding the course or assignment. To ensure constructive engagement, please follow these forum guidelines:

- Post all questions related to the syllabus, course requirements, course organization, weekly assignments, and course content to the Discussion Forum.
- The Discussion Forum will be monitored closely on weekdays during the session and instructor responses, when necessary, will be posted within one business day of the original post.
- Students are expected and encouraged to respond to unanswered questions on the Discussion Forum, and can earn extra credit for doing so.

Forum posts should be specific and informative. Posts that contain questions that are ambiguous (e.g., "Help, I'm stuck!"). Any requests that ask others to complete any work (e.g., "What is the answer to X quiz question?"), or that include non-constructive remarks (e.g., "This assignment is so dumb"), will be ignored and may be removed. The instructor reserves the right to remove and modify forum posts in accordance with the guidelines specified in the syllabus.

Weekly Schedule

Week 1 – Aug 26

Unit 1: Course Introduction & “What is a web map?”

Lab 0: Sign up GitHub Account

Week 2 – Sept 2 (University Holiday - No Class on Monday)

Lecture on Tuesday, Lab on Thursday

Unit 2: Introduction to GitHub Web Page

Lab 1: Setting up your first website

Week 3 – Sept 9

Unit 3: HTML: Formatting, Fundamental Tags, and Sectioning a Web Page

Lab 2: Setting up your first website

Week 4 – Sept 16

Unit 4: Cascading Style Sheet (CSS)

Lab 3: Intro to fundamental tags in CSS, Formatting, and Hosting Changes

Week 5 – Sept 23

Unit 5: Introduction to R

Lab 4: Introduction to R

Week 6 – Sept 30

Unit 6: Leaflet in R

Lab 5: Building an Interactive Map in R with Leaflet

Week 7 – Oct 7

Unit 7: HTML Static / Dynamic Web: Input, Variables, Conditional Statements

Lab 6: Expanding your personal webpage

Week 8 – Oct 14 (University Holiday - No Class on Monday, Tuesday)

Unit 7: Working on midterm project

Week 9 – Oct 21

Unit 9: Working with Spatial Data - Webmaps using the ArcGIS API for Python

Lab 7: Create a web map using ArcGIS API for Python

Week 10 – Oct 28

Unit 10: Working with Spatial Data 02 - Webmaps using open source spatial libraries

Lab 8: Create a web map using open source

Week 11 – Nov 4

Unit 11: Working with Spatial Data 03 - Webmaps using ArcGIS Maps SDK for JavaScript

Lab 9: Create a web map using ArcGIS Maps SDK for JavaScript

Week 12 – Nov 11

Unit 12: Dashboard, Experience builder

Lab 10: Programming-based map vs Non-programming-based map

Week 13 – Nov 18

Unit 13: geemap: A Python package for interactive mapping with Google Earth Engine

Lab 11: Create a web map using geemap

Week 14 – Nov 26 (University Holiday - No Class on Wednesday, Thursday)

Work on Final Project

Week 15 – Dec 2

Final Presentation Due

Week 16 – Dec 9

Work on Final Project

*Course content may vary or be adjusted in order to meet the needs of the class. The instructor reserves the right to adjust the schedule or amend the content of this syllabus at any time and without notice.

Grades

Breakdown of Final Grade

- | | |
|-----------------------|--------------------------|
| • 11 lab (70%): | 700 points (70%) |
| • Midterm exam (15%): | 150 points (15%) |
| • Final Project (15%) | 150 points (15%) |
| | 1000 points total (100%) |
| • Extra Credit (3%) | 30 points |

A standard plus/minus letter grading scheme is used to assign final course grades for all students who take this course on a letter grading basis. Grades will be assigned according to the following scheme, with the percentages corresponding to final weighted grades following the evaluation procedures described in the section below:

Letter Grade	% of Points
A	(above 93.0%)
A-	(90.0 to 92.9%)
B+	(87.0 to 89.9%)
B	(83.0 to 86.9%)

B-	(80.0 to 82.9%)
C+	(77.0 to 77.9%)
C	(73.0 to 76.9%)
C-	(70.0 to 72.9%)
D+	(67.0 to 69.9%)
D	(63.0 to 66.9%)
D-	(60.0 to 62.9%)
F	(0.0 to 59.9%)

A student who enrolls in this course on a pass/no-pass grading basis will earn a passing grade only if their final course grade is equivalent to a “C” or better.

Late Policy

First Offense: No issue. We all need extra time every now and then. If students need additional time to complete an assignment—excluding the midterm and final project—students will be given three days, no questions asked.

Second Offense: Should students need extra time again—excluding the midterm and final project—students will need to provide a reason and some information corroborating your excuse. Failure to provide this info triggers the third offense protocol below.

Third (or more) Offense: For each 24-hour period that an assignment is late—including the final project—beginning immediately after the deadline passes according to the Canvas system clock, the assignment score will be adjusted downward by 20%. In other words, the assignment is considered late if submitted at 11:55:01pm and the deadline is 11:55:00 pm. Work that is more than five days late will not be graded and will receive a zero. Exceptions will be granted only under the most pressing and urgent of circumstances and must be discussed with the instructor in advance of the deadline.

Academic Honesty and Integrity

Students are encouraged to collaborate with one another in reviewing course material and working on assignments. However, every student must turn in an original, unique, and individual creation for every assignment; students working together may not submit the same work. Collaboration with another student on an assignment will require students cite their collaborators by providing the names of collaborators either within the assignment or

alongside the link that you submit to the course website.

All students are expected to demonstrate integrity in all academic endeavors. Students are evaluated on their own merits. Cheating, plagiarism, unauthorized and/or inappropriate collaborative work, or any other form of academic dishonesty are considered unacceptable behavior and will result in a failing grade for the assignment, and a second offense will result in a failing grade for the course and a referral to university administration for disciplinary action.

Use of Large Language Models

Large language models, or generative AI like ChatGPT, are incredibly useful learning tools if used responsibly. This course will not cover their use or application to GIS in detail, but using LLMs for assignments and the final project may be tempting. As beginners in a new technical skill, LLMs may seem magical in their ability to provide answers and ideas, but they should be treated as overzealous interns from which students can test their newly acquired knowledge. Despite having access to massive datasets (e.g. the internet) to mimic speech based on user-specified prompts, they do not query these data or the internet to search for answers. They should not replace existing internet or library search protocols, and whatever LLMs produce will contain “hallucinations” or errors in accuracy. Only advanced individuals in a technical skill will notice these errors.

The instructor placed the LLM section after the “Academic Honesty and Integrity” section purposefully. If the instructor suspects LLMs have done the work for the student, similar consequences will follow if proven.

Additional Campus Resources

Students with Disabilities

Clark University is committed to providing students with documented disabilities equal access to all university programs and facilities. Students are encouraged to register with **Student Accessibility Services** (SAS) to explore and access accommodations that may support their success in their coursework. SAS is located on the second floor of the Shaich Family Alumni and Student Engagement Center (ASEC). Please contact SAS at accessibilityservices@clarku.edu with questions or to initiate the registration process.

FERPA

Clark’s policy regarding student privacy under the **Family Education Rights and Privacy Act**

Title IX

Clark University and its faculty are committed to creating a safe and open learning environment for all students. Clark University encourages all members of the community to

seek support and report incidents of sexual harassment to the Title IX office (titleix@clarku.edu). If students or someone students know has experienced any sexual harassment, including sexual assault, dating or domestic violence, or stalking, help and support is available.

Please be aware that all Clark University faculty and teaching assistants are considered responsible employees, which means that if students tell the instructor about a situation involving the aforementioned offenses, the instructor must share that information with the Title IX Coordinator, Brittany Rende (titleix@clarku.edu). Although, the instructor has to make that notification, the student will, for the most part, control how their case will be handled, including whether or not they wish to pursue a formal complaint. Our goal is to make sure they are aware of the range of options available to them and have access to the resources they need.

If students wish to speak to a confidential resource who does not have this reporting responsibility, they can contact Clark's Center for Counseling and Professional Growth (508-793-7678), Clark's Health Center (508-793-7467), or confidential resource providers on campus:

- Prof. Stewart (als.confidential@clarku.edu)
- Prof. Palm Reed (kpr.confidential@clarku.edu)
- Prof. Cordova (jvc.confidential@clarku.edu)