Interactive Web Mapping & Spatial Data Visualization

New York University
Robert F. Wagner School of Public Service

Instructor
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Office Hours: By appointment

Schedule and Room
Mondays 4:55pm-6:35pm
668 Waverly Hall

Course Description

In this course you will learn the fundamentals of web development with HTML, CSS, and Javascript/JQuery, and learn code management and publishing via github. Using Free and Open Source Spatial Data tools such as QGIS and CartoDB, you will learn to bring your maps to life on the web as interactive experiences. The final project will be an interactive web map around an Urban topic of your choosing.

This course will involve programming, some experience is preferred but not required. This course will require a significant amount of time outside of class periods to work on assignments and the final project, depending on the student’s technical skill level. Contact the instructor for introductory coding resources to review before class. Personal Laptops are required.

Objectives

- Understand the basic structure, styling, and scripting of web sites using HTML, CSS, and Javascript
- Set up a modern web development environment on your computer, manage code and publish project via github
- Understand different spatial data formats & coordinate reference systems
- Be able to perform basic data transformations to prepare spatial data for use in web map projects
- Understand the components of modern web maps, including leaflet.js programming, basemaps, client-side & server-side data rendering, map styling, and interactivity.
- Be able to combine all of these skills into the creation of a custom built web project with an interactive mapping component

Prerequisite

URPL-GP-2618 Intro GIS Course. Some experience with website development Students who have zero experience in web development and coding should complete the first two sessions of this free tutorial.

Class Format

This class will be highly technical and hands-on. Most classes will include an hour of live demonstrations of core concepts, with the remainder of the time available for students to try out techniques, ask questions, and begin working on the assignment. Students should plan to arrive early and attend every class.

Hackpad - The instructor and students will collaborate on a hackpad during each session to keep track of notes, links, code snippets and other resources for students to reference. Students are encouraged to participate in the note-taking for the benefit of themselves and the entire class.
Schedule

1 (25 January) Building the web: HTML, CSS, and Javascript
Using jsfiddle, dive into the world of web development. Learn how to build the structure and content of a web page with HTML, apply styling rules with CSS, and automate and script the page with javascript.

2 (1 February) Setting up a Modern Web Development Environment
Set up a dependent file structure for your websites, edit files with a text editor, manage code using git and github, host your site on the web using github pages

3 (8 February) Mapping with Leaflet.js
Use leaflet.js to add a map element to a website. Add basemaps, markers, and controls to your map,

4 (22 February) Spatial Data for the Web
Understand how data is stored, moved and organized for integration into a web map. Explore data sources and techniques for transforming/preparing data for use in web maps

5 (29 February) Web and Map Design
Review web design and layout examples, explore Twitter Bootstrap for simple web layouts and styling.

6 (7 March) PostGIS and Server-side mapping
Understand the power of a spatial database, use CartoDB to load and visualize data, incorporate the resulting server-rendered map into your client-side code.

7 (21 March) Open Hacking Session
The last class will be used as an open hacking session for you to work on your final projects, explore new techniques, and get closer to a finished product.

Integrity & Attribution
Assignments and the final project will incorporate code snippets from examples and tutorials, combined with code written from scratch. Students should give clear attribution in the code and/or on the finished website when using resources and techniques created by others.

Assignments
Classes 1-5 will include an assignment, due prior to the start of the next class. Assignments will all be published on the web, and submitted to the instructor as a link.

Final Project
The final project will be a finished interactive website that incorporates web mapping techniques covered in class. The subject matter can be any Urban-themed subject, and have a clear and concise user experience. The idea for the final project must be submitted before class 4 for approval by the instructor.

Grading Breakdown

- 5 assignments: 50%
- Final Project 50%

Final project due date: TBD
**Course Materials**

**Software**
- Sublime Text
- Quantum GIS
- Google Chrome
- Microsoft Excel (Not required, but helpful for data manipulation. Google Sheets will work too)

**Books**
- jQuery and Javascript Phrasebook - Essential Code and Commands by Brad Dayley (Recommended)

**Hardware**
- Laptop Computer (Students must have a modern laptop that they can install software on. The instructor will demonstrate on a Macbook Air, Windows and Linux computers will work but may have slightly different methods for some tasks in the course. Macs are recommended)