Interactive Data Visualization

General Course Information
Course Faculty: Daniel Deverell
Email: daniel.deverell@nyu.edu
Course Number: DATA1-CE9010001
Course Title: Interactive Data Visualization
CEUs
Session Dates: Tuesdays, 9/13-10/25, 6-9:30pm
Class Meeting Location: Online Synchronous
Office Hours: By Appointment

Course Description:
How can we transform data into compelling and meaningful visuals and use visualization to tell stories and show patterns from data sets? Learn the basic steps of visualizing data, from spreadsheets to visual representations. Case studies are presented and examined through a technical and conceptual lens. Using programming, experiment with a wide range of visual approaches and create your own custom visualizations. Projects focus on creating interactive systems and interfaces that allow users to explore different layers and views.

Course Prerequisites:
This course is meant for those with little to no programming experience. It will introduce basic programming concepts and skills as needed.

Course Structure/Method:
The course meets once a week, for 3.5 hours, for 7 weeks, online. We will spend about an hour working in JavaScript and computer science fundamentals. Remaining time will include explorations of existing visualizations, reading discussions, and presentations.

Course Learning Outcomes:
By the end of this course, students will be able to:

- Code a small web page.
- Determine common strategies to visualize data.
- Implement their own interactive data visualizations.

Communication Policy:
All email inquiries will be answered within 72 hours.

Course Expectations:

This is a project-focused course, each weekly session will be focused on a different fundamental of data visualization, with the expectation that students will work on one project per week.

Required Material:
A computer with internet access. Students should install Visual Studio Code for editing files. A free account on Netlify is required in order to submit homework and projects.

Grading Strategy:
Participation (sharing examples of good visualizations, and contributions to reading discussions) 20%
Individual Presentations 75% (25% each, 3 weeks)

NYUSPS Policies:
NYUSPS policies regarding the Family Educational Rights and Privacy Act (FERPA), Academic Integrity and Plagiarism, Students with Disabilities Statement, and Standards of Classroom Behavior among others can be found on the NYU Classes Academic Policies tab for all course sites as well as on the University and NYUSPS websites. Every student is responsible for reading, understanding, and complying with all of these policies."

The full list of policies can be found at the web links below:
● University: http://www.nyu.edu/about/policies-guidelines-compliance.html
● NYUSPS: http://sps.nyu.edu/academics/academic-policies-and-procedures.html

School Grading Policies:
NYUSPS Career Advancement (non-degree)
http://sps.nyu.edu/content/scps/academics/noncredit-offerings/academic-noncredit-policies-and-procedures.html

Course Outline

Session 1, Introduction to our tools.
● Course introductions.
● Introduction to HTML, CSS, Javascript, SVG and how they all fit together. We deep dive into what the web technologies we will be using for the remainder of the course and how to use them
● HTML/CSS/Javascript template distributed and discussed
● Javascript: variables, booleans, arithmetic, strings and common data types

Session 2, Deep dive into SVG.
● Introduce SVG and become comfortable with its X and Y coordinate spaces
● Introduce D3 and begin coding with variables, truthy and falsey, arithmetic, strings
● Classic graphs (Bar graphs, Line graphs, Scatter plot, etc., and examples on the web)
● Data as Art. Inspiration data visualization vs explanatory vs analytical

Session 3, Filtering and interactivity.
● Using the power of computers to perform repeated tasks thousands or millions of times
● Using buttons, hover to achieve interactivity
● Using filtering of data to dynamically show different aspects the data
● CS: for-loops, while-loops, arrays, if/else statements,
● Line graphs and scatter plots exploration

Session 4, Using movement and transformation in charts. Design practices for interactivity.
● Applying movement and transformation in different charts to highlight comparisons in the data
● Managing events and using objects to help us build complex visualizations
● Pie Graphs exploration

Session 5, Multiple dimensions of data. Stacked area charts.
● How to use meta data and multiple dimensions of data
● Stacked area charts exploration

Session 6, Best Practices: Organizing your data. Choosing the best graph for your dataset.
● How to create clean code and why it's important
● Matching the visualization to the correct type of graph
● Using color
● Design Ethics in data visualizations

- Scatterplot exploration

Session 7, Beyond D3: Other tools to achieve interactivity with data.
- Introduction to various web and excel based tools that can be leverage to create interactive data visualizations
- Javascript tools

Excel tools