Introduction to Information Visualization

Exploring urban and rural data stories

Data is everywhere. People, organizations, and governments are increasingly using this data to inform personal behaviors, guide decision-making, and craft public policy. However, data is not objective. The way it is collected, analyzed, and presented can strongly influence the story that is communicated. In the worse case, charts can even be designed to mislead and misinform.

This course will help students learn how to communicate important insights about people through data and visualization. They will be able to identify ineffective and misleading visualizations. Through a series of in-class activities, take-home assignments, and group projects, students will have opportunities to flex their new skills and develop portfolio items to showcase their ability to craft compelling data stories with D3.

Teaching Team	
Instructor Dr. Stephen MacNeil (stephen.macneil@temple.edu) https://stevemacn.github.io/	**Teaching Assistant** TBD

Course Number: CIS 4330/4360
Location: 12:30 -1:50 pm Tuttleman 302
Office Hours: by appointment (email me)
Course Materials: (https://templeu.instructure.com/courses/125050)

Weekly Topics

1. What is information visualization?
2. Marks and Channels *(visual encoding)*
3. Data Collection and Data types
4. Representation
5. Misrepresentation *(how charts lie)*
6. Design sprint *(paper prototyping)*
7. Visualization Toolkits
8. **Spring break**
9. Geomaps and projection
10. Interaction
11. Project Pitches *(Telling stories with data)*
12. Designing studies and evaluation
13. Graphs and Uncertainty
14. Project work *(prototyping)*
15. Project work *(implementation)*
16. Project showcase

Past Projects

This course is designed to ensure that you have a portfolio item that you can share with potential employers. As such, you will develop and deploy a custom web-based visualization. This will portfolio piece will demonstrate your ability to 1) build web visualizations, 2) tell stories with data, and 3) identify and scope important problems. See projects from the first time the course was offered in the following link: https://tu-data-vis.github.io/

Assignments (Weekly)

Each week during class you will work with other students to get practice engaging with visualizations. There are two types of activities: **conceptual activities (CXX)** which will engage you in the concepts and theories of information visualization and **skill-building activities (VXX)** which will give you the skills to craft and critique visualizations.

Project (Communicating Regional Data Stories)

Effective communication is all about understanding your audience. Too often, even visualizations that follow best practices are ineffective because they don't meet the needs of a specific audience. In this course project, we will focus on framing interesting data stories, identifying the audience for those stories, and crafting effective data visualizations that communicate effectively to that specific audience. You will be tasked with choosing a specific stakeholder in our local PA region (firefighters, city leaders, k-12 educators, rural farmers, etc) and discovering data and representations that best communicate actionable insights for your selected stakeholder. The project will include developing your own interactive data visualization using the web-based visualization library, D3.

Labs

Throughout the first half of the semester, we will have a lab on most Thursdays. These labs will help you to develop the practical skills necessary to actually build and deploy web-based visualizations. Most labs will focus on the D3 visualization library, but we may also have a few that focus on general tools like Python and Tableau.

Intended Learning Outcomes

- The ability to find appropriate data to answer an important question
- The ability to remember, understand, and analyze common visualizations
- The ability to design visualizations that are effective for communicating insights to an audience
- The ability to implement web-based visualizations using D3

Course Policies and Procedures

Course Materials

There is no textbook required for this course. Any readings, such as research papers or book chapters will be provided as PDFs by the instructor. Students should have a laptop that is capable of running a modern web browser like Google Chrome 92+.

Grading

The table below describes the breakdown for graded course activities. Note that many of these activities will take place during the class period. While **participation** is not explicitly required, any missed activities must be made up and submitted outside of class period on your own time. **Late assignments** are accepted but 10% credit will be deducted for any late work and an additional 10% will be deducted for each week that it is late. All assignments must be submitted at least 3 weeks before the end of the semester.

Graded Item	Points assigned to grade
Activities and Discussions	40
Labs	30
Course Project and Design Sprint	30

Academic Integrity

Most of the activities in the class will require collaboration and we will expect you to work with others. In all cases, collaboration should be explicitly acknowledged.

Accommodations for students with disabilities

Any student who has a need for physical access or academic accommodations based on the impact of a documented disability or medical condition should contact Disability Resources and Services (DRS) in 100 Ritter Annex (drs@temple.edu; 215-204-1280) to request accommodations and learn more about the resources available to you. Students should also contact the Law School Office of Student Affairs (Suite 103, Barrack Hall, (215) 204-8574) for the implementation of those assigned accommodations. All discussions related to accommodations will be confidential.

Fostering a safe, inclusive, and equitable learning environment

It is important that students are able to learn and work together in a safe and inclusive environment. However; there are a variety of systemic factors that can get in the way. If believe that you are experiencing discrimination in the classroom, please reach out to me by email. Similarly, if there are ways that I can make the course more accessible and inclusive, please don't hesitate to share your suggestions. All interactions will be confidential unless they involve self-harm or the harm of others. Here are some helpful resources:

- Sexual Misconduct resources at Temple
- Anti-racism resources at Temple
- How to be an Ally

Mental health

We are living in unprecedented times and it is important to protect your mental health. If you are experiencing significant anxiety, changes in your mood, or problems eating or sleeping---please do not hesitate to reach out to the professor. Mental health challenges are often not visible to others, so please be proactive about seeking help. Here are a few free and confidential resources available to you:

- Student Counseling Center: 1700 North Broad Street (2nd floor) Telephone: (215) 204-7276
- Temple Wellness Center

Acknowledgements

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