

Data Visualization for Public Policy (PUBPOL 457/557) – Fall 2019
MW 4:00PM-5:30PM

Instructor: Alton B.H. Worthington

Email: abhw@umich.edu

Office: 3216 Weill Hall

Office Hours: TBD (and appointments at bit.ly/ABHW-OO)

Syllabus Version: 3.0 (30 August 2019)

Overview and Goals:

Communicating through visual presentation of data is a critical skill in a variety of careers. At its core, the field of data visualization is a merging of design and statistics, with the goal of conveying insights and information to a wide audience through visual presentation. This course will introduce students to data visualization, from principles to practice. You will be asked to examine and critique existing work and practice creating visualizations of your own. This course will introduce students to data visualization principles and practice through visualization in 3 software packages: Excel, Stata, and R.

The focus of the course is on creating visualizations for static presentation, emphasizing clarity, accuracy, and utility. At its conclusion, students should have the skills necessary to create visualizations which effectively communicate information for a general audience. In addition, students should become more sophisticated consumers of data visualization in academic research, journalism, and policymaking. At the conclusion of the course, students should also be able to continue their own learning, both in terms of software/programming and seeking out new visualization styles, including dynamic and interactive visualization.

The landscape of visualization types, style guides, software, and implementations is vast and growing. In the time we have, we will cover a lot of ground, so consider this a gateway into learning more about these methods. At the end of this course, I'd like you to have good fundamental ideas about design and presentation of data as well as a good library of ideas, examples, and best practices in your mind.

Text(s):

This course is taught without a required text, but optional supplementary readings will be posted to Canvas to provide students with additional information. These will take the form of book chapters, articles, or web resources (articles, blog posts, etc.), and will be shared in a fashion consistent with copyright and accessibility considerations.

Software:

This course is taught in 3 software packages/languages to give students a wide range of experience in computer-aided data visualization. This software is available in computer labs, via AppsAnywhere (with UM login), and via Virtual Sites machines. Excel is available (as part of Office 365) to all UM students. Stata is managed at the university via a group license, but you may also elect (at non-trivial cost) to purchase an individual license. R is open-source and free, and RStudio, the IDE we will use in class, is also available without cost. More information on how to get the software will be discussed in class and posted to Canvas.

Course assessments:

The grade for the course comes from four main components, and final grades are assigned in accordance with LSA grading standards.

- Interim Data/Proposal Prep (15%)
- Course Visualization Portfolio (40%)
- Short Task Assessments (30%)
- Participation/Canvas Engagement (15%)

The major course project, a data visualization portfolio or presentation, is a project of original research. Students will select a topic, obtain and organize data, plan a set of visualizations, then create and iterate those visualizations to present a coherent argument or story in the form of: 1) a slide deck, 2) a presentation poster, or 3) a short memo document (where the majority of content is visualization). The goal is to give students a project to put in their portfolio, alongside the experience of managing a project from start to finish. There will be one mid-semester submission, due October 21, to demonstrate progress and provide an opportunity for feedback, final projects will be submitted on December 2, then the final projects will be presented in two class sessions, where students can share feedback. Grading of final projects will be the responsibility of the instructor.

In addition to the major project, students will complete short tasks on coding/creation of visualizations, and demonstration of fundamental knowledge from the course.

Short Task Schedule:

- September 30 – Task 1 (Data Entry and Manipulation) Due
- October 16 – Task 2 (Summaries, Distributions, and Categorical Visualizations) Due
- October 30 – Task 3 (Relational and Hierarchical Visualization) Due
- November 18 – Task 4 (Spatial Visualization) Due
- December 11 – Task 5 (Presenting Model Results) Due

The remaining portion of the grade will be determined by student participation in class and/or on the Canvas site. Students will have the opportunity to participate in discussions in class and on the “Discussions” tab of the Canvas site, where example visualizations (both from the instructor and other students) will be posted for feedback and analysis.

A note on attendance: This class is somewhat dense and is organized around lab time. Your attendance is expected. Of course, there are a variety of reasons why one might miss class. (The university has policies around religious observance and the like, but many more may arise for which no policy exists.) If you expect to be unable to attend class, please let me know via email. If you consistently miss class, we will need to have a conversation about your participation in the course. To aid my (ABHW's) memory, attendance will be taken in session.

Additional Matters:

Accommodations - This course is meant to give you the skills you need when you leave the Ford School and go out into a career. If you are having difficulty with how the material is presented, or need additional help getting something to “stick” in your mind, please let me know. I want this course to be a

positive one for everyone. If you believe you need an accommodation for a disability, please let your instructor know at your earliest convenience. Some aspects of courses may be modified to facilitate your participation and progress. As soon as you make your instructor aware of your needs, they can work with the Services for Students with Disabilities (SSD) office to help determine appropriate academic accommodations. Any information you provide will be treated as private and confidential.

Communication - I try to reply to emails within 24 hours. Over holidays, this may run a bit longer. If your email is a simple one, I'll get to it all in one go. If you ask something more in-depth, or have a more complex request, it may take more time. I'll still try to touch base within 24 hours so you know I'm working on it. Please make requests or notify me of absences as early as possible.

Student Mental Health and Well-Being Resources - The University of Michigan is committed to advancing the mental health and wellbeing of its students. We acknowledge that a variety of issues, such as strained relationships, increased anxiety, alcohol/drug problems, and depression, directly impacts students' academic performance. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact [Counseling and Psychological Services](#) (CAPS) and/or [University Health Service](#) (UHS). For a listing of other mental health resources available on and off campus, visit: <http://umich.edu/~mhealth/>

On Inclusivity - Members of the Ford School community represent a rich variety of backgrounds and perspectives. We are committed to providing an atmosphere for learning that respects diversity. While working together to build this community we ask all members to:

- share their unique experiences, values and beliefs
- be open to the views of others
- honor the uniqueness of their colleagues
- appreciate the opportunity that we have to learn from each other in this community
- value one another's opinions and communicate in a respectful manner
- keep confidential discussions that the community has of a personal (or professional) nature
- use this opportunity together to discuss ways in which we can create an inclusive environment in Ford classes and across the UM community

A more comprehensive list of expectations, policies, and resources is on the Ford School website. (<http://fordschool.umich.edu/academics/expectations>) Please take particular note of the policies on academic dishonesty.

A Final Note - This course calendar was created as a guide but may change. It is very possible that we, as a group, may find ourselves moving more quickly through material than planned. It is also possible that we may need to take more time to nail down details of certain topics/tasks. If the schedule changes significantly to reflect our progress, a new syllabus (with an updated version number - see above) will be distributed.

Class/Topic Schedule:

Session 1 – September 4 – Welcome Session (Syllabus and Intro)

Session 2 – September 9 – Introduction to Software 1: Excel and Stata (pt 1)

Session 3 – September 11 – Introduction to Software 2: Stata (pt 2) and R

Session 4 – September 16 – Fundamentals of Data and Measurement, and Keeping your Data Tidy

Session 5 – September 18 – Getting data into software and manipulating it (Excel and Stata pt 1)

Session 6 – September 23 – Getting data into software and manipulating it (Stata pt 2 and R)

Session 7 – September 25 – Encoding Data as Visuals, the Grammar of Graphics, and 5 Types of Visualizations

Session 8 – September 30 – Categorical Visualizations (Part 1)

Session 9 – October 2 – Categorical Visualizations (Part 2)

Session 10 – October 7 – Relational and Temporal Visualizations (Part 1)

Session 11 – October 9 – Relational and Temporal Visualizations (Part 2)

NO CLASS – October 14 (STUDY BREAK)

Session 12 – October 16 – Scales (and how to use them)

Session 13 – October 21 – Part-to-Whole Relationships – Hierarchical Visualizations (Part 1)

Session 14 – October 23 – Hierarchical Visualizations (Part 2)

Session 15 – October 28 – Showing AND Telling – Titles, Labels, and Text in Viz

Session 16 – October 30 – Encoding with Color in Principle and Practice

Session 17 – November 4 – How and When Spatial Visualizations Work and Mapping in Excel

Session 18 – November 6 – Spatial Visualizations – Mapping in Stata

Session 19 – November 11 – Spatial Visualizations – Mapping in R

Session 20 – November 13 – Presenting Uncertainty and Projections (Part 1)

Session 21 – November 18 – Presenting Uncertainty, and Projections (Part 2)

Session 22 – November 20 – Visualizing Model Results (Part 1)

Session 23 – November 25 – Visualizing Model Results (Part 2)

NO CLASS – November 27 (Thanksgiving Recess Starts 5PM)

Session 24 – December 2 – Making your Viz Accessible

Session 25 – December 4 – PRESENTATION SESSION 1

Session 26 – December 9 – PRESENTATION SESSION 2

Session 27 – December 11 – Wrap-up Session: Where to go next