Data Visualization (GOVT 421)

Dates: June 7 - July 30 2021

Location: This course is conducted entirely online, which means students do not have to be on campus to complete any portion of it. Students will participate in the course using Georgetown University's online learning management system called Canvas. To learn more about Canvas, please go through the Canvas Guide for Students.

Professor: Mark Carl Rom, Associate Professor of Government and Public Policy, McCourt School of Public Policy and Department of Government

Professor Contact Information: romm@georgetown.edu or cell 202-213-8767 for text or call (please use phone only if message is pretty urgent)

Virtual Office Hours: Professor Rom will be on Zoom every Monday from 10-noon and Wednesday from 3-5 p.m. (Georgetown time zone) and also by request. All meetings will be on his office hour Zoom (on Canvas). You can sign up for an appointment during my office hours here.

COURSE DESCRIPTION

A picture is more powerful than 1000 words. In this course, you will learn to create data visualizations (pictures) of political phenomena. In order to create 'data viz' you will:

1. ***Study visualization principles***
2. ***Develop software skills***
3. ***Apply these principles and skills to political data.***

The best data visualizers are able to create graphics that are ***analytically informative and aesthetically compelling***. We seek to become the best.

COURSE LEARNING OBJECTIVES

1. **Thinking critically:** Visualizations can be used to inform, or to deceive. They can reveal truth, but they can just as easily conceal it. Our goal in this course is to, as best we are able, develop our critical skills to visualize the world as it is. To do so, we must relentlessly question our concepts, our data, and our images. For example, imagine we are creating visualizations to depict "political polarization" in the United States. We will need to critically examine the concepts ("What do we mean, concretely, by political polarization?"), the data we have to identify the concepts ("Does our data accurately measure polarization? How was it collected? From whom was it collected?), and the way we portray them ("Did we choose an appropriate technique? Does the graph overstate or understate polarization? Does the visualization provide the clearest depiction of polarization?"). Your critical thinking skills will be applied both to the analysis of existing visualizations as well as to the creation of new ones.

2. **Thinking creatively:** Good visualizations are not created by simply plugging data into a chart. Instead, the best visualizations reflect a wide variety of creative choices. The initial creative choices involve the project's goals: will you be a 'miner,' digging through the data in the hopes of finding gold, or will you be an

"architect', who begins with a vision or plan in mind? How might you begin your digging to discover or your drafting to design? What graphical techniques most effectively convey your meaning? How should you format the graph in terms of layout, colors, and font? Basic graphs can communicate well enough, but how might you make your visualizations inspire and delight?

3. **Communicating effectively:** Visualizations can have multiple purposes, such as sparking curiosity and conveying beauty. As important as those can be, in this class we will emphasize using visualizations to communicate your messages most effectively. It is not quite true that a picture (visualization) is worth a 1000 words. Done well, a visualization is more valuable than that: it can convey meaning almost impossible to put into words. Creating visualizations is like learning to communicate in a different language, in which you literally can say things that cannot be said in your native language. You will develop the skills to ensure your viewers understand and remember.

4. **Interacting effectively:** Elon Musk is the genius behind Tesla, SpaceX, and other wonders. For these companies to thrive, however, they must have teams capable of working together in common purpose. While this course will not specifically emphasize skills for effective interaction, I will seek to create an environment in which you will be encouraged to take risks, to share your work, and to work collaboratively as we learn together.

COURSE READINGS

Required Readings

The following readings are available for purchase at the Georgetown Bookstore and online vendors:

Knaflic, Cole Nussbaumer. 2015. *Storytelling with Data: A Data Visualization Guide for Business Professionals* New Jersey: John Wiley & Sons

Yau, Nathan. 2013. *Data Points: Visualization That Means Something* Indiana: John Wiley & Sons

The following readings are available in the Canvas course.

Healy, Kieran. 2018. *Data Visualization: A Practical Introduction*. Princeton, NJ: Princeton University Press. Chapter 1, "Look at Data," pp. 1-32.

Kirk, Andy. 2012. *Data Visualization: A Successful Design Process.* Chapter 5, "Taxonomy of Data Visualization Methods" pp. 119-158.

I will also be using material from *How Charts Lie* and other books.

Many types of software are used in data visualization. For data science professionals, the open source R program is the go-to program.

Tableau Software

In our class, we will exclusively be using Tableau, which is powerful, (relatively) easy to learn, and in high demand among employers.

GRADING POLICIES

I have become persuaded, by theory and evidence, that grades often do not serve well the purposes of either students or instructors, especially in courses (like this one) in which students bring a wide variety of technical skills and which final projects contain substantial aesthetic components.

For instructors, the main (non-administrative) justifications for grading include: a) motivating students; b) distinguishing between higher and lower performers.

The evidence indicates that grading *in general* does not serve to motivate, and can often demotivate. I also believe, based on evidence, that most grading schemes only crudely rank student performance. Moreover, in a course relying on subjective assessments, it is

inevitable that my own aesthetic biases (which may reflect my culture, sex, ethnicity, education, and personal idiosyncratic experiences) will affect my perceptions of your performance. [Note: Subjective does not mean arbitrary. Data visualization experts are likely to largely agree that certain visualizations are better than others when there are large differences. The disagreements are more likely to occur, for example, when the graphics are generally of high (or low) quality.]

So: I will not assign you grades for your work in this class, except for the fact that I must submit a final grade for you to the registrar. Instead, I'll seek to provide honest and thoughtful comments on your work as it develops. I will also provide you a series of benchmarks that you can use to assess your effort, improvement, and performance.

Grading Considerations

I'm willing to work with you to respond to your individual needs and interests. Here, I outline

I recommend that you assign yourself a grade based on two main considerations

First, a self assessment. In your self assessment, you will write a one page reflection in which you address the following questions (which were derived from the standard course evaluation):

1. How much have you learned in the course?
2. To what degree did you achieve your objectives for the course?
3. Did you establish high standards, challenge yourself, and seek to do your best work?
4. Did you consistently complete your work in a timely manner?
5. Did you contribute to an intellectually, professionally, and personally stimulating class?
6. How high was the quality of the work you prepared for the class?
7. How do you compare your performance in this class to the other Georgetown classes you have taken?

Second, a self assessment of your peer's assessments. Here, I ask you to consider how your colleagues in our class view your performance. This portion of your

self-assessment will include a reflection regarding how your peers view your performance, as well as the grade you believe they would award you.

Based on these considerations, you will assign yourself a letter grade from the usual choices.

I will review your reflections as well as those of your teammates, discuss them with you as appropriate, and assign a final grade. Unless I have a compelling reason to overrule your judgment, and can articulate my reason to you directly, I will submit the grade you recommend.

To help you assess your performance over the eight weeks of the course, you will meet with me three times via Zoom. The first meeting will come after four weeks, at the mid-way point. The second meeting occurs after the end of the sixth week, at the time you have finished all your work leading up to your final project. The final meeting will take place after you have submitted your final portfolio.

Grading Options

Students will have the option to choose one of two grading frameworks, either
1. a letter grade, or
2. Satisfactory (S); Credit (CR); or No-credit(NC): (S=grades A through C; CR=C-, D+, D; NC=F)

Students can make this choice in MyAccess beginning up until the last day of classes. The choice can be made without permission from the deans (per the usual process). The S/CR/NC options will not be counted toward the stated maximum of student's degree programs (e.g., "six" as outlined in the Undergraduate Bulletin). The withdrawal date will also be extended to the last day of classes. A transcript notation will explain that S/CR/NC was instituted because of the 2020 COVID-19 pandemic.

Grading Scale

95 - 100 % = A
90 - 94.9 % = A-
87 - 89.9 % = B+
83 - 86.9 % = B
80 - 82.9 % = B-

77 - 79.9 % = C+
73 - 76.9 % = C
70 - 72.9 % = C
67 - 69.9 % = D+
60 - 66.9 % = D
Below 60 % = F

COURSE ASSIGNMENTS

In assessing your performance, you should focus on two components.

First: Effort on Tasks (about 60 percent of your grade).

In the first six modules of the course you'll have a series of about 10 tasks each week.

I've tried to make each task take approximately one hour. If you can't finish a task in an hour, worry not: you can submit what you have or you can keep working on it. It's up to you. You can do those activities at any time during the week so long as you finish them by 6:00 pm on Monday of the upcoming week. If you submit the task on time, I will post a "2" on the gradebook. If you submit the assignment late, I'll record a "1". If you do not submit the task, a "0" will appear.

The deadlines are for your benefit. I'm persuaded by the evidence that better work is done when a deadline is given, and good faith efforts are made to meet the deadline. But I do recognize that we are continuing to live in a time of exceptional stress, so if you cannot make a deadline just let me know. But, please: don't let the assignments build up.

So spend an hour working on each task. Submit your work on time. See the two points in the grading column. You will receive feedback on many assignments to help you track your progress. As you evaluate your performance in the class, you'll want to keep you performance on these tasks in mind.

Second: Performance on Portfolios (about 40 percent)

You will spend the final two weeks of the class working exclusively on your final portfolios.

These final portfolios will involve a selection of data visualizations that you'll create on political topics. Your portfolio should include viz that are interesting and important, that use data appropriately, visualize them carefully, and interpret them accurately, so that we may learn information about American politics through your visualizations.

We will work together to help ensure that the individual graphics, as well as the portfolio as a whole, are informative and beautiful.

Note: All assignments are due by 6 p.m. on the Monday night *after* the beginning of the module. For example, if the module begins on Monday, June 7 all tasks for that module should be completed by 6 p.m. Monday, June 14.

Why Monday, and not Sunday? Just to give you a bit more time, just in case you haven't finished up everything over the weekend.

Why 6 p.m., and not 11.59 p.m. (the default assignment deadline)? Because I hate to think about you working until midnight. So finish by 6, have dinner, and then do something enjoyable the rest of the evening (if you can).

COURSE SCHEDULE

This course begins with an Orientation and a Syllabus Overview. It is then divided into eight modules, each lasting one week. An outline for the Orientation and each module appears below. Students are required to move through each module in sequential order.

ORIENTATION: Opens June 1

The orientation provides an overview of the course and introduces you to your instructor and peers. You will also learn about the technology requirements and where to get support.

MODULE 1: June 7 - June 14

In Module 1, you will learn the fundamental concepts of data visualization:

1. Data visualization defined;
2. Principles of data and visual perception;
3. Principles of information hierarchy;
4. Principles of sketching and storytelling;
5. Fundamentals of visual displays;
6. Fundamentals of visual interactivity.

You will reconnect with your previous courses in politics and begin planning how to visualize political phenomena:

1. Political concepts;
2. Visualizing political concepts;
3. Defining data necessary for visualizing.

MODULE 2: June 14 - June 21

In Module 2, you will learn data visualization concepts regarding:

1. Data visualization as a medium (information, entertainment, art, everyday use);
2. The importance of context -- to visualize well, you will need to understand your audience and what you want to communicate;
3. Some of the most common dozen visuals, as well as visuals typically to avoid.

You will explore political concepts and topics concerning:

1. The public, the political system, and American democracy;
2. A collection of visualizations on political institutions;
3. Your first opportunity to make a visualization on political institutions more effective.

MODULE 3: June 21 - June 28

In Module 3, you will learn concepts of data visualization:

1. Detailed elements in representing data, especially the relative importance of the position, length, angle, direction, area, volume, saturation, and hue;
2. Cartesian, polar, and geographic data mapping;
3. The way that a single data set can be visualized in a wide variety of ways;
4. Gestalt principles;
5. De-cluttering principles;
6. Focusing principles.

You will analyze politics and political visualization by exploring:

1. Federalism concepts;
2. Education within a federalist system;
3. Federalism as a visualizer's dream.

MODULE 4: June 28 - July 5

In Module 4, you will learn concepts of data visualization:

1. The process of visual exploration;
2. Methods of visualizing categorical, time series, and spatial data;

3. Methods of visualizing distributions of individual variables and relationships of multiple variables;
4. How to think like a designer;
5. How to dissect your visualizations.

You will analyze politics and political visualization by exploring:

1. The major institutions of the federal government (legislative, executive, judicial, bureaucratic)

You will continue systematically developing your Tableau skills by learning how to:

1. Determine which calculations to make;
2. Perform calculations;
3. Modify table calculations.

At the end of this module, you will have your first consultation with Professor Rom.

MODULE 5: July 5- July 12

In Module 5, you will learn concepts of data visualization:

1. Yau's rules: a) make sure your data answer a question; b) describe your data precisely; c) use visual hierarchy; highlight what's important; make your data readable.
2. Tactics for storytelling: horizontal logic, vertical logic, reverse storyboarding
3. Finding your voice: passion, simplicity, focus.
4. Pulling it all together.

You will analyze politics and political visualization by exploring:

1. Public opinion and political participation.

You will continue systematically developing your Tableau skills by learning how to:

1. Finally! Visual analytics!

At the end of this module, you will have your second consultation with Professor Rom.

MODULE 6: July 12 - July 19

In Module 6, you will learn concepts of data visualization:

1. Another approach to 'designing for your audience' in Yau, Chapter 6.
2. Strategies for dealing with common problems in Knaflic, Chapter 9.
3. The need for continual exploration and improvement in Knaflic, Chapter 10.

You will analyze politics and political visualization by exploring:

1. Interest groups, political parties, and the news media.

You will continue systematically developing your Tableau skills by learning how to:

1. More visual analytics.
2. New "current" techniques.

MODULE 7: July 19 - July 26

In this module and the next, you will not be required to learn any new concepts or techniques. Instead, you will work intensively to develop your final portfolios.

MODULE 8: July 26 - July 30 (Short Week)

In the final module, you will complete and post your final portfolio. You will also complete your self assessment.

INFORMATION ABOUT TOOLS AND TECHNICAL REQUIREMENTS

As an online student your "classroom" experience will be very different than a traditional student. As part of your online experience, you can expect to:

- Communicate with me and classmates regularly via email, discussion boards, and other platforms.
- Navigate the internet using a web browser (note that certain tools may require a specific browser).
- Use office applications such as Microsoft Office or Google Docs to create documents..
- Submit assignments in Canvas.
- Upload and download saved files (including text, audio, and video).
- Use a microphone to record audio.
- Use an internal or external camera to record video.

In this course we will use the following tools:

- Zoom enables users to conduct synchronous ("real-time") conferences, presentations, lectures, meetings, office hours and group chats via audio, video, text chat and content sharing.
- Panopto is a cloud-based lecture capture service available to Georgetown University faculty, staff and students.
- Tableau is a data visualization tool.

Computer Requirements

- You will need access to a computer (Windows or Mac) and adequate Internet service to complete this course Although you can use other devices such as

smartphones and tablets for most online coursework, there may be some activities that are difficult to access with these devices.

● You will also need an internal or external microphone and camera to complete this course. While you can use any browser to access Canvas please note that some tools only work with certain browsers (e.g., Proctorio only works with Chrome).

The minimum requirements needed to use Canvas can be found in this [Canvas guide](#).

COURSE EXPECTATIONS

Expectations of the Students

This course consists of 8 modules. You are expected to complete all readings, assignments, and activities on time. Participation is essential to your success in this class. Students are expected to participate actively in discussions with your peers and contribute to the group assignments. It is important to subscribe to the course discussion boards so that you receive notifications when new messages are posted. In order to get full credit for your work, you should complete all of your module assignments and quizzes on time.

Expectations of Your Professor

You should expect your professor to treat you with respect, fairness, and kindness; to be responsive to your requests for assistance; to be available to meet at times of mutual agreement; and to put your interests above his.

Time Expectations

Our online classes are designed to meet the same academic standards as our place-based (face-to-face) courses. You can think of each module equal to the same level of participation, commitment, and academic rigor as a face-to-face class. Students should plan on spending approximately 10-12 hours per week (this is for 8 week, 3 credit courses).

Communication Expectations

Communication with Professor Rom:

Please feel free to email me with your questions, concerns, and/or to schedule a time to meet over Zoom. When sending emails please remember to follow the guidelines outlined below. If you have general questions about assignments and course materials please post these questions in the [General Question Discussion Board Forum](#), which you can access by clicking Discussions in the course navigation menu. This is an open forum, and you are encouraged to give answers and help each other.

- **Check the syllabus.** Before sending your email or message, be sure that your question has not already been addressed in the syllabus or announcements.
- **Be patient.** If you have a concern and send me a message, you can expect a response within 48 business days. Please allow [insert #] business days for assessment submission feedback.
- **Specify subject.** Subject line should include the topic of the message and class title.
- **Greet & Close.** E-mails should begin with a formal greeting and end with you signing your name in all messages/emails.
- **Check writing**. Proofread (i.e. grammar and spelling) your message before sending.

Online Communication Guidelines

To promote the highest degree of education possible, we ask each student to respect the opinions and thoughts of other students and be courteous in the way that you choose to express yourself. Students should be respectful and considerate of all opinions.

In order for us to have meaningful discussions, we must learn to genuinely try to understand what others are saying and be open-minded about others' opinions. If you want to persuade someone to see things differently, it is much more effective to do so in a polite, non-threatening way rather than to do so antagonistically. Everyone has insights to offer based on his/her experiences, and we can all learn from each other. Civility is essential.

ACCOMMODATIONS

Students with Disabilities

Under the Americans with Disabilities Act (ADA) and the Rehabilitation Act of 1973, individuals with disabilities have the right to specific accommodations that do not fundamentally alter the nature of the course. Some accommodations might include note takers, books on tape, extended time on assignments, and interpreter services among others. Students are responsible for communicating their needs to the Academic Resource Center, the office that oversees disability support services,(202-687-8354; arc@georgetown.edu; https://academicsupport.georgetown.edu/disability/) before the start of classes to allow time to review the documentation and make recommendations for appropriate accommodations. The University is not responsible for making special accommodations for students who have not declared their disabilities and have not requested an accommodation in a timely manner. Also, the University need not modify course or degree requirements considered to be an essential requirement of the program of instruction. For the most current and up-to-date policy information, please refer to the Georgetown University Academic Resource Center website. Students are highly encouraged to discuss the documentation and accommodation process with an Academic Resource Center administrator.

Accessibility and Inclusion

One of the central tenets of Georgetown's educational mission is *cura personalis*, a Latin phrase meaning "care of the whole person." Georgetown is committed to showing care and concern for each student by creating an inclusive and accessible learning

environment that follows universal design principles to meet the needs of its diverse student body.

I am committed to creating a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.). If your name or pronoun needs to be corrected, please let me know early in the semester so that I can make the appropriate changes to my records.

ACADEMIC INTEGRITY

Students at Georgetown University are expected to maintain the highest standards of academic and personal integrity. Although most Georgetown students conduct themselves in accordance with these standards, occasionally, there are students who violate the code of conduct. Cheating harms the University community in many ways. For example, honest students are frustrated by the unfairness of cheating that goes undetected and students who cheat can skew the grading curve in a class, resulting in lower grades for students who worked hard and did their own work.

Academic dishonesty in any form is a serious offense, and students found in violation are subject to academic penalties that include, but are not limited to failure of the course, termination from the program, and revocation of degrees already conferred. All students are expected to fully adhere to the policies and procedures of [Georgetown's Honor System](#) and to take the Honor Code Pledge.

Honor Code Pledge

In pursuit of the high ideals and rigorous standards of academic life I commit myself to respect and to uphold the Georgetown University honor system; to live out a commitment to integrity in all my words and actions; to be honest in every academic endeavor; and to conduct myself honorably, as a responsible member of the Georgetown community as we live and work together; to live out the ideals of Georgetown University I commit myself to be a person for others in my daily life, respectful of difference and disagreement; To care

*for this venerable campus and all of those with whom I share it; and to fulfill in all ways
the trust placed in me to carry on the Georgetown tradition.*

Plagiarism

Stealing someone else's work is a terminal offense in the workplace, and it will wreck
your career in academia, too. Students are expected to work with integrity and honesty
in all their assignments. The Georgetown University Honor System defines plagiarism
as "the act of passing off as one's own the ideas or writings of another." More guidance
is available through the [Gervase Programs](#). If you have any doubts about plagiarism,
paraphrasing, and the need to credit, check out [Plagiarism.org](#).

All submissions must be your original work. Any submission suspected of plagiarism
will be immediately referred to the Honor Council for investigation and possible
adjudication. All students are expected to follow Georgetown's honor code
unconditionally. If you have not done so, please read the honor code material located
online at the [Honor Council website](#).

SUPPORT SERVICES

Georgetown recognizes that COVID-19 has a significant impact on everyone in the
Georgetown community. Georgetown offers a variety of support services for students
that can be accessed online and has put together [this newsletter](#) which aims to provide
you with information about well-being resources and virtual meetings that can connect
you with mental health professionals on and off campus during this time. Below are
some resources available to you:

- [Academic Resource Center](#)
  202-687-8354 | arc@georgetown.edu

- [Counseling and Psychiatric Services](#)
  202-687-6985

- [Institutional Diversity, Equity & Affirmative Action (IDEAA)](#)
  (202) 687-4798

Sexual Misconduct

Georgetown University and its faculty are committed to supporting survivors and those impacted by sexual misconduct, which includes sexual assault, sexual harassment, relationship violence, and stalking. Georgetown requires faculty members, unless otherwise designated as confidential, to report all disclosures of sexual misconduct to the University Title IX Coordinator or a Deputy Title IX Coordinator. If you disclose an incident of sexual misconduct to a professor in or outside of the classroom (with the exception of disclosures in papers), that faculty member must report the incident to the Title IX Coordinator, or Deputy Title IX Coordinator. The coordinator will, in turn, reach out to the student to provide support, resources, and the option to meet. [Please note that the student is not required to meet with the Title IX coordinator.]. More information about reporting options and resources can be found on the [Sexual Misconduct Website](#).

Title IX Pregnancy Modifications and Adjustments

Georgetown University is committed to creating an accessible and inclusive environment for pregnant and parenting students. Students may request adjustments based on general pregnancy needs or accommodations based on a pregnancy-related complication. SCS students must complete the [Pregnancy Adjustment Request Form](#) and submit it to the SCS Deputy Title IX Coordinator at titleixscs@georgetown.edu. Upon receiving the completed form, the Deputy Title IX Coordinator will schedule a meeting with the student to discuss the requested adjustments and implementation process. More information about pregnancy modifications can be found on the [Title IX at Georgetown University Website](#).

Georgetown Library

If you have a question for a librarian you can go to their [“Ask Us”](#) page where you will have the option to chat online, send an email, or schedule a Zoom appointment to

discuss a research topic, develop a search strategy, or examine resources for projects and papers. Librarians offer an overview of and in-depth assistance with important resources for senior or master's theses, dissertations, papers and other types of research. This service is available to currently enrolled students who need assistance with Georgetown-assigned projects and papers. Please review the [Services & Resources Guide for Online Students](#) for additional information.

eResources

Students enrolled in courses have access to the University Library System's eResources, including 500+ research databases, 1.5+ million ebooks, and thousands of periodicals and other multimedia files (films, webinars, music, and images). You can access these resources through the [Library's Homepage](#) by using your NetID and password.

Learning Resources

Georgetown offers a host of [learning resources](#) to its students. Two that you might find particularly helpful in this course are the [Writing Center](#) and [Refworks](#).

- [The Writing Center](#) offers peer tutoring by trained graduate and undergraduate students who can assist you at any point in the writing process. They help at any stage of your writing process, from brainstorming to revision. Tutors can offer advice on thesis development, use of evidence, organization, flow, sentence structure, grammar, and more. The Writing Center will not proofread or edit papers; rather, they will help to improve your proofreading and editing skills to become a better writer. Appointments can be booked online through their website.
- [Refworks](#) is an online research management tool that aids in organizing, storing, and presenting citation sources for papers and projects. I strongly encourage you to use RefWorks to compile your bibliography. [You can find a guide for using RefWorks here.](#)

Technical Support

All students have 24/7 access to Canvas technical support 24 hours a day, 7 days a week, including live chat and a support hotline at 855-338-2770. Use the 'Help' icon in the lower left of your Canvas window to view all available support and feedback options. If you're looking for help on a specific feature, check out the Canvas Student Guide.

For technical assistance with other tools used in this course, click on links below:

- Zoom
- Panopto
- Tableau
- PollEverywhere
- Google Apps