DATA.502.MQ/DATA.251.Q: DATA VISUALIZATION
Fall 2020 / Tuesday 6-8:30pm
Zoom info for lecture:
https://zoom.us/j/96632902314?pwd=VXJoekVLcFpwZm9MbklMUUFIWHFXQT09
Meeting ID: 966 3290 2314
Passcode: Qv83QV

Nipa Onulak – Instructor
nonulak@drew.edu
Office hours: T 4:30-6pm and 8:30-9pm (before and after class), by appointment as well
Zoom info for office hours:
https://drew.zoom.us/j/98521401386?pwd=TkVzOG5NeWZscUZvaWpqU2tPTHZnQT09
Meeting ID: 985 2140 1386 Passcode: 907003

Milla Schneider – Teaching Assistant
mschneider2@drew.edu
Office Hours: Mondays and Wednesdays 3-4 pm
Zoom Info: https://us02web.zoom.us/j/81272958798?pwd=cEhuM1NWK3R5aWUwK0ExeitQaGl5dz09
Meeting ID: 812 7295 8798 Passcode : 9YECBa

COURSE DESCRIPTION
A survey of techniques and tools for effectively visualizing small & large data sets in informative ways for a variety
of audiences. Examples from a range of disciplines are used. Students will articulate individual concepts in
statistical analysis and in solving design problems. Critical awareness of the visual display of quantitative
information in a historical context is encouraged through lectures, discussion, and critiques.

COURSE LEARNING GOALS & OUTCOMES
The goals of this course are to:
  • explore various theoretical, practical, and aesthetic perspectives on information visualization
  • examine visual & cognitive research relevant to visual perception & information processing
  • develop familiarity with a wide variety of visual representations
  • build skills in planning, developing, and evaluating information visualizations
By the end of this course, students will be able to:
  • critically discuss information visualizations in light of current theories and research
  • develop design sense in the context of various tasks, communications goals & data constraints
  • transform data into meaningful and effective visualizations using current software & tools

REQUIRED TEXT
  ● Tamara Munzner, Visualization Analysis & Design, A K Peters Visualization Series, CRC Press, 2014.
    (available in the Drew bookstore)
  ● Additional readings, resources, and online videos will be posted throughout the semester

SOFTWARE
  ● R
  ● Tableau
  ● Microsoft Excel

EXAMPLE MEDIA SOURCES
  ● 538
  ● New York Times
  ● Bloomberg
  ● The Pudding

TECHNOLOGY
Students are expected to bring their laptops to each class. Students should use laptops only when instructed and must not use laptops for unrelated activities, such as web-browsing or messaging. No use of smartphones, social networking sites or other distractions allowed in class.

COURSE FORMAT
This course will be structured as a lecture/discussion and lab. While the professor will clarify the main points of each session and address more advanced research material, the main portion of class will be devoted to discussion of the required readings for that week, as well as hands-on visualization activities using sketchbooks & colored pencils, design software and computer programming. Students will bring their own ideas, experience, and interpretations to class and will learn from sharing and hearing others. Active preparation is therefore an important part of the class and contributes significantly to your overall learning in the course.

COMPONENTS OF GRADES
- Attendance & class participation [20%] (100)
- Homework assignments [30%] (150)
- Assessments/Exams [20%] (100)
- One page proposal to final project [5%] (25)
- Final project & Online portfolio [25%] (125)

ATTENDANCE & PARTICIPATION
Students missing a class are responsible for all the information and assignments covered during that class. More than three unexcused absences will result in a grade reduction. Two latenesses are equal to one absence, and absences for more than five sessions may result in a failing grade regardless of the reason. Participation in class discussions and critiques is also an important part of this course. A participation grade will be posted roughly every two or three weeks.

HOMEWORK ASSIGNMENTS
In general, you will be given one or two assignments each week. Assignments will be announced in class and posted on Moodle. Each assignment will vary in format, content, and length. Assignments can be submitted on Moodle (unless otherwise noted) by 1:25 pm on the due date.
Late assignments will be accepted with a 20% grade penalty per 12 hours late.
Homework assignments will be different for 251 and 502 students.

ASSESSMENTS/EXAMS
Lecture, readings, and homework assignments will prepare you for the assessments. There will be one midway through the semester (after fall break) and one at the end of the semester during finals week. Exam will be done during the class period immediately following the lecture for that week. Structure of the exam will be disclosed to you as the time approaches. Be prepared with your laptops and visualization softwares.
Assessments/Exams will be different for 251 and 502 students.

FINAL PROJECT & ONLINE PORTFOLIO
Toward the beginning of the semester, each student will be instructed to create a personal website using Domain of One's Own. This website will be your online portfolio. At the end of the term, each student will make a formal presentation to the class of the website as part of the final project.

The final class project is a comprehensive data visualization project that allows students to utilize skills they have learned throughout the semester. Students will clean, manipulate, and visualize a dataset of their interests. The project contains the following components.

- One page proposal for your project. With the help of your instructors, you should decide on a dataset that you want to work with. You should also elaborate on the following questions: what story do you want to tell from this dataset? What kind of visualizations will you try to use? What format and tools will you be using? Your proposal should begin with a refined research question followed by a discussion of how you plan to approach that question and a description of the tools you will be using (**due: October 20**).
- Presentation: you will make *five* different visualizations based on your dataset and post them to your online portfolio. At the end of term, you will make a formal presentation to the class of these visualizations, as well as your entire online portfolio.

COURSE SCHEDULE

This is a tentative outline of topics, readings, and assignments. The outline will be updated frequently as the semester progresses. On occasion, substitute topics or readings will be given and posted here; no printed updates will be given.

Week 1: August 25
- Intro & Lecture Chapter 1
- Lab : R Cloud, Excel, Tableau; R importing/exporting data, Excel pivot tables, Tableau importing data
- Reading: Chapters 1 & 2
- Assignment: Homework #1

Week 2: September 1
- Lecture on Chapter 2
- Lab: R, basic data manipulation; simple graphs and graphing parameters using base R packages
- Reading: Chapter 3
- Assignment: Homework #2

Week 3: September 8
- Lecture on Chapter 3
- Lab: R, Excel, Tableau
- Reading: Chapter 4
- Assignment: Homework #3

Week 4: September 15
- Lecture on Chapter 4
- Website: Domain of One's Own
- Lab: R, introduction to ggplot
- Reading: Chapter 5
- Assignment: Homework #4; setup domain & homepage

Week 5: September 22
- Lecture on Chapter 5
- Lab: R, Excel, Tableau
- Reading: Chapter 6
- Assignment: Homework #5

Week 6: September 29
- No Class – Fall Break

Week 7: October 6
- Lecture on Chapter 6

- Discussion of student visualization responses
- Assessment/Exam
- <u>Reading</u>: Chapter 7
- <u>Assignment</u>: Homework #6

Week 8: October 13
- Lecture on Chapter 7
- Visualization: what *not* to do; lying with data
- Lab: R, Tableau, Excel
- <u>Reading</u>: Chapter 8
- <u>Assignment</u>: Homework #7 & Project proposal

Week 9: October 20
- Lecture on Chapter 8
- Discussion of student project proposals
- Lab: R ggplot
- <u>Reading</u>: Chapter 9
- <u>Assignment</u>: Homework #8

Week 10: October 27
- Lecture on Chapter 9
- Lab: R, Tableau Dashboard/Storytelling, Excel
- <u>Reading</u>: Chapter 10
- <u>Assignment</u>: Homework #9

Week 11: November 3
- Lecture on Chapter 10
- Lab: R trelliscope, plotly – interactive displays
- <u>Reading</u>: Chapter 11
- <u>Assignment</u>: Homework #10

Week 12: November 10
- Lecture on Chapter 11
- Lab: R, Tableau, Excel
- <u>Reading</u>: Chapter 12
- <u>Assignment</u>: Online Portfolio and Final Project

Week 13: November 17
- Lecture on Chapter 12
- Lab: R, Tableau, Excel
- Visual storytelling: student final project review
- <u>Reading</u>: Chapter 13

Week 14: November 24
- Thanksgiving Break – BUT we have class 😊
- Lecture on Chapter 13
- Presentations
- <u>Reading</u>: Chapter 14

Week 15: December 1
- Lecture on Chapter 14
- Presentations

Week 16: December 8
- Finals Week
- Assessment/Exam
- Remaining Presentations

ACADEMIC INTEGRITY

All students are required to uphold the highest academic standards. Any case of academic dishonesty will be dealt with according to the guidelines and procedures outlined in Drew University's "Standards of Academic Integrity: Guidelines and Procedures." A copy of this document can be accessed on the CLA Dean's U-KNOW space by clicking on "Academic Integrity Standards."

ACADEMIC ACCOMMODATIONS

Students who wish to disclose a disability for the first time are instructed to contact Accessibility Resources, Brothers College, 119B; 973-408-3962. Although disclosure may take place at any time during the semester, students are encouraged to do so early in the semester, because, in general, accommodations are not implemented retroactively. For additional information, visit http://www.drew.edu/academic-services/disabilityservices

Returning Students with Approved Accommodations: requests for previously approved accommodations for the current semester should be sent to Accessibility Resources ideally within the first two weeks of class. This allows the office sufficient lead time to process the request. Please call 973-408-3962, email disabilityserv@drew.edu, or complete the accommodations request online.