RUTGERS
Rutgers Business School
Newark and New Brunswick

Information Technology
Course Number: 22:544:646
Course Title: Data Analysis & Visualization

COURSE DESCRIPTION

The implosion of available data has made visualization more critical but also more challenging. Data analysis and data visualization are essential tools for business analysts, engineers, policy-makers, and decision-makers. Developed originally for "small data", visualization techniques have been met with varied success in the past centuries and decades. There are a few well-known visualizations that are very effective in capturing the essence of the data, and of course, there are many infamous negative examples of poor visuals. An effective visual is critical for decision making it, but it also requires a lot of work, customization, attention to detail, and refinements.

In this course students will learn a large number of data visualization methods. Focus will be given to business data visualizations similar to those that appear in business publications. Also, students will learn advanced techniques that will help them analyze big data with tens or hundreds of variables. Students will learn through practice using the software Tableau.

COURSE MATERIALS

- Course Slides
- Tableau Instructional Videos available for free to all studies
- Readings available online will be posted on canvas

- Check Canvas (canvas.rutgers.edu) and your official Rutgers email account regularly. All the information regarding lecture notes, reading materials, assignments, and late breaking news will be posted on Canvas.

LEARNING GOALS AND OBJECTIVES

- This course is designed to help students develop skills and knowledge in the following area(s):

- Develop an understanding of what is a good visualization for a given purpose
- Learn visualization theory & techniques
- Build a substantial visualization project
- Apply data analysis and visualization with Tableau
- Learn how to build a number of essential business visualizations
- Use advanced multidimensional and high-dimensional visualization techniques

- Students who complete this course will demonstrate the following: How to effectively analyze and communicate the analysis results through a variety of visualization techniques

- Students develop these skills and knowledge through the following course activities and assignments:
  - Three assignments on how analyze and visualize data
  - One substantial project assignment

PREREQUISITES

There is no formal prerequisite for this course. However, student must learn how to use Tableau with the assistance of the instructor

ACADEMIC INTEGRITY

I do NOT *tolerate cheating*. Students are responsible for understanding the RU Academic Integrity Policy http://academicintegrity.rutgers.edu/

I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, "On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment." I will screen all written assignments through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work. Don't let cheating destroy your hard-earned opportunity to learn. See business.rutgers.edu/ai for more details.

ATTENDANCE AND PREPARATION POLICY

- Expect me to attend all class sessions. I expect the same of you. If I am to be absent, my department chair or I will send you notice via email and Canvas as far in advance as possible. If you are to be absent, report your absence in advance at https://sims.rutgers.edu/ssra/. If your absence is due to religious observance, a Rutgers-approved activity, illness, or family emergency/death and you seek makeup work, also send me an email with full details and supporting documentation within 7 days of your first absence.
- For weather emergencies, consult the campus home page. If the campus is open, class will be held.
- Expect me to arrive on time for each class session. I expect the same of you.
- Expect me to remain for the entirety of each class session. I expect the same of you.
- Expect me to prepare properly for each class session. I expect the same of you. Complete all background reading and assignments. You cannot learn if you are not prepared. The minimum expectation is that for each 3-hour class session, you have prepared by studying for at least twice as many hours.
- Expect me to participate fully in each class session. I expect the same of you. Stay focused and involved. You cannot learn if you are not paying attention.

CLASSROOM CONDUCT

All students are expected to know, understand and live up to the standards of RU.

EXAM DATES AND POLICIES

This class has homework and a project and no exams

GRADING POLICY

Course grades are determined as follows:

- There are three graded items in this course: Midterm Exam 1, Midterm Exam 2, and Final Exam. You will receive a separate score between 0 and 100 for each of the three exams. The final grade will be a weighted average of the three items using the weighting scheme indicated below. The submission dates for each assignment will be announced on Canvas.
- Grading distribution
  - Assignment 1 ... 10%
  - Assignment 2 ... 15%
  - Assignment 3 ... 15%
  - Project   ... 60%

- Your final grade is not subject to negotiation. If you feel I have made an error, submit your written argument to me within one week of receiving your final grade. Clarify the precise error I made and provide all due supporting documentation. If I have made an error, I will gladly correct it. But I will adjust grades only if I have made an error. I cannot and will not adjust grades based on consequences, such as hurt pride, lost scholarships, lost tuition reimbursement, lost job opportunities, or dismissals. Do not ask me to do so. It is dishonest to attempt to influence faculty in an effort to obtain a grade that you did not earn, and it will not work.

COURSE SCHEDULE

Week	Topic
Week 1	Value of Visualization
Week 2	Data and Image Models
Week 3	Visualization Design
Week 4	Exploratory Data Analysis
Week 5	Multidimensional Data & Analysis
Week 6	Interaction
Week 7	Visualization Software
Week 8	Project Discussion
Week 9	**NO CLASS**

Week 10	Color
Week 11	Visualization Software
Week 12	High Dimensional Data Visualizations
Week 13	Dashboards
Week 14	Design Critiques
Week 15	Project Demonstration

SUPPORT SERVICES

If you need accommodation for a *disability*, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. More information can be found at ods.rutgers.edu.

[Rutgers University-New Brunswick ODS phone (848)445-6800 or email dsoffice@echo.rutgers.edu]

[Rutgers University-Newark ODS phone (973)353-5375 or email ods@newark.rutgers.edu]

If you are *pregnant*, the Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy.

[Rutgers University-New Brunswick Title IX Coordinator phone (848)932-8200 or email jackie.moran@rutgers.edu]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email TitleIX@newark.rutgers.edu]

If you seek *religious accommodations*, the Office of the Dean of Students is available to verify absences for religious observance, as needed.

[Rutgers University-New Brunswick Dean of Students phone (848)932-2300 or email deanofstudents@echo.rutgers.edu]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email DeanofStudents@newark.rutgers.edu]

If you have experienced any form of *gender or sex-based discrimination or harassment*, including sexual assault, sexual harassment, relationship violence, or stalking, the Office for Violence Prevention

and Victim Assistance provides help and support. More information can be found at
http://vpva.rutgers.edu/.

[Rutgers University-New Brunswick incident report link: http://studentconduct.rutgers.edu/concern/. You may contact the Office for Violence Prevention and Victim Assistance at (848)932-1181]

[Rutgers University-Newark incident report link:
https://cm.maxient.com/reportingform.php?RutgersUniv&layout_id=7 . You may also contact the Office of Title IX and ADA Compliance at (973)353-1906 or email at TitleIX@newark.rutgers.edu. If you wish to speak with a staff member who is confidential and does **not** have a reporting responsibility, you may contact the Office for Violence Prevention and Victim Assistance at (973)353-1918 or email run.vpva@rutgers.edu]

If students who have experienced a temporary condition or injury that is adversely affecting their ability to fully participate, you should submit a request via https://temporaryconditions.rutgers.edu .

If you are a military *veteran* or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. http://veterans.rutgers.edu/

If you are in need of *mental health* services, please use our readily available services.

[Rutgers University-Newark Counseling Center: http://counseling.newark.rutgers.edu/]

[Rutgers Counseling and Psychological Services–New Brunswick: http://rhscaps.rutgers.edu/]

If you are in need of *physical health* services, please use our readily available services.

[Rutgers Health Services – Newark: http://health.newark.rutgers.edu/]

[Rutgers Health Services – New Brunswick: http://health.rutgers.edu/]

If you are in need of *legal* services, please use our readily available services: http://rusls.rutgers.edu/

Students experiencing difficulty in courses due to *English as a second language (ESL)* should contact the Program in American Language Studies for supports.

[Rutgers–Newark: PALS@newark.rutgers.edu]

[Rutgers–New Brunswick: eslpals@english.rutgers.edu]

If you are in need of additional *academic assistance*, please use our readily available services.

[Rutgers University-Newark Learning Center: http://www.ncas.rutgers.edu/rlc

[Rutgers University-Newark Writing Center: http://www.ncas.rutgers.edu/writingcenter]

[Rutgers University-New Brunswick Learning Center: https://rlc.rutgers.edu/]

[Optional items that many faculty include:

  - Students must sign, date, and return a statement declaring that they understand the RU Academic Integrity Policy.

  - Students must sign, date, and return a statement declaring that they understand this syllabus.]