

I 320D

Topics in Human-Centered Data Science: Data Visualization

27475

FALL 2024

CLASS MEETS: Tue and Th, 12:30-3:30 pm Room: SZB 4.508

Instructor: Luis Francisco Revilla

Pronouns: he/his/ him

Office hours: by appointment

Email: use Canvas messaging system

COURSE DESCRIPTION

From science to business to finance, data is the keystone for making better decisions, as it provides evidence of the actual characteristics of a phenomenon or topic. It is by visualizing data that decision-makers gain useful insights and can make accurate predictions. **Data Visualization is much more than putting pixels on the screen; it is about helping people gaining insights and understand the data.** Good data visualizations simplify the many challenges associated with understanding data, such as identifying outliers, patterns and trends. Good data visualizations are critical for making persuasive and impactful presentations. In today's society, it is important **for students to be able to design and create effective data visualizations.**

This course teaches students how data is used in decision making, how to work (wrangle) with the data such that it can be visualized and analyzed, how to design and build alternative visualizations (e.g., graphs), and how users perceive and interact with different data visualizations. Students benefit by understanding the underlying theory, and developing their ability to make better visualizations.

PRE-REQUISITES FOR THE COURSE

There are no prerequisites to take this course, though previous experience with Tableau is advantageous.

LEARNING OUTCOMES

This course will teach students to understand data visualization approaches in: “conceptual visualization,” “scientific visualization,” and “visual analytics systems.” Students will learn the fundamentals of human perception, color theory, and data-wrangling skills. After this course, students will:

1. understand the best practices for data visualization
2. develop their skills to visualize data using different types of graphs
3. develop their skills to create dashboards and impactful presentations using technologies such as Tableau, and D3.
4. develop their skills for implementing data visualizations that support decision-making

HOW WILL YOU LEARN?

STATEMENT OF LEARNING SUCCESS

Your success in this class is important to me. We all learn differently and everyone struggles sometimes. You are not, ever, the only one having difficulty! I encourage you to ask questions and to share your experience with your classmates and teammates. If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. I also encourage you to reach out to the student resources available through UT and I am happy to connect you with a person or Center if you would like.

TEACHING MODALITY

This course is structured to be taught in-person. Class activities include lectures, presentation of readings, discussions, and question-answer sessions about difficult topics. In addition, this course includes out-of-class activities, including: reading assignments, and a final project. It is expected that all students complete their reading assignments before class. This course is not designed for remote attendance; therefore, they will not be postings with recordings of the lectures.

COMMUNICATION

The course Canvas site can be found at utexas.instructure.com. Please email me through Canvas. You are responsible for ensuring that the primary email address you have recorded with the university is the one you will check for course communications because that is the email address that Canvas uses.

ASKING FOR HELP

We all need help at some point. Please feel free to send me a message using Canvas, talk to me after class, or we can set up a zoom session, as best fits the situation.

DIVERSITY, EQUITY AND INCLUSION

It is my intent that students from all backgrounds and perspectives be well served by this course, that students' learning needs be addressed, and that the diversity that students bring to this class can be comfortably expressed and be viewed as a resource, strength and benefit to all. Please come to me at any time with any concerns.

DISSABILITY AND ACCESS (D&A)

The university is committed to creating an accessible and inclusive learning environment consistent with university policy and federal and state law. Please let me know if you experience any barriers to learning so I can work with you to ensure you have equal opportunity to participate fully in this course. If you are a student with a disability, or think you may have a disability, and need accommodations please contact Disability & Access (D&A). Please refer to the D&A website for more information: <http://diversity.utexas.edu/disability/>. If you are already registered with D&A, please deliver your Accommodation Letter to me as early as possible in the semester so we can discuss your approved accommodations and needs in this course.

COURSE REQUIREMENTS AND GRADING

REQUIRED MATERIALS

1. Stephen Few, 2012, “Show Me the Numbers: Designing Tables and Graphs to Enlighten”, Second ed. Analytics Press. ISBN 978-0970601971
2. Steve Wexler, Jeffrey Shaffer, and Andy Cotgreave. 2017. The Big Book of Dashboards: Visualizing Your Data Using Real-World Business Scenarios (1st. ed.). Wiley Publishing. ISBN 978-1-119-28271-6

REQUIRED DEVICES

It is expected that every student has a laptop or personal computer and internet access.

- **Tableau Desktop:** download and install Tableau: <http://www.tableau.com/academic/students>

CLASSROOM EXPECTATIONS

Class attendance. It is expected that all students attend class. While this normally means attending in-person, if you are sick or at risk of being sick, please tell me and I will set up a zoom session using Canvas so you can attend online. Please communicate this need as soon as possible so we can prepare. Attending online for a normal lecture counts as a normal attendance. Exams do require in-person attendance. If you are sick and have to attend an exam online, please let me know ahead of time so we can prepare for it.

Class participation. Class participation is instantiated by in-class exercises. It is expected that all students attend class and participate in class discussions.

Behavior expectations. It is expected that all students follow the Student Discipline and Conduct as provided by the University. Detail information about the code of conduct can be found at:

<https://deanofstudents.utexas.edu/sa/downloads/InstRulesCh11.pdf>

This course includes individual and collaborative activities that will ask you to work individually, in pairs, or in a group. It is expected that you respect the boundaries of collaboration as specified for each activity, and that you behave professionally and collaboratively when working with another student. In case of personal differences, please message me so we can find an appropriate solution.

ASSIGNMENTS

The following table represents how you will demonstrate your learning and how we will assess the degree to which you have done so.

Assignments	Points Possible	Percent of Total Grade
1. Reading Assignments (Individual)	25	25%
2. Exam 1 (Individual)	25	25%
3. Exam 2 (Individual)	25	25%
4. Final Project (Group)	25	25%
Final Grade		100%

Table 1. Grades

Class Participation (Individual)

All students are expected to participate in class activities and discussions.

Reading Assignments (Individual)

The goal of the reading assignments is to provide a general view of the research work conducted in the sub areas of Data Visualization. Every student is expected to read all the reading assignments, understand them, and participate actively in the class discussions. Every student must prepare 3 reading points for every reading assignment, identifying the most important lessons learned from the reading assignment.

Students must send these points before class using Canvas 24 hours before class start

Exams 1, 2 (Individual)

This course includes two exams that will assess the level of understanding of all the readings, class lectures, and in-class exercises. The exams will be conducted in class.

Final Project (Group)

Early in the course, students will form groups of 3 or 4 to work in their final projects. The project involves selecting a complex dataset, creating a data visualization system (e.g., a dashboard), and allows users to interact with the data in order to accomplish a set of goals (e.g., decision-making, data analysis, etc.). The Project has three Phases.

Project Proposal: Each group will write their proposal and discuss it with me. The proposal must specify a scenario of use that includes:

1. who is the audience (users and other stakeholders)
2. goals
 - a. what tasks the users need to perform
 - b. what questions the users need to answer
3. what data is needed to help the users accomplish their goals
4. where will you get the data

Project Design: This is an intermediate presentation, in which each group will present their overall vision, their target audience, the main user tasks and user questions that the visualization will answer, and their current design iteration.

Final Presentation: Each group will present their project to the class, explain why they selected the data, the design interactions, implementation, and demonstrate the final system. The Presentation of the Final Project include 3 deliverables:

1. In-person presentation with slides
2. Demonstration of functional system
3. Paper

LATE WORK AND MAKING UP MISSED WORK

Late work is not accepted. If you are facing a situation that will interfere with a deadline, please talk with me ahead of time to see if we can figure out a solution.

ABSENCES

While it is expected that all students attend class, I do not take roster. Missing class does have the implication of missing the in-class exercises.

USE OF A CURVE

Grading for this course is intended to reflect your personal knowledge and ability to create effective Data Visualization. This assessment is not referential to the performance of other students. As such, grading does not include using a curve for grades.

+/- GRADING POLICY

The final grade will use +/- as specified in the following table

GRADE BREAKS

Grade	Cutoff	Grade	Cutoff	Grade	Cutoff	Grade	Cutoff	Grade	Cutoff
A	95%	B+	87%	C+	77%	D+	67%	F	<60%
A-	90%	B	84%	C	74%	D	64%		
		B-	80%	C-	70%	D-	60%		

Table 2. Grade Breaks

COURSE OUTLINE

All instructions, assignments, readings, rubrics and essential information will be on the Canvas website at utexas.instructure.com. Check Canvas regularly. **Changes** to the schedule may be made at my discretion if circumstances require. I will announce any such changes in class and will also communicate them via a Canvas announcement. It is your responsibility to note these changes when announced, and I will do my best to ensure that you are notified of changes with as much advance notice as possible.

Week	Date	Class Topic	Show Me The Numbers	Big Book of Dashboards	Project Deliverable
1.	27-Aug	Introduction			
	29-Aug	General Concepts	1		
2.	3-Sep	Basic Statistics	2		
	5-Sep	Tables and Graphs	3-4		
3.	10-Sep	Visual Perception	5		
	12-Sep	Visual Analytics		1	
4.	17-Sep	Color Theory			
	19-Sep	Color in Visualizations	6		
5.	24-Sep	Best Practices 1	7		
	26-Sep	Best Practices 2	8		
6.	1-Oct	Graph Design. Part 1	9-10		
	3-Oct	Graph Design. Part 2	11		

7.	8-Oct	Graph Design. Part 3	12		
	10-Oct	Storytelling	13-14		
8.	15-Oct	Exam 1			
	17-Oct	Exploratory Visualization		2-5	
9.	22-Oct	Dashboard Design		6-7	
	24-Oct	Dashboard Development, Part 1		8-9	
10.	29-Oct	Dashboard Development, Part 2		23-24	
	31-Oct	Dashboard Development, Part 3		25-26	
11.	5-Nov	Dashboard Development, Part 4		27-28	
	7-Nov	Dashboard Development, Part 5		31-33	
12.	12-Nov	Dashboard Development, Part 5		34-36	
	14-Nov	Final Project Proposals			Proposal
13.	19-Nov	Final Project Progress Review			
	21-Nov	Final Project Progress Review			Design
14.	26-Nov	<i>Thanksgiving Week</i>			
	28-Nov	<i>Thanksgiving Week</i>			
15.	3-Dec	Project Presentations			Project
	5-Dec	Project Presentations			Project
16.	10-Dec	No class. Semester is over			
17.	16 Dec	Final Exam			

Table 3. Course Outline

Notice: Final Exam is MONDAY DECEMBER 16, 3:30-5:30 PM

COURSE POLICIES AND DISCLOSURES

ACADEMIC INTEGRITY EXPECTATIONS

Students who violate University rules on academic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on academic dishonesty will be strictly enforced. For further information, please visit the Student Conduct and Academic Integrity website at:

<http://deanofstudents.utexas.edu/conduct>

CONFIDENTIALITY OF CLASS RECORDINGS

Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

GETTING HELP WITH TECHNOLOGY

Students needing help with technology should contact the [ITS Service Desk](#) or the Ischool Help Desk

CONTENT WARNING

Our classroom provides an open space for the critical and civil exchange of ideas. Some readings and other content in this course will include topics that some students may find offensive and/or traumatizing. I'll aim to forewarn students about potentially disturbing content and I ask all students to help to create an atmosphere of mutual respect and sensitivity.

BASIC NEEDS SECURITY

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course, is urged to contact the Dean of Students for support. UT maintains the [UT Outpost](#), which is a free on-campus food pantry and career closet. Furthermore, if you are comfortable notifying me, please do so, as I may have additional resources I can share.

SHARING OF COURSE MATERIALS IS PROHIBITED

No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets may be shared online or with anyone outside of the class without explicit, written permission of the instructor. Unauthorized sharing of materials promotes cheating. The University is well aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to [Student Conduct and Academic Integrity](#) in the Office of the Dean of Students. These reports can result in sanctions, including failure of the course.

RELIGIOUS HOLY DAYS

By [UT Austin policy](#), you must notify me of your pending absence as far in advance as possible of the date of observance of a religious holy day. If you must miss a class, an exam, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

NAMES AND PRONOUNS

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender identity & expression, and nationalities. Class rosters are provided to the instructor with the student's legal name, unless they have added a "chosen name" with the registrar's office, which you can do so [here](#). I will gladly honor your request to address you by a name that is different from what appears on the official roster, and by the pronouns you use (she/he/they/ze, etc.). Please advise me of any changes early in the semester so that I may make appropriate updates to my records. For instructions on how to add your pronouns to Canvas, visit [this site](#). More resources available on the Gender and Sexuality Center's website, www.utgsc.org.

UNIVERSITY RESOURCES FOR STUDENTS

DISABILITY AND ACCESS (D&A)

The university is committed to creating an accessible and inclusive learning environment consistent with university policy and federal and state law. Please let me know if you experience any barriers to learning so I can work with you to ensure you have equal opportunity to participate fully in this course. If you are a student with a disability, or think you may have a disability, and need accommodations please contact Disability & Access (D&A). Please refer to the D&A website for more information: <http://diversity.utexas.edu/disability/>. If you are already registered with D&A, please deliver your Accommodation Letter to me as early as possible in the semester so we can discuss your approved accommodations and needs in this course.

COUNSELING AND MENTAL HEALTH CENTER (CMHC)

I urge students who are struggling for any reason and who believe that it might impact their performance in the course to reach out to me if they feel comfortable. This will allow me to provide any resources or accommodations that I can. If immediate mental health assistance is needed, call the Counseling and Mental Health Center (CMHC) at 512-471-3515 or you may also contact Bryce Moffett, LCSW (iSchool CARE counselor) at 512-232-2983. Outside CMHC business hours (8a.m.-5p.m., Monday-Friday), contact the CMHC 24/7 Crisis Line at 512-471-2255.

UNIVERSITY HEALTH SERVICES (UHS)

Your physical health and wellness are a priority. University Health Services is an on-campus high-quality medical facility providing care to all UT students. Services offered by UHS include general medicine, urgent care, a 24/7 nurse advice line, gynecology, sports medicine, physical therapy, lab and radiology services, COVID-19 testing and vaccinations and much more. For additional information, visit <https://healthyhorns.utexas.edu> or call 512-471-4955.

SANGER LEARNING CENTER

Did you know that more than one-third of UT undergraduate students use the Sanger Learning Center each year to improve their academic performance? All students are welcome to take advantage of Sanger Center's classes and workshops, private learning specialist appointments, peer academic coaching, and tutoring for more than 70 courses in 15 different subject areas. For more information, please visit <https://ugs.utexas.edu/slc> or call 512-471-3614 (JES A332)."

STUDENT EMERGENCY SERVICES (SES)

Student Emergency Services in the Office of the Dean of Students helps students and their families during difficult or emergency situations. Assistance includes outreach, advocacy, intervention, support, and referrals to relevant campus and community resources. If you need to be absent from class due to a family emergency, medical or mental health concern, or academic difficulty due to crisis or an emergency situation, you can work with Student Emergency Services. SES will document your situation and notify your professors. Additional information is available at <https://deanofstudents.utexas.edu/emergency/> or by calling 512-471-5017.

IMPORTANT SAFETY INFORMATION

If you have concerns about the safety or behavior of fellow students, TAs or professors, contact BCCAL (the Behavior Concerns and COVID-19 Advice Line) at <https://safety.utexas.edu/behavior-concerns-advice-line> or by calling 512-232-5050. Confidentiality will be maintained as much as possible, however the university may be required to release some information to appropriate parties.

CLASSROOM SAFETY AND COVID-19

- For any illness, students should stay home if they are sick or contagious, not only to stop the spread, but also to promote their personal wellness.
- The university will continue to provide rapid antigen self-test kits at [distribution sites](#) throughout campus. Students can receive up to four tests at a time.
- The university will provide [symptomatic COVID-19 testing](#) on campus for all students, faculty and staff.
- UHS maintains up-to-date resources on COVID, which can be found here:
 - [COVID-19 Information and Resources](#)
 - [COVID-19 Exposure Action Chart](#)

CARRYING OF HANDGUNS ON CAMPUS

Texas' Open Carry law expressly prohibits a licensed to carry (LTC) holder from carrying a handgun openly on the campus of an institution of higher education such as UT Austin. Students in this class should be aware of the following university policies:

- Students in this class who hold a license to carry are asked to [review the university policy regarding campus carry](#).
- Individuals who hold a license to carry are eligible to carry a concealed handgun on campus, including in most outdoor areas, buildings and spaces that are accessible to the public, and in classrooms.
- It is the responsibility of concealed-carry license holders to carry their handguns on or about their person at all times while on campus. Open carry is NOT permitted, meaning that a license holder may not carry a partially or wholly visible handgun on campus premises or on any university driveway, street, sidewalk or walkway, parking lot, parking garage, or other parking area.
- Per my right, I prohibit carrying of handguns in my personal office. Note that this information will also be conveyed to all students verbally during the first week of class. This written notice is intended to reinforce the verbal notification, and is not a “legally effective” means of notification in its own right.

TITLE IX DISCLOSURE

Beginning January 1, 2020, Texas Education Code, Section 51.252 (formerly known as Senate Bill 212) requires all employees of Texas universities, including faculty, to report any information to the Title IX Office regarding sexual harassment, sexual assault, dating violence and stalking that is disclosed to them. Texas law requires that all employees who witness or receive any information of this type (including, but not limited to, writing assignments, class discussions, or one-on-one conversations, or third-party reports) must report it. Before talking with me, or with any faculty or staff member about a Title IX related incident, please remember that I will be required to report this information to the Title IX Coordinator. If you would like to speak with someone who can provide support or remedies without making an official report to the university, please email supportandresources@austin.utexas.edu. For more information about reporting options and resources, visit <http://www.titleix.utexas.edu>, contact the Title IX Office via email at titleix@austin.utexas.edu, or call 512-471-0419.

Although graduate teaching and research assistants are not subject to Texas Education Code, Section 51.252, they are still mandatory reporters under Federal Title IX laws and are required to report a wide range of behaviors we refer to as sexual misconduct, including the types of sexual misconduct covered under Texas Education Code, Section 51.252. The Title IX office has developed supportive ways to respond to a survivor and compiled campus resources to support all impacted by a Title IX incident.

CAMPUS SAFETY

The following are recommendations regarding emergency evacuation from the [Office of Campus Safety and Security](#), 512-471-5767,

- Students should sign up for Campus Emergency Text Alerts at the page linked above.
- Occupants of buildings on The University of Texas at Austin campus must evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors. Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
- For more information, please visit [emergency preparedness](#).