ISYS 6645: DATA VISUALIZATION Fall 2021

Professor:	Carolina Nobre
Contact:	nobrec@bc.edu
Class Meets:	Section 1: Fulton Hall 220 Thursdays 4:30-6:50pm Section 2: Fulton Hall 115 Wednesdays 7:00-9:30pm
Office Hours:	Tue 1:00-2:30 and Fri 10-11:30 or by appointment https://bccte.zoom.us/j/3539323479
Website:	https://bostoncollege.instructure.com/courses/1625820
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Course Overview

This course is designed to provide students with the foundations and principles of data visualization to create meaningful displays of quantitative and qualitative data, facilitate managerial decision-making, and present their insights clearly in a way that will engage their audience, and teaches through many examples of compare and contrast. The course provides discussions on topics such as exploratory data analysis, visual perception and cognition, effective use of chart types and colors, visual analytics (i.e., communicating common statistical relationships such as distribution, correlation, trends, and uncertainty), best practices for visualizing typical data types, including survey and mapping data, and other visualization techniques for persuasion and effective storytelling. The conceptual discussions will be integrated with hands-on experience using popular data visualization software (i.e., Tableau).

The course material will be presented in three modules as follows:

- *Module I: Foundation for Data Visualization*
- *Module II: Principles of Visual Design and Critique*
- *Module III: Visual Analytics*

Learning Goals and Objectives

By the end of the course, students will have gained:

- An understanding of the key techniques and theory used in visualization, including visual perception, variations and uses of common chart types and other visual representations.
- Exposure to a number of common data domains and corresponding analysis tasks, including multivariate, text, survey, and cartography.

- Practical experience building and evaluating data visualization examples.

Required Readings

The required books for this course are listed below. There are also several book chapters, scholarly articles, and videos that will be available on Canvas. The books are available at the BC Bookstore, and through their website, www.bcbookstore.com. You may also purchase them online from Amazon or any other vendor. You may buy **e-books** to save paper and read them on your Desktop by using a reader app (e.g., Kindle PC).

- The Truthful Art: Data, Maps, and Charts for Communication **by Cairo, Alberto** (2016) https://www.amazon.com/Truthful-Art-Data-Charts-Communication-ebook/dp/B01BLN09U0/ref=mt_kindle?_encoding=UTF8&me=&qid=
- Practical Tableau: 100 Tips, Tutorials, and Strategies from a Tableau Zen Master **by Sleeper, Ryan**, *O'Reilly Media* (2018) https://www.amazon.com/Practical-Tableau-Tutorials-Strategies-Master- ebook/dp/B07BX5HH4Z

Optional (Recommended) Readings:

- Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations **by Berinato, Scott**, *HBR Press* (2016) https://www.amazon.com/Good-Charts-Smarter-Persuasive-Visualizations/dp/1633690709/ref=pd_sbs_14_1/142-3441629-3831238?_encoding=UTF8&pd_rd_i=1633690709&pd_rd_r=1397fd78-8c26-4e6a-ae73-fe4fc449f39d&pd_rd_w=2nEnZ&pd_rd_wg=VY2fL&pf_rd_p=52b7592c-2dc9-4ac6-84d4-4bda6360045e&pf_rd_r=Z91KCT4QJ6D9VBCM5ZHQ&psc=1&refRID=Z91KCT4QJ6D9VBCM5Z HQ
- Communicating Data with Tableau: Designing, Developing, and Delivering Data Visualizations **by Jones, Ben**, *O'Reilly Media*. https://www.amazon.com/Communicating-Data-Tableau-Developing-Visualizations- ebook/dp/B00KZ1WZY8/ref=sr_1_1?s=digital-text&ie=UTF8&qid=1547066921&sr=1-1&keywords=communicating+data+with+tableau

Required Software

The required data visualization software is Tableau. To download the latest version of Tableau Desktop, please go to the landing page below and follow the instructions.

1. Download Tableau Desktop here
2. Select each product download link to get started. When prompted, enter your school email address for *Business E-mail* and enter the name of your school for

Organization.

3. Activate with your product key: **TCQ8-B0AB-56C0-61A4-8588**
4. Already have a copy of Tableau Desktop installed? Update your license in the application: Help menu -> Manage Product Keys

Are you new to Tableau? Data Analytics for University Students guide helps you get started. You can continue using Tableau after the class is over by individually requesting your own one- year license through the Tableau for Students program.

Course Grading and Expectations

Overall course grades will be determined from the following items.

Participation: Visualizations Today, Class Discussions, Tableau in-class Graded Activity, Labs, and Meet your Professor	23%
Prep Quizzes	15%
Group Projects with Tableau: Project 1: Running a design sprint to create your first chart Project 2: Conducting exploratory data analysis to see relationships Project 3: Mapping data to reveal change over time	30%
In-class Peer Review: Project 1 Project 2	2%
Midterm Exam	30%

Class Participation: Much of your learning will occur in preparation for and participating in class discussions. You will gain little from the course unless you take responsibility for your own learning, invest in learning the software on your own, and actively engage in the collective learning process. Missing classes and/or not being active participants will adversely affect your participation grade. I keep regular notes on class participation, and I track both quality and frequency of participation. You are expected to attend all classes, be prepared for class, and participate in a meaningful and productive manner. If you have an access problem on a particular day, please notify the instructor as soon as possible. Interviews are not a valid excuse for missing class so please schedule your interviews so they do not conflict with class time. If you need to miss class, please tell the instructor as far in advance as possible.

Students are expected to prepare and participate by:

1. Reading the assigned readings each week
2. Completing the “prep quizzes” each week
3. Actively participating in class discussions, activities, and labs
4. Participating in “Visualizations Today”

***Visualizations Today*:** Before each session, 5-6 students are pre-assigned to post a visual on Canvas Discussion board. These visualizations should be collected recently and found to

be useful, misleading, creative, simple, etc. Along with visualizations, students are asked to provide a brief comment on their visualization. Other students are welcome to comment on Visualizations Today for class participation grade.

Tableau in-class graded activity: Using Tableau technical skills and principles of Data Visualizations learned in this course, you should be able to independently create visualizations in Tableau. You will be assessed on your ability to do so in an in-class activity. This will be an individual 1 hour exercise assigned to complete during class and graded for 10% of your final grade.

Prep-quizzes: Class participation is complemented with prep-quizzes for each session date. Prep-quizzes account for 15% of your final grade. Submissions are due at 12:00 pm of the day that they are due. The idea is to provide you a guideline for the class discussion. *Late submissions will not be accepted*.

Group Projects with Tableau: There will be a mandatory empirical component that you will work on as a group in this class. Inactive participation in a group will adversely affect your individual project grade. Through three major empirical assignments and a variety of assigned data sets, you will create visualizations with Tableau. These assignments are due by noon on the assigned date (Wednesdays by 12:00 pm) or as indicated by the instructor. *Late assignments will not be accepted*.

Midterm Exam: You will take an individual, in-class, closed-book exam. The exam is intended to provide an individualized opportunity to demonstrate an understanding of the concepts, principles, recommendations, and tools that are central to data visualization and their applications in real-world scenarios. The exam will include multiple-choice questions, fill-in the blank and short answer questions. I will post a quizlet to prepare for the exam. The questions will be similar to the exercise questions posted during the course as prep-quizzes. Further information will be provided in class as the exam date approaches.

Grading: This is a challenging course that allows students to demonstrate their mastery of the subject matter. In general, students in this course can expect a grading distribution as follows:

- 25-35% of students can expect to receive A's for excellent work;
- 50-70% of students can expect to receive B's for good or very good work;
- 5-15% of students can expect to receive C's or less for adequate or below work;

An average student should expect a grade of B or B+. Note that while I use this range as a

guide, the actual distribution for this course and your own grade will depend upon how well you actually perform in this course

Course Rules and Administration

As a participant of this course, you commit to the following course rules:

- Electronic devices: You are not allowed to use laptops, mobile phones, or other electronic devices during the first half of the class. Laptops and tablets may be used only for specific class activities and Tableau labs. As a courtesy to guest speakers, all computing devices must be turned off and put away during guest presentations.

- Class attendance: Class attendance and participation are required. Missing classes will adversely affect your participation grade.

- Assignment deadlines: There will not be any time extension granted on any of the assignments. There will also not be any extra credit assignments given during the course. Be sure to keep up with the exercises, project work, and other course assignments.

- Adjustments to Assignments, Schedule, and Syllabus: The scope, timing, and due date/time of any assignments, projects, homework, or any other required work may be adjusted by the instructor as needed to maximize learning opportunities for students and/or better serve the goals of the course. The syllabus may likewise be modified at the discretion of the instructor.

- Avoiding plagiarism: Students are responsible for ensuring that all outside sources used to prepare written assignments and class presentations are appropriately credited and cited.

- Response time: The instructor will typically respond to email within 24 hours. Please do not expect to receive an email response to your questions immediately during weekends.

- Academic integrity: Our learning process in this course will be highly collaborative, but be sure that individual assignments represent your own work. When collaboration is permitted on an assignment this will be clearly indicated; otherwise you should always assume that the assignment is individual in nature. Cheating, copying the work of others, talking during exams, or any other breach of academic integrity will be pursued with the utmost seriousness. If you are confused or stuck on an assignment, the best thing to do is to ask the instructor for help. Actual cases of cheating are dealt with very severely. Please refer to BC's academic integrity policy for further information: http://www.bc.edu/offices/stserv/academic/integrity.html

- Special accommodations: If you have a disability and will be requesting accommodations for

this course, please register with either Kathy Duggan (Kathleen.duggan@bc.edu) Associate Director, Academic Support Services, the Connors Family Learning Center (learning disabilities and ADHD) or Suzy Conway (suzy.conway@bc.edu), Assistant Dean for Students with Disabilities (all other disabilities). Advance notice and appropriate documentation are required for accommodations.

- Technical Support: You may call the BC Technology Help Center at (617) 552-HELP (4357), email help.center@bc.edu, live tech support chat, or visit the Technology Help website at www.bc.edu/help. Staff at the BC Help Center are always available to help you. You can get technology help regardless of where you buy your computer.

Course Schedule

The course schedule, including a list of reading assignments and deadlines, is available on Canvas and should be consulted regularly. While the exact assignments are subject to change, it should give you a sense of the topics that we will be covering during the course.