



SYLLABUS   
College of Computing and Software Engineering

School of Data Science and Analytics

DATA 3230: Data Visualization  
Fall 2024

# Course Information

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Class meeting time: *Tuesdays & Thursdays 2 – 3:15 PM*

Modality and Location: *Face to Face course; Atrium Building 251*  
*Syllabus is posted in D2L*

# Instructor Information

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Name: Austin Brown

Email: abrow708@kennesaw.edu  
Office Location: Atrium Building 347

Office phone: 470-578-7827

Office Hours: Tuesdays & Thursdays 12:30 – 1:45 PM or by appointment!  
Preferred method of communication: KSU email – abrow708@kennesaw.edu

# Course Description

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This course introduces students to the field of data visualization. The course covers basic design and evaluation principles to prepare and analyze large datasets, and standard visualization techniques for different types of data using modern data visualization software. The course prepares students to communicate clearly, efficiently, and in a visually compelling manner to a variety of audiences.

Prerequisites: A letter grade of “C” or better in STAT 1401 or DATA 1501 or STAT 2332 or STAT 3125

# Course Materials

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Required Text:

* *DATA 3230 – Data Visualization* – Austin R. Brown (<https://abrown9008.github.io/DATA-3230-Textbook/>)

Recommended Texts:

* *Communicating Data with Tableau: Designing, Developing, and Delivering Data Visualizations 1st Edition* – Ben Jones; ISBN: 978-1449372026
* *R Graphics Cookbook: Practical Recipes for Visualizing Data 2nd* *Edition* – Winston Chang; ISBN: 978-491978603 (<https://r-graphics.org/>)
* *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 2nd Edition* – Hadley Wickham, Mine Çetinkaya-Rundel, & Garrett Grolemund; ISBN: 978-1492097402 (<https://r4ds.hadley.nz/>)

Class GitHub Repository: <https://github.com/abrown9008/DATA-3230-Data-Visualization>

Technology requirements: Consistent and reliable access to a computer, the internet, the course D2L website, a GitHub account (see instructions for signing up [here](https://github.com/signup?ref_cta=Sign+up&ref_loc=header+logged+out&ref_page=%2F&source=header-home)) and access to RStudio (via Posit Cloud – see instructions for signing up for an account if you haven’t already [here](https://posit.co/products/cloud/cloud/))

# Learning Outcomes

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Upon completion of this course, students should:

1. List and compare the different tools and technologies used for data visualization.
2. Describe the variety of data visualization techniques and describe their appropriateness for different data types and visualization goals.
3. Explain the principles of designing effective data visualizations.
4. Design and implement useful data visualizations for data understanding and communication.
5. Utilize existing tools to render data visualizations.

# Course Requirements and Assignments

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***Assignments and Point Totals:***

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| **Assignment** | **Points** |
| VizLabs | 100 |
| In-Class VizLabs | 100 |
| Final Project | 100 |
| Total Points | 300 |

***Grading Policy:***

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| --- | --- |
| A | ≥ 270 points |
| B | 240 – 269 points |
| C | 210 – 239 points |
| D | 180 – 209 points |
| F | < 180 points |

**VizLabs:** Throughout the course of the semester, you will be assigned three assignments called “VizLabs.” In each lab, you will be asked to take a provided dataset (or datasets) and create a visualization or visualizations bearing in mind the needs of the fictitious audience to whom this will be presented. Labs will be evaluated on the appropriateness, completeness, and professionalism of the chosen visualization or visualizations.

**In-Class VizLabs:** Since our class is going to be largely “flipped,” this means class time is going to be used to actually work on producing visualizations. To this end, each VizLab will have an associated In-Class VizLab which we will work on together and will help you complete the Out-of-Class VizLab. In the In-Class VizLabs, you will be asked to not only produce visualizations, but you’ll also be asked to respond to questions which demonstrate your conceptual understanding of topics surrounding data visualizations. For instance, you may be asked to compare and contrast different methods for visualizing quantitative data in addition to explaining in which scenarios each may appropriate. You may also be asked to evaluate a visualization and provide feedback on how it may be improved.

**Final Project:** At the beginning of the semester, you will be asked to identify a publicly available dataset which will be used to answer some research question or questions. With this dataset, you will perform various appropriate analytical methods you have learned in prior courses in addition to visualizations learned in this course. At the end of the semester, and in lieu of a final exam, you will be asked to present your work to the class in a 10-15 minute virtual presentation. To ensure everyone is on track for successful completion of this project, there will be required “check ins” throughout the term where progress can be evaluated and questions can be answered. This project will be evaluated on professionalism, appropriateness of the methods utilized, and correctness of the interpretations.

# Course Policies

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***Attendance and Participation:***

* Students are expected to show up on time to every class period ready to participate. Much of the learning taking place in this course will be done through hands on, in-class examples. Thus, habitual absenteeism or tardiness will inhibit the acquisition of the important skills and concepts necessary for your success in the course.

***Feedback Expectations & Response Time:***

* All assignments will be evaluated within a week’s time, unless otherwise noted.
* Emails will generally be responded to within 24 hours during the week. Emails sent over the weekend will be responded to on Monday.

***Instructor Expectations:***

* Each student is responsible for maintaining the pace of the course and turning in assignments on time. Students should utilize the course schedule, calendar, and task list to keep up with the course lectures and assignments.
* All work turned in is expected to be complete and professional. All assignments should be well organized and easy to follow. All written work should observe proper grammar, spelling, and sentence structure. If applicable, all visualizations should be well-formatted with descriptive titles and labels. Points will be deducted for sloppy unprofessional work.
* For content related questions, students should use the “Discussion” tab in D2L. Students must include the subject in the forum title, or the post may be deleted. In addition to the instructor, students are encouraged to respond to other student’s questions, if they can be of assistance. Please check the discussion titles, to make sure your question has not already been answered before starting a new thread. Please be as descriptive as possible with your questions and include pictures, references, screenshots, etc., when applicable.
  + You can also start a class GroupMe, but make sure to add me so I can be in the loop too ☺
* For personal questions, students should reach out to the professor directly at [abrow708@kennesaw.edu](mailto:abrow708@kennesaw.edu) and correspond through email or set up a meeting.
* The instructor will use email AND D2L to communicate important information to both individual students and the class as a whole. Therefore, the instructor expects students to check their D2L and email accounts on a **daily** basis.
* Students are highly encouraged to retain copies of all graded materials that are returned for the duration of the semester. If there is a discrepancy between the instructor's records and those of the student, the student will have to provide the appropriate documentation. The burden of proof is on the student.

Please note: all work submitted to the instructor must be an authentic product of each individual student. If evidence arises that a student has submitted someone else's work as their own, cheated on an assignment, or has committed some other academic violation of the University Code of Conduct, the student will receive an F in the class and be referred to the University Judiciary Program for formal charges.

# Department or College Policies

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***Academic Integrity Concerning GroupMe, Group Chats, Group Texts, and Other Technology-Related Group Conversations***

Kennesaw State University encourages students to use technology to help them learn. However, it is important for students to understand the difference between appropriate collaboration and inappropriate uses of technology for plagiarism and cheating. Students who participate in group texts or other group conversations through mobile apps such as GroupMe or WhatsApp are subject to consequences if any member of that group is found to plagiarize material or facilitate cheating. By virtue of membership in the conversation or participation in the group, any student who is part of a group conversation where cheating or plagiarism occurs may receive the same penalty as students who actively cheat within the group.  Additionally, any students who are found to purchase, sell, or otherwise distribute or collect existing course material are also subject to academic dishonesty hearings. This includes use of Quizlet, Hero, and student organization test files.

# Institutional Policies

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[Federal, BOR, & KSU Required Syllabus Policies](https://cia.kennesaw.edu/instructional-resources/syllabus-policy.php)

# KSU Student Resources

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This link contains information on help and resources available to students: [KSU Student Syllabus Resources](https://cia.kennesaw.edu/instructional-resources/syllabus-resources.php)

# Course Schedule

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| **Weeks** | **Concepts Covered** |
| 1 | **Course Introduction:** Accessing Posit Cloud, Navigating RStudio, and R Programming Basics |
| 2 | **Problems & Principles in Communicating Data** |
| 3-6 | **“How much?” or “How Many?”:** An introduction to bar charts and dot charts including how to add annotations and modify aesthetic elements of the visualizations such as titles, legends, color, and size. |
| 7-9 | **Variation and Uncertainty:** Understanding and generating visualizations (including line charts) used to display changes in values of variables over time and between groups, visualizing confidence intervals, and an introduction to control charts. |
| 10-11 | **Multiple Quantities:** Understanding various visualizations (primarily the scatterplot) used for assessing associations between variables and how to generate them, adding chart annotations, faceting graphics by a grouping variable, adding background images, and using filtering as a method for exploratory data analysis. |
| 12-14 | **Special Topics:** Building dendrograms and heatmaps which can be used to show relationships between observations; dynamic visualizations |
| 15 | **Final Project Presentations!!** |