

Florida State University College of Business  
Department of Business Analytics, Information Systems, & Supply Chain

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ISM 5419: Data Visualization  
Spring 2024  
RBA 201, M/W 1:20pm – 2:35pm

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## Instructor Information

**Instructor:** Matt Baucum

**Office:** RBB 152

**Email:** [mbaucum@fsu.edu](mailto:mbaucum@fsu.edu)

**Office hours:** Monday & Wednesday, 2:45pm – 4:15pm. Virtual/Zoom office hours also available by appointment.

**Preferred communication method:** Email [mbaucum@fsu.edu](mailto:mbaucum@fsu.edu)

## General Course Information

**Description:** This course will survey the principles and techniques of sound data visualization. This will be accomplished through rigorous analysis and critique of existing data visualizations, and producing novel data visualizations with commonly-used software platforms (Tableau and Power BI).

**Learning Objectives:** After this course, students will be able to:

- Articulate the types of visualizations that *are* and *are not* appropriate for visualizing certain types of data
- Articulate common data visualization pitfalls and why these design decisions should be avoided
- Intelligently critique data visualizations, including (1) describing the scales and aesthetics used to present the data, and (2) proposing suggestions for how the visualization could more clearly or succinctly communicate information
- Reproduce complex data visualizations using both Tableau and Python
- Create a variety of visualizations from 'scratch' that tell a compelling and clear story about their data, using both Tableau and Python

**Recommended Textbooks (not required, but great resources):**

- Visual Analytics with Tableau (Alexander Loth, 1<sup>st</sup> edition)
- Fundamental of Data Visualization (Wilke); full text available at [this link](#)

## Required Software/Hardware:

- Tableau (will need to request 1-year student license)
- Power BI Desktop

## The '3A' Rule

This section appears near the top of the syllabus because it applies to *every* visualization you will critique or develop in this class. Any visualization used in an assignment (including in-class visualization critiques, homework assignments, and the final project) must have **at least three *aesthetics* or *additional aggregations***. An 'aesthetic' is a visual feature that is used to represent one variable. An 'additional aggregation' is a summary measure for a variable that is added to a chart for context (e.g., adding a trend line to a scatter plot, or adding a median reference line to a bar chart). Under this rule, here are some examples of visualizations that **are** and **are not** acceptable for assignments:

### Examples that meet the 3A rule:

- Scatter plot with a trend line → x-position (aesthetic) + y-position (aesthetic) + trend line (addl. aggregation)
- Stacked bar chart → x-position (aesthetic) + y-position (aesthetic) + bar colors (aesthetic)
- Side-by-side strip plots with median reference lines: x-position (aesthetic) + y-position (aesthetic) + median line (addl. aggregation)
- Tree map of country populations with cells colored by region: Size (aesthetic) + color (aesthetic) + detail/position (aesthetic). Note: This is an example where two levels of detail (country and region) for the same variable (country) can count as separate aesthetics/variables.
- U.S. map with counties shaded by population density: Latitude (aesthetic) + Longitude (aesthetic) + color (aesthetic)

### Examples that DO NOT meet the 3A rule:

- Simple x-y scatter plot → x-position (aesthetic) + y-position (aesthetic)
- Simple line chart → x-position (aesthetic) + y-position (aesthetic)
- Overlapping histograms → x-position (aesthetic) + color (aesthetic)
- Simple bar chart → x-position (aesthetic) + y-position (aesthetic)
- Simple pie chart → Angle (aesthetic)
- Simple map with locations/destinations marked (but no color/size aesthetic used) → Latitude (aesthetic) + longitude (aesthetic)

## Homework Assignments

Homework assignments ask you to find a data visualization online and do one of the following:

- Provide a full critique of the visualization (i.e., describe which aesthetics or aggregations were used, what could have been improved, other visualization types that could have been used, etc.)
- Reproduce the visualization in Tableau
- Reproduce the visualization in Power BI

Students must ‘sign up’ for the visualizations they plan to use on Canvas, so that no two students use the same visualizations across any assignments. Students must turn in at least one submission from each of the above categories (i.e., at least one critique assignment, at least one Tableau assignment, and at least one Power BI assignment).

Unlike with quizzes, the lowest homework score is *not* dropped. If you are unable to turn in any homework assignment due to extenuating circumstances, you may ‘double up’ one of your other homework assignments. That is, you may do two assignments (with two separate visualizations) and turn them in on the same day, and each assignment will be graded separately. Note that this option is only available if you *do not turn in* one of the other homework assignments. It may not be used to ‘overwrite’ a lower grade on another completed homework assignment.

## Final Project

The final project is your chance to create your *own* data visualizations (rather than critiquing or reproducing somebody else’s) for a topic of your choosing. The final deliverable will be a slide deck (made in PowerPoint, Canva, or other presentation software) which uses data visualization to tell a story about your chosen topic. Details about the final project are posted on Canvas.

## Grading

Grades will be weighted as follows:

Grade Category	Description	Weight
Attendance	Attending class and participating in visualization activities. Students will be allowed three free (unexcused) absences before attendance points are deducted.	5%
In-class visualization critique	Student-led in-class discussion of a visualization of their choosing. Must be accompanied by online submission before date of critique.	5%
Homework assignments	Students will critique or reproduce visualizations they find online. All assignments are weighted equally. <b>Lowest homework score is not dropped.</b>	35%
Quizzes	Biweekly quizzes over topics covered in class. <b>Lowest quiz score will be dropped.</b>	35%
Final Project	Students will design a visualization-driven presentation on a topic of interest. See ‘Final Project’ section for details. 5% of each student’s final grade will depend on their completion of a mid-semester project milestone, and 15% will depend on the final deliverable.	20%

This course uses the following grade distribution. Please note that **grades are calculated to the second decimal point and are not rounded up.**

Grade	Range (%)	Grade	Range (%)
A	93.00 - 100	C	73.00 – 76.99
A-	90.00 – 92.99	C-	70.00 – 72.99
B+	87.00 – 89.99	D+	67.00 – 69.99
B	83.00 – 86.99	D	63.00 – 66.99
B-	80.00 – 82.99	D-	60.00 – 62.99
C+	77.00 – 79.99	F	0 – 59.99

## Attendance/Absence Policy

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid written excuse. Consideration will also be given to students whose dependent children experience serious illness. For more information on requesting excused absences for religious holidays, see [FSU’s religious holiday policy](#).

Students are allowed **three unexcused absences** that will not count towards their attendance grade, to allow students to miss classes for other reasons (e.g., travel, non-documented family emergencies, feeling unwell, mental health days).

## Policy on AI Tools (including Large Language Models, e.g., ChatGPT)

This course employs a ‘moderate AI use’ policy, in which students are allowed to use AI-based tools (such as ChatGPT or other generative language tools) for *homework and project assignments*, but **not for quizzes**. The use of a large language model during a quiz may result in the student receiving a 0% on the quiz (which will not be dropped from the student’s grade). The instructor will ‘walk the room’ during quizzes to ensure students are not using AI-based tools, and will check students’ free-response answers against output from ChatGPT when grading.

In general, students’ homework and project assignments will not be penalized for the *use* of AI-based tools, but can be penalized based on the *quality and accuracy* of any AI-generated text or code used in such assignments.

## Policy for Late Homework

The policy for late homework is as follows: Students can turn in homework assignments one day (24 hours) late for up to 85% credit, and two days (48 hours) late for up to 70% credit. No credit will be given for assignments turned in more than two days late. **This policy does not apply to the final project – final projects must be turned in on time to receive credit.**

## Collaboration and Academic Integrity

Assignment Type	Collaboration Policy	Penalty for Violating Policy
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Quiz	Collaborating with other students on quizzes is strictly prohibited – quizzes are meant to test each student’s ability to recall important concepts without help from their peers.	Students who violate this policy may receive a 0% on the quiz in question – <b>and this 0% is not eligible to be dropped from the quiz average.</b>
Homework	Collaboration (i.e., discussing your work with others) is allowed, but students’ submitted assignments <b>must be their own work.</b> You may not share Power BI or Tableau workbooks with other students, and you may not submit workbooks that you receive from other students. Two students may not use the same visualizations for homework assignments.	Students who violate this policy may receive a 0% on the homework in question- and that homework is not eligible to be replaced by ‘doubling up’ on another homework.
Final Project	Same policy as for homework. Collaboration is allowed, but students may not share Power BI code or Tableau workbooks (except between project partners). Students can look at other students’ projects for ideas or inspiration, but the style, structure, and ordering of their slide deck’s visualizations should be original.	Students who violate this policy may receive a 0% on the final project.

## Emergency Preparedness

Should class be disrupted due to extreme weather (hurricanes, severe thunderstorms) or other emergencies, I will communicate clearly with all students about subsequent adjustments to our class schedule.

## Other University Policies and Resources

**Academic Honor Policy:** The Florida State University Academic Honor Policy outlines the University’s expectations for the integrity of students’ academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to “. . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University.” (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>).

**Academic Success:** Your academic success is a top priority for Florida State University. University resources to help you succeed include tutoring centers, computer labs, counseling and health services, and services for designated groups, such as veterans and students with disabilities. The following information is not exhaustive, so please check with your advisor or the Department of Student Support and Transitions to learn more.

**Americans With Disabilities Act:** Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Office of Accessibility Services; and (2) request a letter from the Office of Accessibility Services to be sent to the instructor indicating the need for accommodation and what type; and (3) meet (in person, via phone, email, skype, zoom, etc...) with each

instructor to whom a letter of accommodation was sent to review approved accommodations. This syllabus and other class materials are available in alternative format upon request. For the latest version of this statement and more information about services available to FSU students with disabilities, contact the:

Office of Accessibility Services  
 874 Traditions Way  
 108 Student Services Building  
 Florida State University  
 Tallahassee, FL 32306-4167  
 (850) 644-9566 (voice), (850) 644-8504 (TDD)  
[oas@fsu.edu](mailto:oas@fsu.edu)  
<https://dsst.fsu.edu/oas>.

**Confidential campus resources:** Various centers and programs are available to assist students with navigating stressors that might impact academic success. These include the following:

<i>Victim Advocate Program</i> University Center A, Room 4100 (850) 644-7161, Available 24/7/365, Office Hours: M-F 8-5 <a href="https://dsst.fsu.edu/vap">https://dsst.fsu.edu/vap</a>	<i>Counseling &amp; Psychological Services</i> Askew Student Life Center, 2ndFloor 942 Learning Way (850) 644-8255 <a href="https://counseling.fsu.edu/">https://counseling.fsu.edu/</a>	<i>University Health Services</i> Health and Wellness Center (850) 644-6230 <a href="https://uhs.fsu.edu/">https://uhs.fsu.edu/</a>
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## Course Calendar

Day	Date	Topic	HW Due	Quiz (in-class)
M	1/8	Intro to course		
W	1/10	Aesthetics & scales		
M	1/15	MLK Day – No class		
W	1/17	Amounts lecture + Bar charts (Tableau)		
M	1/22	Point + lollipop charts (Tableau)		
W	1/24	Point + lollipop charts (Tableau, <b>self-guided</b> )		Quiz 1 (Aesthetics/scales)
M	1/29	Bar charts + waterfall charts (Power BI)		
W	1/31	Bar charts + waterfall charts (Power BI, <b>self-guided</b> )	HW1	
M	2/5	Distributions lecture + Strip plots/box-whisker		
W	2/7	Strip plots + box-whisker (Tableau, <b>self-guided</b> )		Quiz 2 (Amounts)
M	2/12	Violin plots + KDE (Power BI)		
W	2/14	Violin plots + KDE (Power BI, <b>self-guided</b> )		
M	2/19	Proportions lecture + tree map/pie charts (Tableau)		
W	2/21	Tree map/pie chart (Tableau, <b>self-guided</b> )	HW2	Quiz 3 (Distributions)
M	2/26	Sunburst charts (Tableau)		
W	2/28	Sunburst charts (Tableau, <b>self-guided</b> )		
M	3/4	Sankey diagram (Power BI)		

W	3/6	Sankey diagram (Power BI, <b>self-guided</b> )		Quiz 4 (Proportions I)
M	3/11	Spring Break – no classes		
W	3/13			
M	3/18	Cascade chart (Tableau)		
W	3/20	Cascade chart (Tableau, <b>self-guided</b> )	HW3	
M	3/25	Change over time lecture + Line/area charts (Tableau)		
W	3/27	Line/area/ribbon charts (Power BI, <b>self-guided</b> )		Quiz 5 (Proportions II)
M	4/1	Phase plots (Tableau)		
W	4/3	Phase plots (Tableau, self-guided)	HW4	
M	4/8	Radial time series charts (Power BI)		
W	4/10	Radial time series charts (Power BI, self-guided)		
M	4/15	Maps lecture + choropleth (Tableau)		
W	4/17	Choropleth + symbol maps (Power BI)		Quiz 6 (Change over time)
M	4/22	Hex maps (Tableau)		
W	4/24	Project work time	HW5	
<b>Final project due on Tuesday 4/30/2024 @ 11:59pm</b>				