WESTERN KENTUCKY UNIVERSITY
Gordon Ford College of Business

BDAN 430 Data Visualization
Course Syllabus

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Office Hours
All by appointment but my hours are very flexible.
The best method of reaching me is via email.
*I typically respond to email within a few hours, Monday-Friday. I will do my best to answer your emails, even if it is on the weekend or last minute on due dates.

Summary
This course provides an introduction as well as hands-on experience in data visualization. It introduces students to design principles for creating meaningful displays of quantitative and qualitative data to facilitate managerial decision-making.

Course Objectives
- Provide an overview and brief history of the practice of data visualization
- Introduce students to the key design principles and techniques for visualizing data
- Develop an understanding of the fundamentals of communication and alignment around concepts that are required for effective data presentation
- Provide an overview and develop an introductory level of competency on the use of several available software tools that can be used for data visualization
- Allow for project-based opportunities to identify, understand, analyze, prepare, and present effective visualizations on a variety of topics

Course Prerequisites
- General computer skills and a familiarity with charting tools like Microsoft Excel are necessary, along with access to the Internet for research and data gathering.
- Direct access to a computer on which the student can install software is highly recommended (see *Required Software* below)
- An understanding of basic charting and statistical terms and practices will be helpful, but not required.

Course Materials
There is no textbook for the course. Everything you need for class will be posted on Blackboard. All materials will be posted ahead of time. I recommend you check Blackboard frequently.

Student Outcomes
After taking this course, students should be able to collect and process data, create an interactive visualization, and use it to demonstrate or provide insight into a problem, situation, or phenomenon.

Moreover, students should have the basic knowledge needed to critique various visualizations (good and bad), and to identify design principles that make good visualizations effective. Students should also have a basic understanding of some of the challenges present in making data understandable across a wide range of potential audiences.

Finally, students will have the opportunity to demonstrate their own skills in identifying a visualization that can be improved, completing their own design and/or analysis on the underlying data, and working to publish or promote acceptance of their presentation.

Course Format

Students will read class material, study best and worst practices, compare and contrast real-world examples, engage in problem solving, and participate in discussions related to the course material. Students will also practice applying the techniques and best practices discussed to real-world problems.

Required Software

A significant amount of time that students spend completing their assignments will involve the use of visualization software. Instruction will be focused and directed based on the capabilities/features of:

- Tableau Desktop Professional (TFT License), Student License or Tableau Public
- Microsoft Excel - Optional
- R, R Studio and Shiny - Optional

Students will be able to learn the basic features of one or more of these through training videos that are posted in Blackboard, self-directed studies or by using available resources online. The instructor is also willing to help with specific questions or techniques as needed.

A fully licensed version of Tableau Desktop is made available to each student for the duration of the class, or if preferred, the student may use the freely available Tableau Public software for non-proprietary and non-confidential data.

Expectations of Students

Students are expected to prepare and participate by:

1. Reading scheduled assignments each week
2. Participating in class discussions posted on Blackboard
3. Completing the assigned homework projects by the due date

Students are expected to complete each test, exam, homework, and all other assignments independently. The student's submissions must represent his or her individual work, and citations must be provided where content from other sources is referenced. Also, you may not re-use a data set from one project to another; you must start with a completely new data set each time.

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Performance Evaluation

Course grades will be determined as follows:	Number	Points Each	%	Points
1) Conceptual Assignments	5	20	10%	100 pts
2) Walkthrough Assignments	9	20-60	45%	450 pts
3) Independent Assignments	3	100	30%	300 pts
4) Final Project - Final Interactive Data Visualization and Presentation	1	150	15%	150 pts
Total:			100%	1,000 pts

Grading Scale

900 - 1000	A
800 - 899	B
700 - 799	C
600 - 699	D
Below 600	F

All students have the same opportunity to earn points in the course. Any <u>questions regarding grading</u> must be addressed within one week of return of the graded assignment, quiz or exam to the student.

Assignments

<u>The conceptual assignment</u> involves a comprehensive review of the concepts covered during our class sessions. It requires exploring the core principles and theories discussed to deepen understanding and reinforce theoretical foundations.

<u>The walkthrough assignment</u> necessitates a step-by-step exploration of Tableau skills. Following detailed instructions, this task focuses on practical application, allowing us to develop hands-on proficiency in utilizing Tableau software.

<u>The independent assignment</u> serves as an opportunity to further refine our skills through self-guided practice. These assignments encourage us to apply the knowledge acquired in class and during walkthroughs independently. By working on exercises aligned with our previous practices, we aim to cultivate a heightened level of competence in utilizing Tableau for data visualization and analysis.

Late Assignments

Late assignments will receive a deduction of 5% per day, beginning with a 5% deduction for assignments turned in past the date and time due. Assignments more than 7 days late will not be accepted.

Adjustments to Assignments, Schedule, and Syllabus

The scope, timing, and due date/time of any assignments, projects, homework, exams, 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.

Any adjustments will be communicated to students in class and on Blackboard with as much advance notice as possible.

GRADING RUBRICS for BDAN 430 Visualization, Project, and Assignments

Criteria	100% – Outstanding	90% – Proficient	80% – Basic	70% (or lower) - Below Expectations
OBJECTIVE				
Completed assignment per requirements	All portions of the assignment, including presentations, data preparation, and visualizations were attempted and submitted. This is a pass / fail component. All or no points are awarded.			
Data is appropriate and sufficient for the analysis	The data set chosen or used by is appropriate, correct, and sufficient to support the thesis of the analysis.	Data is appropriate but minor data issues may be present or enhancements may be needed for a proper analysis.	Data is related but not sufficient to support the analysis, or significant data issues prevent a clear reading of the results.	Data has little or no relation to the topic being explored, errors will lead to incorrect conclusion, and/or data issues make the analysis unusable.
Headers, directions, citations, and visual cues are given as guides	Clear direction is provided. Visual cues, tooltips, and citations are consistently and correctly employed to inform and guide.	Header, footers, and instructions are present, but visual cues may be missing or could be improved.	The user must self-discover functionality. Headers and footers may be missing. Difficult to know what to do.	The user has little or no indication of how to engage. Directions are missing on clear. Missing headers and footers for context and meaning.
Basic visualization rules and best practices are consistently applied and demonstrated	Chart types are suitable and best options for the analysis. All axes and text are treated appropriately. The application of color is correct and clearly conveys meaning.	Chart types chosen are acceptable, but axes may be cluttered or have rotated text. Color choices communicate meaning but can be improved.	Charts incorrectly used for the purpose intended. Axes are difficult to read and detract from understanding. Color used in a distracting or unsuitable manner.	Difficult to understand what is intended with the chart and data. Color actively distracts and confuses. Chart junk dominates the visualization and the meaning is unreadable.
The visualization allows the user to conduct the intended analysis	The visualization facilitates quick cognition and leading to a fact-based conclusion or assertion.	Study is required to interpret the data and how it applies to the thesis of the analysis.	The visualization does not directly address the topic or relies on presentation support.	The visualization is completely inappropriate and cannot be used to conduct the intended analysis.
SUBJECTIVE				
Viz is clean, clear, concise, captivating (Shaffer 4 C's)	The 4Cs are well represented; the visualization is clear, clean, concise, and captivating.	Aspects of the 4Cs are apparent; opportunity exists for further enhancement.	Multiple aspects of the 4Cs are missing, or have not been well addressed in the visualization.	Significant or complete disregard for the guidance present in the 4Cs, resulting in a poor visualization.
Attractiveness and attention to design and details of craft	Fonts choices are conscious and consistent, proper grammar and spelling is used, and choice of position, size, and emphasis integrate elements into a visually appealing and engaging whole.	Visualization shows thought and planning, and most aspects work in harmony. May exhibit minor issues with spelling, alignment, or sizing mismatched with importance.	Visualization appears sloppy and may be difficult to understand as a coherent whole. Multiple issues with spelling, font consistency, positioning, or other distracting characteristics.	Little or no apparent thought or given and visualization comes across as disorganized. May be visible through numerous spelling or grammar issues, poor alignment and positioning choices inappropriate font use, etc.
The visualization is usable and actionable (Duell Rules)	The visualization is targeted to the audience, the story is evident, and the conclusion or action required is clearly apparent. No additional interpretation is needed.	There is a clear message or story conveyed, but the action or conclusion that should be drawn is not definitive. May require interpretation.	The visualization suggests some possibilities, but does not lead to clarity of understanding and therefore action is not possible.	No apparent message or relevancy to the user; no actions can nor should be taken based on the analysis.
Quality, integrity, and impact of the findings and analysis	The analysis shows a level of quality, integrity, and competency that makes the viz impactful, generating a high level of trust.	The overall conclusions of the analysis seem to be sound, with support by anecdotes or additional evidence.	The analysis shows a trend or suggests a result, but is not trustworthy because of errors in process, omission, or scope.	The analysis appears to be poorly conducted, greatly compromising the integrity of some or all of the visualization.
Overall effectiveness of communication and presentation	The visualization (or presentation) is delivered in a convincing way that demonstrates confidence, competency, and thoroughness.	Delivery provides a strong argument and is well supported; minor details should be vetted and affirmed.	The presentation and communication leaves concerns or lingering lack of clarity. Work required to review and confirm.	The communication and presentation results in confusion and low level of confidence in the analysis, requiring a significant or complete re-do.