School of Computer Science and Information Systems
44-613 Data Visualization (3 hours)
44-413 Visualization (3 hours)
Fall 2024

Instructor: Dr. Ajay Bandi
Office hours: M, W: 09:30 a.m. to 10:00 a.m.
                M, W, F: 02:00 p.m. to 04:00 p.m.

Office: CH 2250
Email: ajay@nwmissouri.edu

Prerequisites: Coursework equivalent to general statistics and programming.

Textbook and supplementary materials: No textbook is required; all the materials will be posted in Northwest Online.

Course description: This course covers the design and development of exploratory diagrams and graphics for various data sets. The course may include concepts such as chart and graph design, networks, topological graphs, display of multi-dimensional data, effective use of space and color, animations, interactive visualizations, mapping, cartography, web data acquisition, and advanced visualization tools.

Learning Outcomes:

Student learning outcomes	Assessment methods
1. An ability to communicate effectively with a range of audiences	Grades on individual presentation, team presentation, writing worksheets on tools and class participation.
2. An ability to use current techniques, skills, and tools necessary for computing practice.	Grades on assignments, worksheets, individual presentation, and a team project.
3. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs	Grades on in class activities, worksheets, assignments, and a team project.
4. An ability to foster diversity, equity, and inclusion.	Scores on team presentation and class participation.
5. An ability to function effectively on teams to accomplish a common goal.	Team and individual scores on final project presentation and class participation.
6. Understand and develop leadership traits including accountability, integrity, and commitment.	Team and individual scores on project presentation, attendance, punctuality, and academic integrity.

In addition, after successfully completing this course student will be able to:
- ➢ Understand foundation of data visualization, identify, and apply data visualization techniques, skills, and tools necessary for computing practice.
- ➢ Generate word clouds using qualitative data visualization techniques.
- ➢ Analyze, clean data sets, and generate various diagrams, charts or graphs using Microsoft Excel
- ➢ Introduction to JavaScript library, D3.js to visualize data in web pages.
- ➢ Design and create interactive dashboards & storyboards using Tableau for decision making.
- ➢ Enhance teamwork and oral & written communication skills.

Instructional methods: Instructional methods include lectures, practical demonstration, classroom practice, class projects, individual projects, and interactive question and answer sessions.

Graded course requirements:

Category	Points
Worksheets	160
Assignments	85
Presentations	50
Final Project	50
Quizzes	60
Class Participation/Miscellaneous	15
Total	420

Grading scale:

Undergraduate Credit (44-413)	
Percent Range	**Grade**
88-100%	A
>= 78% and < 88%	B
>= 68% and < 78%	C
>= 58% and < 68%	D
below 58%	F

Graduate Credit (44-613)	
Percent Range	**Grade**
90-100%	A
>= 80% and < 90%	B
>= 70% and < 80%	C
>= 60% and < 70%	D
below 60%	F

Tentative Course outline/major topics studied:

Modules	Weeks	Topics
Module 1	Week 01	Course Orientation Introduction to Data Science
	Week 02	Business Intelligence Framework Introduction to Data Visualization Types of Data Visualization
Module 2	Week 03	Forming goals Visualizing data using MS Excel
	Week 04	Relationships Advanced charts in Excel
Module 3	Week 05	Advanced charts in Excel(continuation) Dashboards in Excel
	Week 06	Dendrograms Visualizing data using d3.js
Module 4	Week 07	Tableau Installation Introduction to Tableau
	Week 08	Calculated Fields & Maps in Tableau Generating Dual Layer Map in Tableau Live Data & Map Box Implementation in Tableau
Module 5	Week 09	Groups, Sets & Filters in Tableau Lollypop chart in Tableau Dumbbell chart in Tableau.
	Week 10	Connecting to Tableau Online Connecting to Oracle Server in Tableau
Module 6	Week 11	Dashboards and Stories in Tableau Trend Lines, Reference Lines and Forecast in Tableau
	Week 12	Divergent Chart in Tableau
Module 7	Week 13	Analyzing survey data Data Science Lifecycle Data Extraction & Data Cleaning
	Week 14	Introduction to Microsoft Power BI Individual Presentations

Note: Course schedule is subject to change with instructor notification and students will be responsible for abiding by these changes.

Academic Calendar: http://www.nwmissouri.edu/academics/calendar.htm
Final Exam Schedule: Tuesday, December 10, 2024, from 2:00 to 4:00 PM
http://www.nwmissouri.edu/registrar/finals.htm

Attendance: This course will have many in-class activities, so attendance is strongly suggested. Some in-class exercises may have points associated with them and may not be announced in advance. A student who misses such an exercise due to an unexcused absence will not be allowed to make it up and will receive a zero. For an absence to be excused, written documentation must be provided and approved by the instructor abided by the MS-ACS attendance procedure. Excused absences include attendance at a university-sponsored event (documented with an excuse signed by the university sponsor prior to the event) or by circumstances considered adequately extenuating by the course instructor. It is the responsibility of the student to promptly notify his or her instructor when unable to attend class. Please refer to the university policy on attendance at https://www.nwmissouri.edu/policies/academics/Attendance.pdf

Late Submission Policy for assignments: Each assigned, graded activity will have a due date posted and is expected to be completed by the due date. All the submissions must be submitted through Northwest Online. The score for late submissions will be 0 grade and submissions with incorrect file extensions and wrong file submissions will result in a 0 grade.

Artificial Intelligence Engines: Generative AI engines are fast becoming important tools to help improve various personal, professional, and educational tasks. Specifically for this course, the submission of academic work created by a generative AI engine is not allowed. All submitted coursework must be your own work. The goal is for you to learn and understand the course content. AI engines are a tool which can help facilitate the learning process. The understanding of course content is assessed by completing the required coursework. Your understanding cannot be gauged if AI-generated material is used.

Quizzes and In-class Activities: There may sometimes be short quizzes or in-class activities in class, usually worth five to ten points or less. These quizzes or activities will not always be announced in advance.
They will usually be given at any point of class time. If you arrive late or miss a quiz or an activity due to an unexcused absence, you will receive a grade of zero on the quiz or activity. Different sections may have quizzes or activities on different days.

Arriving late for class: Students are expected to be on time for each class period.