

CS 3260: INTRODUCTION TO DATA VISUALIZATION WITH AI

<i>Semester Hours:</i>	3.0	<i>Contact Hours:</i> 3
<i>Coordinator:</i>	Jong Kwan "Jake" Lee	
<i>Text:</i>	None	
<i>Author(s):</i>	VARIED	
<i>Year:</i>	Varied	

SPECIFIC COURSE INFORMATION

Catalog Description:

This course provides an introduction to the fundamentals of data visualization, with an emphasis on creating interactive visualizations. Students will learn to design dynamic visualizations from scratch, focusing on effective data representation, interactivity, and storytelling techniques. The course also explores how to enhance visualizations with AI-powered insights, enabling users to engage with data in more meaningful and impactful ways. Through hand-on projects and practical design experiences, students will develop the skills needed to create engaging, user-friendly visualizations. Prerequisites(s): A grade of C or higher in CS 2020 or CS 2200. Approved for distance education.

Course type: **ELECTIVE**

SPECIFIC COURSE GOALS

- Implement interactive visualizations by applying data representation techniques
- Utilize a generative AI API to enhance visualizations for improved user interaction
- Create visual narratives by designing dashboards and integrating storytelling techniques
- Develop AI-enhanced visualizations by integrating interactivity, data insights, and user engagement features.
- Assess ethical issues such as bias in AI-generated content and usability challenges in interactive visualizations

LIST OF TOPICS COVERED

- Introduction to Visualization Tool/System and Fundamentals of Data Visualization
 - Overview of data visualization principles and applications

- Setting up visualization tool/system and creating basic charts (e.g., bar charts, line charts)
- Data Handling and Dynamic Visualizations
 - Loading and binding external data (e.g., CSV, JSON)
 - Creating dynamic charts with filters, controls, and real-time updates
- Interactivity, User Events, and Animations
 - Adding tool tips, click events, and hover effects
 - Implementing smooth transitions, animations, and advanced interactivity (e.g., zooming, panning)
- Advanced Visualizations: Network and Hierarchical Structures
 - Building force-directed graphs and network diagrams
 - Creating hierarchical visualizations (e.g., treemaps, sunburst charts)
- AI-Enhanced Dashboards with Generative AI Integration
 - Making API calls with Generative AI (e.g., OpenAI) to generate insights
 - Adding AI-powered tooltips and conversational interfaces
 - Developing dashboards with AI-enhanced interactions
- Storytelling with Data and Narrative Techniques
 - Designing narrative-driven dashboards for communication
 - Applying storytelling techniques to enhance engagement
- Ethics, Usability, and Accessibility in Visualization Design
 - Addressing bias and ethical challenges in AI-generated content
 - Applying accessibility principles and conducting usability testing