SJSU SAN JOSÉ STATE UNIVERSITY

College of Information, Data and Society · Applied Data Science

Business Intelligence and Data Visualization Section 22

DATA 230

Spring 2025 In Person 3 Unit(s) 01/23/2025 to 05/12/2025 Modified 01/22/2025

Contact Information

Instructor: Guannan Liu, Ph.D
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Office: ISB 854

Class Day/Time: Wednesday 6:00 pm to 8:45 pm
Classroom: ISB 782
Office Hours: Wednesday 4:00 pm to 5:00 pm or by appointment (via Zoom)

Course Description and Requisites

Study data visualization as an analytical tool, a medium of communication, and the basis for interactive dashboards; apply cognitive theories and design principles in the development of presentations and visualizations; create digital data visualizations using emerging software packages and environments.

Prerequisite: Classified standing or instructor consent

Letter Graded

Classroom Protocols

- Classes will start on time, so do not be late.
- If a student misses a class, the student is responsible for finding out what's said/done in that class (such as new announcement, deadline change, etc.) and responding accordingly.
- Please make sure to turn off or mute the cell phone during class.
- Please do not perform irrelevant or distracting activities in class.

Program Information

MS Data Analytics Program Learning Outcomes

PLO 1 - Integrate multidisciplinary knowledge to engage in practical data analytics projects, from analyzing requirements to managing data, building models, presenting results, and assessing societal impacts.
PLO 2 -Identify, use, and evaluate current and emerging multidisciplinary data analytics technologies and tools.
PLO 3 -Apply effective oral and written communication skills necessary to professional work including collaboration and presentation to multidisciplinary audiences.
PLO 4 - Perform independent research in applying data analytics to specific domains.
PLO 5 - Utilize quantitative skills from a rich foundation of essential knowledge to solve complex, dynamic, and practical data analytics problems in various professional domains.
PLO 6 - Work productively as individuals and in teamwork to perform data analytics tasks as part of a multidisciplinary team.
PLO 7 - Identify ways in which data analytics professionals can contribute to the cultural, economic, educational and social well-being in diverse and multicultural local, national and global contexts.

Course Learning Outcomes (CLOs)

CLO 1 –Use basic knowledge and skills to manage and visualize large data sets. [PLO 2]

CLO 2 – Practice basic skills and tools to design effective interaction and narrative visualization framework. [PLO 2, 3]

CLO 3 – Design and implement practical projects using visualization techniques for diverse applications. [PLO 2, 6]

Course Materials

- Textbook
  No required textbooks for this course. All course materials will be posted on Canvas.
- Other Reading Materials
  Fundamentals of Data Visualization, Claus O. Wilke, O'Reilly Media 2019, ISBN: 1492031089

Course Requirements and Assignments

Requirements

- Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course-related activities including but not limited to internships, labs, clinical practice. Other course structures will have equivalent workload expectations as described in the syllabus.
- Students are expected to actively participate in classroom discussions, which often lead to a deeper understanding of the concepts and are also strongly associated with course grades.

- Students may collaborate on homework but must write independent code/solutions. Copying and other forms of cheating will not be tolerated and will result in a zero score for the homework (minimal penalty) or a failing grade for the course, possibly combined with other disciplinary actions from the university.

Assignments

- There are 5 scheduled assignments for this course which will count for 20% of the course grade.
- 40 points for each assignment (40 X 5 = 200 points).
- There are two types of assignments: checks for understanding of concepts and small coding tasks.
- All submissions are required to be PDFs or scanned documents.

Quizzes

- There are 5 quizzes for this course. The 4 highest grades from these quizzes will be selected and count for 10% of the course grade.
- 25 points for each quiz (25 X 4 = 100 points).
- Students will be asked to answer short questions related to materials covered in class.

Group Project

- Group Project (4 students in a group) (200 points)
- Students will collaborate in groups to work on a semester-long group project related to data visualization. All projects will be presented in class.
- The quality and completeness of all deliverables (including the technical report, presentation slides, codes) will be considered in grading the projects. The project will be evaluated based on the significance of the problem, the quality of technical solution, the quality of presentation and the quality of documentation.
- Each group member is expected to participate in every stage of the project. Each member should be prepared to address project-related questions, present some part of the project, contribute to the project's implementation and the writing of the technical report. The grade of each member will reflect their contribution to the project, as judged by both the instructor and the group peers.
- Description of the project will be posted on Canvas.

Midterm Exam

- Proctored exam (200 points)
- Exams will be a combination of single and multiple choice, true or false, short answer questions.
- Description of the exam will be posted on Canvas.
- Exam date cannot be rescheduled. Arrange your schedule in advance to attend.

Final Exam

- Proctored exam (300 points)
- Exams will be a combination of single and multiple choice, true or false, short answer questions.
- Description of the exam will be posted on Canvas.
- Exam date cannot be rescheduled. Arrange your schedule in advance to attend.

Grading Information

Grading Components

20% Assignments

10% Quizzes

20% Group Project

20% Midterm Exam

30% Final Exam

Grading Scale

A+ 97.00-100.00

A 94.00-96.99

A- 90.00-93.99

B+ 87.00-89.99

B 84.00-86.99

B- 80.00-83.99

C+ 77.00-79.99

C 74.00-76.99

C- 70.00-73.99

D 60.00-69.99

F 0.00-59.99

Grading Policy

- All work including homework assignments and project reports should be submitted on Canvas.
- All Canvas deliverables are due at 11:59 pm.

Late Policy

- No late assignment will be accepted.

University Policies

Per University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

Subject to change with fair notice on canvas.

Week	Date	Topics	Activities
1	1/29	Introduction to data visualization; Foundational knowledge for data visualization; How to do DA project.	
2	2/05	Introduction to Matplotlib; Visualizing data.	
3	2/12	Introduction to Tableau and dashboard design.	Assignment 1 assigned. **Group member list due**
4	2/19	Geospatial data visualization; Coordinate systems and axes.	
5	2/26	Introduction to Seaborn & Plotly; Visualizing amounts;	Assignment 1 due; Assignment 2 assigned
6	3/05	Visualizing distribution: Histograms, density plots, and cumulative densities.	
7	3/12	Visualizing distribution: Box plots, violin plots, and q-q plots.	Assignment 2 due; Assignment 3 assigned
8	3/19	Visualizing time series.	**Group project mid-presentation**
9	3/26	**Midterm Exam**	
10	4/02	**Spring Recess– No Class**	

11	4/09	Introduction to Power BI	Assignment 3 due; Assignment 4 assigned.
12	4/16	Linear transformations in computer graphics	
13	4/23	Dimensionality reduction for visualization	Assignment 4 due; Assignment 5 assigned.
14	4/30	Current trends and future of data visualization	
15	5/07	Group project presentation	Assignment 5 due. Technical report, project code, slides, and everything else due on Canvas
	5/14	Final Exam 17:30-19:30 PM	