SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

Introduction to Data Visualization

CS 133

Spring 2026   Section 01   In Person   3 Unit(s)   01/22/2026 to 05/11/2026   Modified 01/20/2026

👤 Contact Information

Instructor: Dr. Jessica Huynh-Westfall

Email: jessicawestfall@gmail.com
Office: DH282

To contact me, please, contact me through Canvas mail, not my SJSU email.

Office Hours

Tuesday, Thursday, 9:00 AM to 10:00 AM, DH 282

Please make an appointment to let me know you are coming and what you want to discuss. [Calendly Scheduler (https://calendly.com/jessica-westfall/office-hours)](https://calendly.com/jessica-westfall/office-hours)

🕐 Course Information

Overview

- We shall alternate between the two modes. A typical class will begin with a lecture, followed by a hands-on.
- Regular class attendance is highly recommended and strongly encouraged.
- Please arrive to class on-time so that you benefit fully from the course experience and you do not disturb classmates and the instructor while class is in session.
- Students are responsible for knowing all materials covered in class lectures, readings, assignments, and other course-related work.
- Please do not use mobile phones during class time. Laptops, tablets and other devices should only be used for course-related purposes.

Student Conduct Code

Students are expected to adhere to the Student Conduct Code found at https://www.sjsu.edu/studentconduct/policies.php (https://www.sjsu.edu/studentconduct/policies.php). Additionally, students should regularly attend lectures, treat instructors and peers with respect, and refrain from the use of cell phones during any classroom activities.

Communication with the instructor

Students are requested to use the Canvas message function to contact the instructor. Private messages sent to the instructor's email address get lost due to the large volume of emails received. The instructor does not write messages after normal business hours, on weekends or holidays.

Reviewing code for the homework and technical trouble-shooting should be done during the office hours.

Never send your entire code for an assignment to the instructor. The instructor will not fix all the bugs in your code.

Class Attendance

Regular class attendance is expected. Students are responsible for all material presented in all classes.

Grades

Grades assigned are final, unless there was an error in the grading. If a student wants to request a regrade of a homework or test, please follow instructions on the "Regrade request" page on Canvas. A request for a regrade is not a technique to drum up a few more points. If the course instructor thinks a component was scored too generously the first time, it may be lowered in a regrade. Thus, regrading may result in a lower grade.

Academic Integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/ (http://www.sjsu.edu/studentconduct/%20). Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, AI generated answers, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your

assignment or any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Integrity Policy S07-2 requires approval of instructors.

Anyone caught cheating (including sharing answers with others during exams) in the class will receive a failing grade on the exam or assignment, in addition to other sanctions that are permitted by the University, including but not limited to the filing of a report with the Dean of Student Services and expulsion from the University.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, [http://www.sjsu.edu/senate/docs/S12-7.pdf (http://www.sjsu.edu/senate/docs/S12-7.pdf)](http://www.sjsu.edu/senate/docs/S12-7.pdf), requires students to obtain instructor's permission to record the course. Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.

Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor-generated material for this course such as exam questions, lecture notes, hands-on exercises or homework solutions without instructor consent.

🖥 Course Description and Requisites

Topics in data analysis and visualization. Covers tools and techniques to efficiently analyze and visualize large volumes of data in meaningful ways to help solve complex problems in fields such as life sciences, business, and social sciences.

Prerequisite(s): CS 146 with a grade of "C-" or better, or CS 22B and graduate standing. Computer Science or Software Engineering majors only.

Letter Graded

▦ Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

▁▂▃ Course Learning Outcomes (CLOs)

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

- CLO 1 Manipulate large datasets and handle missing or inconsistent values in datasets.
- CLO 2 Perform statistical analysis using packages such as Numpy and Scipy
- CLO 3 Analyze and visualize datasets using packages such as seaborn and matplotlib
- CLO 4 Develop interactive visualization using packages such as Plotly
- CLO 5 Recognize and reduce data and spatial biases

📘 Course Materials

Recommended Reads:

Biological data exploration with Python, pandas and seaborn by Martin Jones. June, 2020.[Author's page (https://pythonforbiologists.com/biological-data-exploration-book.html) , ISBN-13: 979- 8612757238]

Hands-on data visualization by Dougherty, Jack, and Ilya Ilyankou. " O'Reilly Media, Inc.", 2021. [Free open-access web edition (http://handsondataviz.org/)]

Hands-On Data Visualization: Interactive Storytelling From Spreadsheets to Code by Jack Dougherty and Ilya Ilyankou, 2021.[Free open-access web edition (https://handsondataviz.org/), ISBN-13: 978-1492086000] .

Cole Nussbaumer Knaflic. Storytelling with data: A data visualization guide for business professionals. (2019) [ISBN: 978-1-119-00225-3]

Technology requirements:

Students will need to have either a personal laptop/desktop with Internet service or access to an on campus computer lab.

Practice of data visualization will be done in Python 3.7 or 3.8 programming environment Google Colab (https://colab.research.google.com/) with Chrome or any supported web browser Anaconda (https://www.anaconda.com/products/individual) (optional) for local installation of Jupyter notebook.

≔ Course Requirements and Assignments

Exams including final exam:

Two midterm exams will be conducted during the regular class hours in addition to a final exam. See the schedule for the midterm exam dates.

Final exam will be given on **Wednesday, May 13th at 10:45 AM-12:45.** If there is a time conflict, please inform the instructor at least two weeks in advance for rescheduling.

The exams are in-person and hand-written. The exams are comprehensive and will contain multiple choice questions, true/false, short answer, and coding questions.

No make-up exams will be given if a student misses the midterm exam submission deadline (except for a legitimate excuse or other personal emergencies and students can provide documented evidence).

Assignments:

There will be in-class and take-home assignments. The purpose of assignments is to develop students' understanding of the material and the skills in problem-solving. Assignments include code exercises, oral presentations, and projects.

- Hands-On Classwork: These assignments will be in class and graded on completion. The exams will contain questions based on the hands-on assignments, so it is highly recommended students put effort into them.
- Problem Sets:All assignment solutions that you submit must be completely your own work (i.e., your solution cannot be copied from another source, such as other students, the internet, etc.). While it is fine to discuss the worksheet/assignment solutions with other students, solutions submitted on Canvas should reflect your own efforts. All homework should be submitted on Canvas and GitHub, not by e-mail.

Term project and presentation

The term project and presentation will be used to assess student's understanding of the course materials over the course of the semester. Information on the term project can be found in Canvas. It is a group project. Each team consists of three-four students (no solo projects) that will have a unique problem to solve.

✔ Grading Information

Assignment	Grade Weigh
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	20%
Participation (in-class activities)	5%

Homework Assignments	10%
Group Project (incl code, write-up, & oral presentation)	25%

Extra-credits:

No extra-credit assignments or rework opportunities will be given.

Late Submission:

Late submissions within 24 hours will be deducted 10% of its final grade. Submissions over 24 hours late will have 20% grade deducted. Late submissions over 2 days will not be accepted.

Missed Assignments or Exams:

When students need to miss an assignment deadline or exam due to health conditions or any other emergency, it should be reported within ONE week after the due date.

Final Grade Table:

Total Grade	Letter Grade
97% and above	A plus
92% to 96%	A
90% to 91%	A minus
88% to 89.99%	B plus
82% to 87.99%	B
80% to 81.99%	B minus

78% to 79.99%	C plus
72% to 77.99%	C
70% to 71.99%	C minus
60% to 69.99%	D
59.99% and below	F

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 three hours per unit per week) for instruction, preparation/studying, or course related activities. Other course structures will have equivalent workload expectations as described in the syllabus.

🏛 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

While the syllabus is pretty set and I do not expect many changes, I do reserve the right to change the syllabus as situations arise beyond on control.

Date	Week	Topic	Readings
Module 01 - Introduction			
22-Jan	1	Syllabus, Course expectations Introduction to data visualization	Cole Chap 1 DV Chap 1 - Introduction
27-Jan	2	Introduction to GitHub, markdown, and Colab	
Module 02 - Working with pandas			

29-Jan	2	Series and DataFrame	BD Chap 2, 3
3-Feb	3	Exploration of data using pandas (filtering and selecting)	BD Chap 4
5-Feb	3	Exploration of data in dataframe	BD Chap 5
10-Feb	4	Advance features in pandas	
12-Feb	4	Introduce project (in-class)	
Module 03 - Plotting in Seaborns			
17-Feb	5	Relationship plots	BD Chap 6
19-Feb	5	Scatterplot	BD Chap 7
24-Feb	6	Categorical data	BD Chap 8
26-Feb	6	Styling with seaborn	BD Chap 10 and Chap 11
Module 04 - Grouping and Binning			
3-Mar	7	Grouping	BD Chap 12
5-Mar	7	Long form and wide form	BD Chap 14
Module 05 - Matrix and Heatmap			
10-Mar	8	Matrix and heatmap	BD Chap 15
12-Mar	8	Exam #1	
Module 06 - Data collecting and cleaning			
17-Mar	9	Cleaning data	DV Chap 4, BD Chap 16
19-Mar	9	Experimental data cleaning	
Module 07 - Interactive plotting			
24-Mar	10	Plotly	
26-Mar	10	Mapping data	DV Chap 7
31-Mar	11	SPRING RECESS	

2-Apr	11	SPRING RECESS	
Module 07 - Machine learning			
7-Apr	12	Introduce machine learning	
9-Apr	12	Visualizing data to gain insights	
14-Apr	13	Classification data	
16-Apr	13	Regression data	
21-Apr	14	Transforming data	
23-Apr	14	Fine tuning data	
28-Apr	15	Exam #2	
30-Apr	15	Project Presentations	
5-May	16	Project Presentations	
7-May	16	Project Presentations	
13-May	17	Final Exam 10:45 AM-12:45 PM	