SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

Data Structures and Algorithms

CS 146

Fall 2026 In Person 3 Unit(s) 08/19/2026 to 12/07/2026 Modified 08/16/2026

Contact Information

Instructor: Muniba Shaikh

Email: muniba.shaikh@sjsu.edu

Day/Time: Mondays and Wednesdays 10:30 AM – 11:45 AM

Classroom: Duncan Hall 450

Office Hours: Monday and Wednesday 10:15 AM – 10:30 AM & 11:45 –12:00 noon (in or around Duncan Hall 450).

Course Description and Requisites

Implementations of advanced tree structures, priority queues, heaps, directed and undirected graphs. Advanced searching and sorting techniques (radix sort, heapsort, mergesort, and quicksort). Design and analysis of data structures and algorithms. Divide-and-conquer, greedy, and dynamic programming algorithm design techniques.

Prerequisite(s): MATH 30, MATH 42, CS 46B, and [(CS 48 or CS 49J) if CS 46B was not in Java], each with a grade of "C-" or better; Computer Science, Applied and Computational Math, Forensic Science: Digital Evidence, Software Engineering, Data Science majors only; or instructor consent.

Letter Graded

Classroom Protocols

All class meetings, midterms, and exams take place in person in Duncan Hall 450.

Students are requested to use the provided email to contact the instructor. I prefer email over Canvas messages and will often see emails sooner.

Lectures are not recorded.

Lecture slides are provided via Canvas, usually immediately after the lecture.

Lectures may not be recorded by students without prior permission of instructor.

Course material developed by the instructor is the intellectual property of the instructor. Students cannot publicly share or upload instructor generated material for this course such as exam questions, Programming assignment, lecture notes, lecture slides, hands-on exercises or homework solutions without instructor permission.

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)

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

- Implement lists, stacks, queues, search trees, heaps, union-find ADT (Abstract Data Type), and graphs and use these data structures in programs they design.
- Prove basic properties of trees and graphs.
- Perform breadth-first search and depth-first search on directed as well as undirected graphs.
- Use advanced sorting techniques (radix sort, heapsort, mergesort, quicksort).
- Determine the running time of an algorithm in terms of asymptotic notation.
- Solve recurrence relations representing the running time of an algorithm designed using a divide-and-conquer strategy.
- Comprehend the basic concept of NP-completeness and realize that they may not be able to efficiently solve all problems they encounter in their careers.
- Comprehend algorithms designed using greedy, divide-and-conquer, and dynamic programming techniques.

Course Materials

Textbook: Cormen, Leiserson, Rivest, and Stein, Introduction to Algorithms, third edition. MIT Press, 2009. ISBN-10: 0262033844 ISBN-13: 978-0262033848

Technology: Laptop (running OSX, Windows, or some version of UNIX) with internet access, an IDE (Integrated Development Environment) for programming in java, and the ability to compile and run Java applications.

Information: Syllabus, programming assignment instructions, etc. can be found on Canvas (https://sjsu.instructure.com (https://sjsu.instructure.com)). You are responsible for regularly checking the messaging system through MySJSU for updates, or other communication system as indicated by the instructor.

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3: http://www.sjsu.edu/senate/docs/S12-3.pdf (http://www.sjsu.edu/senate/docs/S12-3.pdf).

Assignment 0: Prerequisite Verification (ungraded, **due Friday, August 21**). Submitted on Canvas, required of everyone. Upload your unofficial transcript with the prerequisite courses highlighted: MATH 30, MATH42, and CS 46B (plus CS 49J or CS 48 if your CS 46B was not in Java), each with a grade of C- or better. If you took any prerequisite outside SJSU, also upload your transfer credit report from MySJSU as a PDF, together with the highlighted transcripts showing your name, the institution, the term, and the grade. This assignment is not graded; its purpose is to confirm enrollment eligibility. If your prerequisites are notsatisfied, you must drop the course, or I will need to drop you.

Programming assignments may be discussed with peers, but must be completed individually unless otherwise specified. Code you submit must be written by you.

Academic Integrity Policy for AI-Assisted Software: Use of AI-assisted software must be cited as areference source. Failure to cite the use of any AI-assisted software constitutes a violation of SJSU policyF15-7 and the School of Information's academic integrity policy: https://ischool.sjsu.edu/faculty-handbook-academic-integrity (https://ischool.sjsu.edu/faculty-handbook-academic-integrity).

Grading Information

Course weightings will be as follows:

- 20% Programming Assignments
- 20% First In-semester exam (Midterm #1)
- 20% Second In-semester exam (Midterm #2)
- 40% Final Exam

Final grades may be curved (up) to raise grades if needed.

Your course grade will be determined by your final weighted average:

- A plus = 97% or higher
- A = 93% to 97%
- A minus = 90% to 93%
- B plus = 87% to 90%
- B = 83% to 87%
- B minus = 80% to 83%
- C plus = 77% to 80%
- C = 73% to 77%

- C minus = 70% to 73%
- D plus = 67% to 70%
- D = 63% to 67%
- D minus = 60% to 63%
- F = 0% to 60%

Boundary cases count as the higher of the two grades.

Programming assignment grades are reduced by 10% per day they are late. For example, a program is considered one day late if it is submitted a couple minutes after the due date's 11:59 PM deadline. So, if a program is submitted four- and one-half days late, then the max score it can receive is 50%. There is no point submitting a program more than 9 days late as it already gets a zero then.

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

Key semester dates:

- Instruction begins August 19
- Last day to add or drop September 15
- No class September 7 (Labor Day), November 11 (Veterans Day), November 26-27 (Thanksgiving)
- Last day of instruction December 7
- Final exams December 9-11 and December 14-16