San José State University
College of Science, Department of Computer Science
CS 146 (Sections 7), Data Structures and Algorithms, Fall 2024

Course and Contact Information

Instructor(s): Maryam Khazaei
Email: maryam.khazaeipool@sjsu.edu
Office Hours: Fridays: 8:30 a.m-10:30 a.m - Duncan Hall, room 439

Class Days/Time:
Section 07: Tuesdays/Thursdays 10:30AM - 11:45AM
Classroom: MacQuarrie Hall 233

Prerequisites: 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, or instructor consent.

Course Description

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

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on *Canvas Learning Management System course login website*. You are responsible for regularly checking with the messaging system through *MySJSU* (or other communication system as indicated by the instructor) to learn of any updates.

Course Goal

To ensure students are familiar with implementing elementary data structures and their related algorithms.
To introduce students to the implementation of more complex data structures.

Course Learning Outcomes (CLO)

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

Understand the implementation of lists, stacks, queues, search trees, heaps, 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, merge sort, 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.
Understand the basic concept of NP-completeness and realize that they may not be able to efficiently solve all problems they encounter in their careers.
Understand 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

Other technology requirements / equipment

You will need a laptop with internet access.

Library Liaison

website: https://libguides.sjsu.edu

Course Requirements and Assignments

Reading Assignments: The assignments will be from textbook readings and will be posted at the end of the lecture slides.
Class Discussions: To foster critical thinking and engagement, class time will include opportunities for discussion. During lecture, students will be presented with thought-provoking questions related to the day's material. These discussions aim to solidify understanding of key concepts and to encourage

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, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Grading Information

Course weightings will be as follows:

30% Assignments (programming and non-programming)
20% Midterm 1
20% Midterm 2
30% Final Exam

Exams may be curved up based on student performance.

Course grades will be determined by your final weighted average:
A plus = 97% or higher
A = 93% up 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.

All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades.
See University Policy S20-2 for more details.

Classroom Protocol

Students must not share any course material publicly (on Canvas, GitHub, etc.) without Instructor permission, including but not limited to lecture notes, passwords, homework/exam solutions, and class meeting links.

University Policies

Per University Policy S16-9, 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 Syllabus Information

3	Th 9/5	Heaps and Heapsort	6
4	Tu 9/10	Priority Queues	6
4	Th 9/12	Quicksort	7
5	Tu 9/17	Linear Time Sort, Counting sort	8
5	Th 9/19	Radix Sort, Bucket Sort	8
6	Tu 9/24	Hash Tables	11
6	Th 9/26	Hash Tables, Binary Search Trees	11-12
7	Tu 10/1	Binary Search Trees	12
7	Th 10/3	Review	
8	Tu 10/8	Exam 1	
8	Th 10/10	Red-Black trees	13
9	Tu 10/15	Dynamic Programmefn*28 490.75 234.05 2106 5	