San José State University
Department of Computer Science
Fall 2026
CS 255 Design and Analysis of Algorithms

Course and Contact Information

Instructor:	Ramin Moazeni, PhD
Class Hours:	MW: 10:30 AM - 11:45 AM (In Person)
Office Hours:	Friday, 12:30 PM - 1:00 PM, or by appointment over Zoom
Email:	Ramin.Moazeni@sjsu.edu
Classroom:	MH 223
Prerequisites:	CS 155 or instructor consent

Course Overview

The objective of this course is to develop students' ability to design, analyze, and reason about efficient algorithms.

The course introduces fundamental algorithm design techniques, including divide and conquer, greedy algorithms, dynamic programming, graph algorithms, and network flow. Students will learn how to analyze algorithm running time and prove algorithm correctness.

The course also covers advanced topics including randomized algorithms, parallel algorithms, distributed algorithms, NP-completeness, and approximation algorithms. Throughout the course, emphasis will be placed not only on learning specific algorithms, but also on developing the ability to recognize algorithmic structure and design efficient solutions to new computational problems.

Topics Tentative

- Introduction and Stable Matching
- Algorithm Analysis and Asymptotic Running Time
- Graph Algorithms: BFS, DFS, and Topological Sorting
- Divide and Conquer
- Greedy Algorithms
- Shortest Paths and Minimum Spanning Trees
- Dynamic Programming
- Network Flow
- Parallel Algorithms and the PRAM Model
- Distributed Algorithms
- Randomized Algorithms
- P, NP, NP-Completeness, and Polynomial-Time Reductions
- Approximation Algorithms

Learning Outcomes

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

- Analyze the correctness and running time of algorithms.
- Design efficient algorithms using major algorithmic paradigms, including divide and conquer, greedy algorithms, and dynamic programming.
- Analyze and apply fundamental graph and network optimization algorithms.
- Analyze and/or implement randomized algorithms.
- Analyze fundamental parallel and distributed algorithms.
- Determine whether selected computational problems belong to P, NP, or are NP-complete, and construct polynomial-time reductions.
- Analyze and design approximation algorithms for selected NP-hard optimization problems.

Important Dates

- **Class Begins:** Wednesday, August 19, 2026
- **Midterm:** Monday, October 12, 2026, 10:30 AM - 11:45 AM, MH 223
- **Class Ends:** Monday, December 7, 2026
- **Final:** Friday, December 11, 2026, 10:45 AM - 12:45 PM, MH 223

Required Texts

- Kleinberg, J. and Tardos, É., Algorithm Design, 1st Edition, Addison-Wesley/Pearson
  The primary textbook will be referred to as KT throughout the course schedule.

Optional References

- Cormen, Leiserson, Rivest, and Stein, Introduction to Algorithms (CLRS).
- Vazirani, Approximation Algorithms.

Supplementary Materials

- Lecture slides and notes
- Additional readings and handouts
- Materials for topics not fully covered in the primary textbook
- Materials posted on Canvas

Course Requirements and Assignments

Homework Assignments

Graded homework assignments will be given throughout the semester. Homework will reinforce lecture material and provide practice with algorithm design, correctness, and running-time analysis.

For algorithm-design problems, students should clearly present the algorithm, correctness argument, and running-time analysis, when applicable. Homework must be submitted through Canvas as a single PDF.

Course Project

Students will complete a programming project related to an algorithmic topic covered in the course. Projects will be completed in teams of 2-3 students.

The project will include:

- Project proposal
- Algorithm design and/or implementation
- Correctness and/or performance analysis
- Final report
- Short in-class presentation

Each team will present its project near the end of the semester. The presentation should briefly describe the problem, algorithmic approach, implementation, and results or analysis.

Evaluation

Component	Weight
Homework Assignments	20%
Course Project and Presentation	20%
Midterm Exam	30%
Final Exam	30%
Total	**100%**

Grading Scale

A 93-100%, A- 90-92%, B+ 86-89%, B 82-85%, B- 78-81%, C+ 74-77%, C 70-73%, C- 65-69%, D+ 62-64%, D 58-61%, D- 55-57%, F below 55%.

Assignment Policy

Assignments are due at midnight on the specified due date.

A penalty of 10% per day will be applied to late submissions. No assignment will be accepted more than one week after the due date unless prior arrangements have been made with the instructor.

Collaboration Policy

Discussion of general course concepts and approaches with classmates is encouraged.

For individual assignments, students may discuss general concepts, high-level approaches, and relevant algorithms and techniques. However, each student must independently produce their own written solutions, correctness proofs, pseudocode, analysis, and source code when applicable.

Copying another student's solution or allowing another student to copy your solution is not permitted. Any external resources used in preparing a solution should be appropriately acknowledged.

Specific collaboration requirements for the course project will be provided separately.

Generative AI Policy

The use of generative AI tools, including ChatGPT and other AI-based assistants, is not permitted for homework assignments, course projects, or examinations.

Students must complete and submit their own work. AI-generated algorithms, proofs, pseudocode, analysis, explanations, source code, or other assignment content may not be submitted, whether in whole or in part.

Use of generative AI in violation of this policy may be treated as an academic integrity violation in accordance with university policy.

Exams

There will be one in-person midterm examination and one in-person cumulative final examination, each worth 30% of the course grade.

Exams may include algorithm design, algorithm tracing, pseudocode, correctness proofs, running-time analysis, short-answer questions, and computational problems.

Makeup exams will only be granted in the case of a documented emergency, with advance notice to the instructor whenever possible.

Academic Integrity Cheating and Plagiarism

All homework assignments and exams must be your own individual work. General discussion of course concepts and high-level approaches with classmates is allowed, but each student must write and submit their own solutions.

You may never copy or use another person's work without proper attribution. This includes solutions, proofs, pseudocode, source code, and material obtained from websites or other external sources.

It is never acceptable to share your homework solutions or code with other students. Students who copy, provide, or submit another person's work will be considered in violation of the course academic integrity policy.

The use of generative AI tools, including ChatGPT and other AI-based assistants, is not permitted for homework assignments, course projects, or examinations.

The first incident of cheating will result in a zero on the assignment or exam. A second incident will result in an F for the course. All incidents will be handled and reported in accordance with SJSU's Academic Integrity Policy.

CS 255 Design and Analysis of Algorithms Course Schedule

Course Schedule Tentative

Week	Date	Topic	Reading
1	Wed 8/19/2026	Introduction to Algorithms	-
2	Mon 8/24/2026	Stable Matching; Gale-Shapley Algorithm and Analysis	KT Ch. 1
	Wed 8/26/2026	Running Time; Growth of Functions; Asymptotic Analysis	KT Ch. 2
3	Mon 8/31/2026	Graphs; Breadth-First Search (BFS)	KT Ch. 3
	Wed 9/2/2026	Depth-First Search (DFS); Topological Sorting	KT Ch. 3
4	**Mon 9/7/2026**	**Labor Day - No Class**	**-**
	Wed 9/9/2026	Divide and Conquer: Sorting, Integer/Matrix Multiplication, Max Subarray	KT Ch. 5
5	Mon 9/14/2026	Divide and Conquer: Computational Geometry	KT Ch. 5
	Wed 9/16/2026	Greedy Algorithms: Scheduling, Shortest Paths, Caching, Knapsack	KT Ch. 4
6	Mon 9/21/2026	Greedy Algorithms: Minimum Spanning Tree, Clustering	KT Ch. 4
	Wed 9/23/2026	Dynamic Programming: Scheduling, Knapsack	KT Ch. 6
7	Mon 9/28/2026	Dynamic Programming: All-Pairs Shortest Path	KT Ch. 6
	Wed 9/30/2026	Dynamic Programming: Additional Applications	KT Ch. 6
8	Mon 10/5/2026	Amortized Analysis	CLRS / Lecture Notes
	Wed 10/7/2026	Midterm Review	-
9	**Mon 10/12/2026**	**Midterm Exam**	**-**
	Wed 10/14/2026	Network Flow and Applications	KT Ch. 7
10	Mon 10/19/2026	Network Flow and Applications	KT Ch. 7
	Wed 10/21/2026	Parallel Algorithms; PRAM Model	Lecture Notes
11	Mon 10/26/2026	Parallel Algorithms	Lecture Notes
	Wed 10/28/2026	Distributed Algorithms	Lecture Notes
12	Mon 11/2/2026	Distributed Algorithms	Lecture Notes
	Wed 11/4/2026	Randomization: Quicksort	KT Ch. 13
13	Mon 11/9/2026	Randomization: Hashing	KT Ch. 13
	Wed 11/11/2026	**Veterans Day - No Class**	**-**
14	Mon 11/16/2026	Intractability: P, NP, NP-Completeness, Reductions	KT Ch. 8
	Wed 11/18/2026	NP-Completeness and Polynomial-Time Reductions	KT Ch. 8
15	Mon 11/23/2026	Approximation Algorithms	KT Ch. 11
	Wed 11/25/2026	**Thanksgiving Holiday - No Class**	**-**
16	Mon 11/30/2026	Project Presentations	-
	Wed 12/2/2026	Project Presentations	-
17	Mon 12/7/2026	Course Review	-
Final	**Fri 12/11/2026**	**Final Exam - 10:45 AM-12:45 PM**	**-**

Classroom Protocol and Other Notes

1. Attendance is important for success in this course. Students are responsible for material presented and discussed during class. University Policy F69-24 states that students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to ensure maximum benefit for all members of the class.
2. Students are responsible for all course materials, announcements, and assignments posted on Canvas, as well as material presented and discussed in class.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, including academic integrity, accommodations, and other student responsibilities and resources, is available on the SJSU Syllabus Information webpage.

Students are responsible for reviewing these university policies and resources.