

**San José State University**  
**Computer Science Department**  
**CS146, Data Structures and Algorithms, Section-7, Fall 2017**

**Course and Contact Information**

<b>Instructor:</b>	Dr. Faramarz Mortezaie
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<b>Office Hours:</b>	M 9:00-9:50 AM or by appointment
<b>Class Days/Time:</b>	MW 3:00-4:15 PM
<b>Classroom:</b>	MH-222
<b>Prerequisites:</b>	Math 30 Calculus Math 42 Discrete Mathematics CS 46B Introduction to Data Structures  <b>CS 49J Programming in Java (or equivalent knowledge of Java)</b>

**Course Description**

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

**Course Learning Outcomes (CLO)**

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

1. CLO 1 Understand the implement of lists, stacks, queues, search trees, heaps, union-find ADT, and graphs and use these data structures in programs they design
2. CLO 2 Prove basic properties of trees and graphs
3. CLO 3 Perform breadth-first search and depth-first search on directed as well as undirected graphs
4. CLO 4 Use advanced sorting techniques (radix sort, heap sort, merge sort, quicksort)
5. CLO 5 Determine the running time of an algorithm in terms of asymptotic notation
6. CLO 6 Solve recurrence relations representing the running time of an algorithm designed using a divide-and-conquer strategy

7. CLO 7 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
8. CLO 8 Understand algorithms designed using greedy, divide-and-conquer, and dynamic programming techniques

## Required Texts/Readings

### Textbook:

### **Data Structures and Algorithm Analysis in Java 3<sup>rd</sup> Edition**

Publisher: Pearson

ISBN-13: 978-0-13-257627-7

## 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) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

*There will be a homework assigned for each major topic we study in this course. These include assignments for Complexity analysis, Lists and stacks, Trees, Hashing, sorting, graph and algorithm techniques. The schedule of classes below indicates the due date, assignment weights and how each assignment is aligned with the learning outcomes.*

*There will be 30% penalty for submitting late homework. No late homework will be accepted after a week of the due date for any reason.*

*Exams: Exams are in-class, closed-book, and comprehensive. Makeup exams will only be given in cases of verifiable emergency.*

*Final Exam: Thursday Dec 14: 7:15 AM – 9:30 AM. Makeup final exams will be only given in cases of verifiable emergencies.*

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> 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 insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

## Grading Policy

### Make-Up Exam

Make-up exams are possible only under exceptional circumstances.

## **Grading**

Homework and class work	15%
Exam-1	25%
Exam-2	25%
Team Project	10%
Comprehensive Final Exam	25%

## **Course Grading Standards**

I first try scores of 90, 80, and 70 to cut off letter grades of A-, B-, and C-, respectively. If overall class performance is too low to use these cut offs, I set a cut off of C- to a lower score than the class total average but a higher score than 60 (this number may change), and divide the students' group above the cut off of C- into A+, A, A-, B+, B, B-, C+, C, C-. The rest of students will be given by a grade of D+, D, D-, F or WU depending on their class performance.

Note that “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 F13-1](http://www.sjsu.edu/senate/docs/F13-1.pdf) at <http://www.sjsu.edu/senate/docs/F13-1.pdf> for more details.

## **Classroom Protocol**

*Students are expected to participate all the lectures. Please turn off your cell phones during the lecture time.*

## **University Policies**

### **General Expectations, Rights and Responsibilities of the Student**

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU’s policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See [University Policy S90–5](http://www.sjsu.edu/senate/docs/S90-5.pdf) at <http://www.sjsu.edu/senate/docs/S90-5.pdf>. More detailed information on a variety of related topics is available in the [SJSU catalog](http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html), at <http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html>. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

### **Dropping and Adding**

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at <http://info.sjsu.edu/static/catalog/policies.html>.

Add/drop deadlines can be found on the current academic year calendars document on the [Academic Calendars webpage](http://www.sjsu.edu/provost/services/academic_calendars/) at [http://www.sjsu.edu/provost/services/academic\\_calendars/](http://www.sjsu.edu/provost/services/academic_calendars/). The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at <http://www.sjsu.edu/aars/policies/latedrops/policy/>. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at <http://www.sjsu.edu/advising/>.

### **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>, requires students to obtain instructor's permission to record the course and the following items to be included in the syllabus:

- “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.”
  - It is suggested that the greensheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
  - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.
- “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, or homework solutions without instructor consent.”

### **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](http://www.sjsu.edu/senate/docs/S07-2.pdf) 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](http://www.sjsu.edu/studentconduct/) is available at <http://www.sjsu.edu/studentconduct/>.

### **Campus Policy in Compliance with the American Disabilities Act**

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. [Presidential Directive 97-03](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) at [http://www.sjsu.edu/president/docs/directives/PD\\_1997-03.pdf](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) requires that students with disabilities requesting accommodations must register with the [Accessible Education Center](http://www.sjsu.edu/aec) (AEC) at <http://www.sjsu.edu/aec> to establish a record of their disability.

# CS146 / Data Structures and Algorithms, Fall 2107, Course Schedule

The schedule is subject to change with fair notice announced in class.

Week	Related CLO	Date	Topics	Reading Assignments and homework	Due Date
1		08/23/17	Java Review	Chapter-1	
2	CLO-2 CLO-5	08/28/17 08/30/17	Java Review Algorithm Analysis	Chapter-2 Homework-1	9/6
3	CLO-1	09/04/17 09/06/17	No class Algorithm Analysis	Chapter-2 Homework2	9/13
4	CLO-1	09/11/17 09/13/17	Lists, Stacks and Queues Lists, Stacks and Queues	Chapter-3	
5		09/18/17 09/20/17	Trees Trees	Chapter-4 Homework-3	9/27
6		09/25/17 09/27/17	Review and project Exam-1	Chapter-4	
7	CLO-1	10/02/17 10/04/17	Trees Trees	Chapter-4 Homework-4	10/9
8		10/09/17 10/11/17	Hashing Priority Queue	Chapter-5 Chapter-6 Homework-5	10/18
9		10/16/17 10/18/17	Merge Sort quicksort	Chapter-7	
10	CLO-5 CLO-4	10/23/17 10/25/17	Radix sort and heapsort	Chapter-7 Homework7	11/01
11		10/30/17 11/01/17	The Disjoint Set Class Review	Chapter-8 Homework8 Chapters 4 to 8	11/08
12	CLO-3	11/06/17 11/08/17	Exam-2 Graphs breadth-first search and depth-first search	Chapters 4 to 8 Chapter-9 Homework-9	11/15
13	CLO-3	11/13/17 11/15/17	Graphs Graphs	Chapter-9 Homework-10	11/27
14	CLO-7	11/20/17 11/22/17	Algorithm Design Tech NP-completeness No class	Chapter-9 Chapter-10	
15	CLO-6 CLO-8	11/27/17 11/29/17	greedy, divide-and-conquer, and dynamic	Chapter-10 Homework10	12/06
16		12/04/17 12/06/17	Final Exam Review Project Presentation		
17		12/11/17 12/13/17	Project Presentation Final Exam	Wednesday Dec-13 12:15 – 14:30 PM	