

San José State University
Computer Science Department
CS255, Section 1, Design and Analysis of Algorithms, Spring 2016

Course and Contact Information

Instructor:	Aikaterini Potika
Office Location:	MacQuarrie Hall 215
Telephone:	(408) (9245134)
Email:	katerina.potika@sjsu.edu
Office Hours:	MW 12:00-13:00 or by appointment
Class Days/Time:	MW 13:30-14:45pm
Classroom:	MacQuarrie Hall 223
Prerequisites:	CS 155 or instructor consent

Course Description

Randomized algorithms. Parallel algorithms. Distributed algorithms. NP-completeness of particular problems. Approximation algorithms. Selected applications based on students' inputs

Course Learning Outcomes (CLO)

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

1. CLO 1. Code an example of each of the following types of algorithms:
 - a. Randomized
 - b. Parallel
 - c. Approximation
2. CLO 2. Conduct an amortized analysis.
3. CLO 3. Explain how above techniques are used in several applications, and describe what benefits they have within those applications.

Faculty Web Page

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the Canvas learning management system course website (<https://idp01.sjsu.edu/idp/Authn/UserPassword>). You are responsible for regularly checking with the messaging system.

Required Texts/Readings

Textbook

No required textbook we will use chapters from various books:

1. Cormen, Leiserson, Rivest and Stein, Introduction to Algorithms, 3rd Edition
MIT Press, 2009. You can find errata (bug reports) for the book <http://www.cs.dartmouth.edu/~thc/clrs-bugs/bugs-3e.php>.
2. Kleinberg and Tardos, Algorithm Design, First edition, Addison Wesley, 2005.
3. Dasgupta, Papadimitriou and Vazirani, Algorithms, McGraw-Hill, 2006.
4. Vazirani, Approximation Algorithms, Springer, 2003

Other Readings

- Horstmann and Cornell, Core Java, Vol. I, Ninth edition, Prentice Hall, 2013.
- Research papers
- Handouts (through Canvas)

Other equipment / material requirements

Java Compiler (version 7 or later).

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>.

Homework assignments: individual, regularly assigned, will include written problem assignments, and perhaps some online exercises. Solutions will be not posted. The homework is a tool for you to learn the material and prepare you for the exams.

Reading assignments: Reading assignments will regularly be for the next class (see schedule).

Quizzes: Unannounced quizzes (at least 4) may be given during class, each taking about 5 minutes total. These will generally be problems from the reading assignment and/or the homework.

Project (Programming and Presentation): A programming project of your choice related to the course in groups of two students. At the end of the semester you will present the project in the class. Never use any code you find on the web, unless it is given by me. Penalty for late submission 5% for every 3 days up to 9 days, after that no submission will be accepted. Never email your assignments.

Midterm exams: There will be two written Midterm exams during the semester.

Final exam: One written final exam.

The exams will contain multiple choice questions, short answer questions and questions that require pseudocode and/or computations.

Students must obtain >50% in each component of the course (homework, project, quizzes & written exams) in order to be eligible for a passing grade.

Grading Policy

Final Grade:

30% Project (programming and presentation)

10% Quizzes

30% Midterms (15% each)

30% Final

Exams are closed book, final exam is comprehensive. No extra point options.

No make-ups exams except in case of verifiable emergency circumstances

A+	A	A-	>90
B+	B	B-	>74
C+	C	C-	>59
D+	D	D-	>44
F			<40

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.”

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

Attendance is highly recommended. Please avoid disturbing the class: turn-off cell phones (or put them on vibrate mode), no text messaging in the class or the exams, **no taking pictures and video**, avoid coming late. The course material cannot be shared publicly without my approval. You may not publicly share or upload material for this course such as exam questions, lecture notes, or solutions without my consent (see [University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf), <http://www.sjsu.edu/senate/docs/S12-7.pdf>).

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.”

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/. 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 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.

CS255: Design and Analysis of Algorithms, Spring 2016

The schedule is subject to change with fair notice.

Course Schedule

Lectures	Date	Topic
1	2/1	Introduction: Info & Algorithms
2	2/3	Examples
3	2/8	Growth of functions- O , Ω , Θ , o , ω
4	2/10	Graphs
5	2/15	Graphs
6	2/17	Greedy technique
7	2/22	Greedy technique
8	2/24	Divide and Conquer technique
9	2/29	Divide and Conquer technique
10	3/2	Dynamic Programming technique
11	3/7	Dynamic Programming technique
	3/9	Midterm 1
12	3/14	Network Flow
13	3/16	Network Flow
14	3/21	Heaps
15	3/23	Hashing
	3/28-4/3	<i>Spring Break</i>
16	4/4	Amortized Analysis

17	4/6	Randomized Algorithms
18	4/11	Intractability
	4/13	Midterm 2
19	4/18	Intractability
20	4/20	Intractability
21	4/25	Approximation Algorithms
22	4/27	Approximation Algorithms
23	5/2	Approximation Algorithms
24	5/4	Distributed Algorithms
25	5/9	Review
26	5/11	Project Presentations
27	5/16	Project Presentations
	5/18	Final exam Section1, 12:00-2:30PM