

San José State University
College of Science/Department of Computer Science
CS 255, Design and Analysis of Algorithms, Section 1, Fall, 2016

Course and Contact Information

Instructor:	Dr. Teng Moh
Office Location:	MQH 411
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Email:	MyFirstName <dot> MyLastName <at> SJSU <dot> EDU
Office Hours:	MW 20:45 to 21:45
Class Days/Time:	MW 19:30 to 20:45
Classroom:	MQH 422
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. *Approximation*
 - c. *Parallel*
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.*

Required Texts/Readings

Textbook

- § Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, ***Introduction to Algorithms***, The MIT Press, 3rd ed, 2009, ISBN: 978-0262033848
- § Pete Goodliffe, ***Becoming a Better Programmer: A Handbook for People Who Care About***

Code, O'Reilly Media, 1st ed., 2014, ISBN: 978-1491905531

Other Readings [Optional]

§ Thomas H. Cormen, **Algorithms Unlocked**, The MIT Press, 1st ed, 2013, ISBN: 978-0262518802

§ Michael Mitzenmacher and Eli Upfal, *Probability and Computing: Randomized Algorithms and Probabilistic Analysis*, Cambridge University Press, 1st ed, 2005, ISBN: 978-0521835404

§ David P. Williamson and David B. Shmoys, **The Design of Approximation Algorithms**, Cambridge University Press, 1st ed, 2011, ISBN: 978-0521195270

Other equipment / material requirements (include if applicable)

Include if applicable.

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 is due typewritten (include source code, but not executable files) by class starting time on the due date. Each assigned problem requires a solution and an explanation (or work) detailing how you arrived at your solution. Cite any outside sources used to solve a problem. When grading an assignment, I may ask for additional information. A subset of the assigned problems will typically be graded.

Refer the course website for latest information of homework assignments.

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.”

Examinations

One mid-term exam scheduled approximately at the end of 8th week, and a final exam scheduled on Wednesday, Dec. 14, 19:45-22:00.

Grading Policy

Grading information:

- I will determine letter grades for the course, including +/- grades based on*

Percentage	Grade
92 and above	A
90 - 91	A-

88 - 89	B+
82 - 87	B
80 - 81	B-
78 - 79	C+
72 - 77	C
70 - 71	C-
60 - 69	D
59 and below	F

- *List of the percentage weight [or point value] assigned to various class assignments*
 - Homework: 20%
 - Midterm: 20%
 - Project: 30%
 - Final: 30%
- *No make-up exams will be given and no late homework will be accepted.*

Classroom Protocol

§ *Always start your email subject with “CS255” to get my attention.*

§ ***Wireless laptop is required.** Your laptop must remain closed (preferably in your backpack and, in any case, not on your desk) until I inform you that it is needed for a particular activity.*

§ ***Cheating** will not be tolerated, but working together is encouraged*

§ *Student must be respectful of the instructor and other students. For example, but not limited*

- *Turn off cell phones*

§ *To encourage participation from students, **no** recording is allowed.*

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

CS 255, Fall 2016, Course Schedule

The schedule is subject to change with fair notice and the notice will be made available in class.

Course Schedule

Week	Topics
1	Topics in Algorithms and The Hiring Problem
2	Indicator Random Variables
3	Randomly Permuting Arrays and Balls and Bins
4	The On-line Hiring Problem and The Vertex-Cover Problem
5	2-Approximation Algorithm and (2- ϵ)-Approximation Algorithm
6	The Traveling-Salesman Problem and The Set-Covering Problem
7	MAX-3-CFN Satisfiability and Weighted Vertex Cover
8	Review and Midterm Exam
9	3/2-Approximation Algorithm and Hash Functions
10	Perfect Hashing and Cuckoo Hash
11	Static Threading and The Basics of Dynamic Multithreading
12	A Model of Multithreaded Execution and Analyzing Multithreaded Algorithms
13	Applications of Randomized Algorithms
14	Applications of Approximation Algorithms
15	Applications of Parallel Algorithms
16	Review
Final Exam	Wednesday, Dec. 14, 19:45-22:00