San José State University
Computer Science Department
CS255, Section 1, Design and Analysis of Algorithms, Fall 2018

Course and Contact Information

Instructor: Aikaterini Potika

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Office Hours: T 2:00-3:00pm and Th 3:00-4:00pm or by appointment

Class Days/Time: TTh 3:00-4:15 pm

Classroom: MacQuarrie Hall 422

Prerequisites: CS 155 or instructor consent

Course Format

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas Leaning Management System course login website at http://sjsu.instructure.com. You are responsible for regularly checking with the messaging system through MySJSU at http://my.sjsu.edu (or other communication system as indicated by the instructor) to learn of any updates.

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.

Required Texts/Readings (Required)

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

- Research papers
- Handouts (through Canvas)

Course Requirements and Assignments (Required)

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 (Required)

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.

Quizzes: Unannounced quizzes (at least 4) may be given during class, each taking about 5 minutes total or online. 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. 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 cumulative 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 Information

Determination of Grades

Final Grade:
25% Project (programming and presentation)
5% Quizzes
10% Homework
30% Midterms (15% each)
30% Final

Final exam is comprehensive. No make-ups exams except in case of verifiable emergency circumstances

A+	A	A-	>90
B+	B	B-	>78
C+	C	C-	>65
D+	D	D-	>45
F			<40

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. You may not publicly share or upload material for this course such as exam questions, lecture notes, or solutions without my consent.

University Policies (Required)

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 at http://www.sjsu.edu/gup/syllabusinfo/"

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

Course Schedule

Lectures	Date	Topic
1	8/21	Introduction: Info & Algorithms
2	8/23	Examples
3	8/28	Review: Growth of functions- O, Ω, Θ, o, ω
4	8/30	Graphs
5	9/4	Graphs
6	9/6	Greedy technique
7	9/11	Greedy technique
8	9/13	Greedy technique
9	9/18	Divide and Conquer technique
10	9/20	Divide and Conquer technique
11	9/25	Dynamic Programming technique
12	9/27	Dynamic Programming technique
13	10/2	Network Flow
	10/4	**Midterm 1**
14	10/9	Network Flow Applications
15	10/11	Heaps
16	10/16	Amortized Analysis
17	10/18	Hashing
18	10/23	Parallel algorithms

19	10/25	Intractability
20	10/30	Intractability
21	11/1	Approximation Algorithms
22	11/6	Randomized Algorithms
	11/8	**Midterm 2**
23	11/13	Parallel Algorithms
24	11/15	Distributed Algorithms
25	11/20	Advanced Topics
26	11/27	Project Presentations
27	11/29	Project Presentations
28	12/4	Project Presentations
29	12/6	Project Presentations
		Final exam Monday, December 17 | 14:45-17:00