

Syllabus

CST 370 – Design and Analysis of Algorithms

California State University, Monterey Bay

Fall (B) 2021

Course Information

Credits: 4.0

Prerequisites: CST 238 and MATH 170 (or Instructor's consent)

Lectures: This is an online class.

Course Description

In this course, students will learn important data structures in computer science and acquire fundamental algorithm design techniques to get the efficient solutions to several computing problems from various disciplines. Topics include the analysis of algorithm efficiency, hash, heap, graph, tree, sorting and searching, brute force, divide-and-conquer, decrease-and-conquer, transform-and-conquer, dynamic programming, and greedy programming.

Instructor

Name: YoungJoon Byun, Ph.D.

Email: ybyun@csumb.edu

Phone: 831-582-3602

Zoom: <https://csumb.zoom.us/j/4457737239>

Office Hours:

Monday 4:30P – 5:30P

Wednesday 12:30P – 1:30P

Friday 3:00P – 4:00P

Or by appointment

TA

Name: Sagar Prasad

Email: saprasad@csumb.edu

Zoom: <https://csumb.zoom.us/j/5487084731>

Office Hours:

Monday 7:00P – 9:00P

Tuesday 8:30P – 9:30P

Course Web Site: Canvas

<https://csumb.instructure.com/>

Additional course information and announcements will be available on this site. It is the student's responsibility to check this site frequently.

Required Text

Author: Anany Levitin

Title: Introduction to the Design and Analysis of Algorithms, 3rd Edition

Publisher: Addison Wesley, 2011

ISBN-13: 978-0-13-231681-1

<https://www.vitalsource.com/referral?term=9780133001365>

Course Objectives

The main objectives of this course are to provide students with the knowledge of algorithms for fundamental problems in computer science and data structures to support the efficient implementation of these algorithms. It also teaches the methods of analyzing efficiency of algorithms. Data structures and algorithms are core components in computer science to build large and reliable software systems. To meet these objectives, students will learn several fundamental algorithm design techniques such as brute force, divide-and-conquer, decrease-and-conquer, transform-and-conquer, dynamic programming, and greedy programming. They will also acquire several important data structures such as hash, heap, tree and graph.

Course Outcomes: Upon completion of this course, students should be able to

- Measure the efficiency of an algorithm and use asymptotic notations to represent the efficiency.
- Understand important algorithm design techniques such as brute-force, divide-and-conquer, decrease-and-conquer, transform-and-conquer, greedy method, and dynamic programming.
- Explain different sorting techniques such as heapsort, merge sort, and quick sort.
- Describe tree and graph-based algorithms such as depth-first search, breadth-first search, minimum spanning trees, and shortest path algorithms.

Main Topics

- Review of basic data structures
- Analysis of algorithm efficiency
- Hash, heap, and tree
- Brute-force algorithm design technique
- Divide-and-conquer
- Decrease-and-conquer
- Transform-and-conquer

- Space and time tradeoffs
- Graph algorithms
- Dynamic programming
- Greedy method
- Advanced topics, if time permitted

Exams

- Midterm: Nov. 20 (Saturday) from 10:00(AM) to 12:30(PM).
- Final exam: Dec. 18 (Saturday) from 10:00(AM) to 12:30(PM).
- All exams are closed book exams.
- A calculator is not necessary for the exams.
- No makeup exam will be allowed, except in extreme emergency cases. Students are advised to let the instructor know beforehand, if possible.

Quiz/Homework

- Problem solving quizzes and programming homework will be assigned every week during the semester.
- Submission after the deadline is not accepted.
- No re-grading will be accepted one week after the graded assignment is returned to the students.

Grading Policy

Midterm	15%
Final Exam	15%
Quiz	20%
Homework	50%

Grade		
A+	100	$95 \geq$
A	$95 <$	$90 \geq$
A-	$90 <$	$87 \geq$
B+	$87 <$	$84 \geq$

B	84 <	80 ≥
B–	80 <	77 ≥
C+	77 <	73 ≥
C	73 <	67 ≥
D	67 <	57 ≥
F	57 <	0

Note to Students with Disabilities

Students with disabilities who may need accommodations please see the instructor as soon as possible during office hours or make an appointment by calling 582-3602 or by email ybyun@csumb.edu. Also, contact:
Student_Disability_Resources@csumb.edu
 Building 80, Health and Wellness Services
 Phone: 831/582-3672 voice, or 582-4024 fax/TTY
<http://csumb.edu/sdr>

Academic Integrity Policy in This Class

Cheating of any kind is completely unacceptable in this class. You are responsible for your own original work on homework, projects, quizzes, and exams. You can't use an online website such as "chegg.com", "coursehero.com", etc. for programming assignments. Also, you have to install a camera for the online lecture and turn it on during the quiz and exam. You have to adjust your camera properly so that the instructor can see your face properly.

This is a **penalty for cheating**.

- **Cheating on the midterm or final exam** will result in a **failing grade (= "F")** for the class.
- For the **first violation of a homework or quiz**, you will get zero for that homework or quiz. Then, we will **lower your final letter grade** by one level. For example, if your final letter grade is A, you will receive B. For A-, it will become B-.
- For the **second violation of a homework or quiz**, you will receive a **failing grade (= "F")** for the class.
- In addition to the penalty mentioned above, a student who commits any type of cheating will be **reported to the University's Student Conduct Office**.

For more details, refer to <https://csumb.edu/policy/academic-integrity-policy> and <https://csumb.edu/studentconduct/academic-integrity-violation/>