

California State University, Sacramento College of Engineering and Computer Science

**Computer Science 130: Data Structures and Algorithm Analysis** 

Spring 2024 Syllabus

# Instructor

Devin Cook, M.S.

# **Contact Information**

I use the same e-mail address to answer questions and to receive your coursework. So, please use a descriptive subject in your e-mail. I get quite a bit of e-mail, and the subject helps a lot.

E-Mail	dcook@csus.edu
Office	Riverside Hall 5009
Zoom #	331 390 3761

## Website

All the information in this syllabus - as well as other helpful information presented during the course - can be found online.

Website athena.ecs.csus.edu/~dcook/130

# **Course Description**

# Catalog DescriptionPrerequisitesSpecification, implementation, and manipulation of<br/>complex data structures: multi-lists, trees, sets, and<br/>graphs. Design and analysis of algorithms. Recursion and<br/>stack-based memory management. Advanced searching<br/>and sorting. NP completeness• CSc 20<br/>• CSc 28 (may be taken concurrently)<br/>Textbook (optional, not required)<br/>Robert Sedgewick and Kevin Wayne; Algorithms 4th<br/>Edition; Course TechnologyMajor Topics

- Design, representation and implementation of data structures
- Algorithm analysis and design: Big-O notation; time requirement; space requirement; counting techniques
- Linear lists and multilists: application of stacks and queues, priority queues
- Trees: binary and n-ary trees; traversals; threaded trees; heaps; binary search trees, AVL trees, B-trees, and general search trees
- Sets and their representation: bit map, hash table, union-find
- Graphs: traversals; spanning trees; shortest paths
- Recursion and stack-based memory management
- Advanced sorting: heapsort, mergesort radix sort; comparison with other sort algorithms
- Problem space searching: BFS and DFS
- NP-completeness

# **Crashing the Course**

- <u>All</u> student adds are done, in-person, during the first week of the Semester.
- Waitlisted students will be added first. But, only students physically present will be added.

### **Academic Integrity**

- Do <u>not</u> plagiarize. Plagiarism is the act of incorporating another person's work into yours and claiming it as your own.
- Do <u>not</u> aid any student to commit academic fraud. This means you <u>cannot</u> show your solution to another student or show how to do it.
- Do <u>not</u> use Discord for any channel related to the course. This will be considered cheating.
- In <u>any</u> case of cheating, both the student that copied the solution, <u>and</u> the student who allowed it, will receive a zero. For severe incidents, it will result in an automatic F in the course.
- Any assignments done in prior semesters, *even if you took this class*, are <u>not</u> allowed. Any prior work will receive an automatic zero.

### Lectures

- Attendance is vital to your success in the course. If you miss a class, you are responsible for checking with a classmate about the material we covered.
- Please ask questions or give comments. I enjoy backand-forth interactions with students.
- During lectures <u>no</u> electronic devices, of any type, are allowed. This includes laptops, phones, and other texting devices. <u>No</u> exceptions.
- I will provide all the lecture slides in PDF format on the website. So, you don't have to take notes.

# Assignments

- You only get to submit each assignment <u>once</u> so make sure you did it correctly!
- Late assignments are penalized. I will take off 20%, per day, starting immediately after the assignment is due. Weekend days are counted.
- Do not ask other students for help. All assignments are individual work only.
- My job is not to give you the correct solution, but to help you figure it out by yourself. There are no "dumb" questions, so don't be afraid to ask.

Any material covered in the lectures, or the notes can

### Grading

Title	Points
Projects	300
Midterm Exams	300
Final Exam	300
	900

### Student Resources

- Student Health & Counseling Services
  www.csus.edu/student-life/health-counseling
- Crisis Assistance & Resource Education Support www.csus.edu/student-affairs/crisis-assistanceresource-education-support/

**Note:** Depending on how much material is covered during the semester, the percentages may vary.

The Final is comprehensive.

be included in the exams.

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- Reading and Writing Center
  www.csus.edu/undergraduate-studies/writing-program
- Services for Students with Disabilities
  www.csus.edu/student-affairs/centers programs/disability-access-center