



California State University, Sacramento  
College of Engineering and Computer Science

Computer Science 130: Data Structures and Algorithm Analysis

Spring 2023 Syllabus

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## Instructor

Devin Cook, M.S.

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## 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.

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| <b>E-Mail</b> | dcook@csus.edu      |
| <b>Office</b> | Riverside Hall 5009 |
| <b>Zoom #</b> | 331 390 3761        |

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## Website

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

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| <b>Website</b> | <a href="http://athena.ecs.csus.edu/~dcook/130">athena.ecs.csus.edu/~dcook/130</a> |
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## Course Description

### Catalog Description

Specification, implementation, and manipulation of complex data structures: multi-lists, trees, sets, and graphs. Design and analysis of algorithms. Recursion and stack-based memory management. Advanced searching and sorting. NP completeness

### Prerequisites

- CSc 20
- CSc 28 (may be taken concurrently)

### Textbook (optional, not required)

Robert Sedgewick and Kevin Wayne; Algorithms 4<sup>th</sup> Edition; Course Technology

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## Topics Covered

- 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

## Academic Integrity

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

## Lectures

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- 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 back-and-forth interactions with students. There are no dumb questions!
- During lectures **no** electronic devices, of any type, are allowed. This includes laptops, phones, and other texting devices. **No** exceptions.
- I will provide all the lecture slides in PDF format on the website. So, you don't have to take notes.

## Projects

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- You only get to submit each project **once** – so make sure you did it correctly!
- Late projects are penalized. I will take off 10%, per day, starting immediately after the project is due. Weekend days are counted.
- **Do not ask other students for help.** All projects 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. But, don't be upset if I don't give an answer!

## Grading

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| Title                    | Percent |
|--------------------------|---------|
| Projects                 | 30%     |
| Pop Quizzes / Attendance | 10%     |
| Midterm Exams            | 30%     |
| Final Exam               | 30%     |
|                          | 100%    |

- The Final is comprehensive.
- Any material covered in the lectures, or the notes can be included in the exams.
- **Note:** Depending on how much material is covered during the semester, the percentages may vary

## Student Resources

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- **Student Health & Counseling Services**  
<https://www.csus.edu/student-life/health-counseling>
- **Crisis Assistance & Resource Education Support (CARES)**  
<https://www.csus.edu/student-affairs/crisis-assistance-resource-education-support>
- **Services for Students with Disabilities**  
<https://www.csus.edu/student-affairs/centers-programs/services-students-disabilities>
- **Reading and Writing Center**  
<https://www.csus.edu/undergraduate-studies/writing-program>