

Design and Analysis of Algorithms CS161
Website: <https://panageas.github.io/algo2024.html>

Instructor: Ioannis Panageas, email: ipanagea@ics.uci.edu

Office Hours: Wednesday 2:00-4:00pm via zoom.

Head TA: Navin Velazco, email: nvelazco@uci.edu

Office Hours: Monday 12:00-01:00pm via zoom.

TA: Nikolas Patris, email: npatris@uci.edu

Office Hours: Wednesday 1:00-2:00pm via zoom.

TA: Parnian Shahkar, Email: shahkarp@uci.edu

Office Hours: Friday 05:00-06:00pm via zoom.

TA: Stelios Stavroulakis, email: sstavrou@uci.edu

Office Hours: Wednesday 11:00-12:00pm.

Remark: Office hours will be starting week 2; Zoom links will be posted on canvas.

Required Textbook*: Algorithm Design and Applications, by M. T. Goodrich and R. Tamassia.

Recommended Textbook: Introduction to Algorithms,
by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein.

*The book is available in hard copy from the usual sources. It is also available online at a much cheaper rate.

Edstem: <https://edstem.org/us/courses/57731/discussion>

Edstem is intended as an open and respectful forum for the exchange of questions and answers about the class and the course material. Inappropriate, insulting, or offensive posts will not be tolerated. Such posts will be deleted, and may result in the suspension or termination of access to the forum. In extreme cases, offensive posts may be referred to other University entities for appropriate disciplinary action.

Grading Policy:

- **4 Homeworks (20%):** Four homeworks will be given. Sometimes there will be a programming assignment but will be optional. Each student has to work individually. The assignments will be posted on Gradescope and students need to submit their solutions in PDF format on Gradescope. See <https://help.gradescope.com/article/0chl25eed3-student-scan-mobile-device> for help on scanning. See also schedule when homeworks are due.
- **3 Midterm Exams (20+20+20%):** Will be given on Tuesday of Weeks 4, 6 and 9. Please note all exams will be held synchronously in class hours. 1 hour will be permitted, the rest of time will be allocated for administrative duties.

- **Final Exam (20%)**
- **Homework 5 (Optional, Extra Credit 5%)**
- **Course Evaluation (Optional, Extra Credit 1%)**

Missed Exam Policy: If you need to miss an exam, for any reason, and this is for reasons the instructor accepts, then the points of the missing exam will be allocated equally among the other components. For reasons the student could have known about in advance, it is expected that the student contacts the instructor as soon as possible after the conflict is known. If the conflict could have been known before the exam, the instructor will not provide any relief if informed after the exam unless it would have been unreasonable to do so prior to the exam. If you need to miss an exam, or if you do miss an exam, you must email the instructor as soon as possible upon knowing this. There will be no make up exam. The class has roughly 300 students, so it is impossible to provide individual accommodations.

Discussions and switching: Attending discussions is not required, it is recommended though. Please attend the discussion section you are enrolled and do not attend different time sections.

Schedule of classes (tentative):

Week	Topic	Deadlines
1	Introduction, course expectations and syllabus. Review of basic data structures. Binary search. Sorting: introduction, comparison-based sorting. Insertion sort. Selection sort.	
2	Divide and Conquer recurrence equations. The simplified method. The master method. Divide and conquer algorithms: binary search, mergesort and quicksort; integer multiplication; matrix multiplication and Strassen's algorithm; counting line intersections, counting inversions	Homework 1 due Friday 12th of April
3	Divide and Conquer recurrence equations. The simplified method. The master method. Divide and conquer algorithms: binary search, mergesort and quicksort; integer multiplication; matrix multiplication and Strassen's algorithm; counting line intersections, counting inversions	Homework 2 due Friday 19th of April
4	Dynamic Programming: Introduction. The Weighted Interval Scheduling Problem. The Truck Loading and 0/1 Knapsack problems. Longest Common Subsequence. Optimal matrix chain multiplication. Bellman-Ford and Floyd-Warshall Algorithms	Midterm 1 on Tuesday 23rd of April
5	Dynamic Programming: Introduction. The Weighted Interval Scheduling Problem. The Truck Loading and 0/1 Knapsack problems. Longest Common Subsequence. Optimal matrix chain multiplication. Bellman-Ford and Floyd-Warshall Algorithms	Homework 3 due Friday 3rd of May
6	Greedy Algorithms: Introduction. Fractional knapsack problem. Task scheduling. Graphs: basic concepts.	Midterm 2 on Tuesday 7th of May
7	Weighted graphs. Shortest paths, Dijkstra's algorithm. Minimum spanning trees, the Prim algorithm, Kruskal's algorithm.	
8	Max-flow Min-cut, bipartite matching	Homework 4 due Friday 24th of May
9	Approximation and Randomized Algorithms	Midterm 3 on Tuesday 28th of May
10	NP-complete problems. Reductions. Recap	Homework 5 (Extra credit) due Thursday 13th of June after finals

Academic Dishonesty: Academic dishonesty (cheating) is a serious offense in the eyes of the instructor, the instructional assistants, ICS, and the university. Incidents of academic dishonesty will usually result in your receiving a grade of F in the course and not being allowed to drop the course. Additional consequences may occur at the academic unit or campus level. Examples of academic dishonesty include, but are not limited to:

- Copying from others during an examination
- Using unauthorized materials during an examination.
- Sharing answers or allowing another student to copy off your work during an examination.
- Tampering with an examination after it has been corrected, then returning it for more credit.
- Intentionally disrupting the educational process in any way.

For more complete information about academic honesty policies and procedures, consult the following resources:

1. <https://www.ics.uci.edu/ugrad/policies/index.php?policy=cheating>
2. <https://aisc.uci.edu/students/academic-integrity/index.php>
3. <https://aisc.uci.edu/policies/academic-integrity/AcademicIntegrityPolicyApproved-04.23.15.pdf>