Design and Analysis of Algorithms CS161
Website: https://panageas.github.io/algo2023/

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TA: Raj Mohanty, via zoom, Email: mohantyk@uci.edu
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TA: Renascence Tarafder Prapty, via zoom, Email: rprapty@uci.edu
Office Hours: Wednesday 12:00-1:00pm.
Remark: Office hours will be starting week 2.

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.

Piazza: https://piazza.com/uci/spring2023/cs161

Please note that although posters can hide their identity from other students, the instructor and the teaching assistants are able to determine the identity of posters. Piazza 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 (24%)**: Four homeworks will be given, including written and programming assignments. If you use Latex for **all** your written hwks, you get 5% bonus (105 maximum). 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.

- **2 Midterm Exams (25+25%)**: Will be given on Thursday of Weeks 5 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 (25%)**
- **Course evaluation (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.

Sections A,B 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. As far as exams are concerned, you are not allowed to give exams in a different section from the one you are enrolled. If you do so, you will get a zero in the exam.

Schedule of classes (tentative):

Week	Topic	Reading [GT]
1	Introduction, course expectations and syllabus	Sections 1.1, 1.2, 1.3
2	Review of basic data structures. Binary search. Sorting: introduction, comparison-based sorting. Insertion sort. Selection sort.	Chapter 2, Section 3.1, Section 5.2.2
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.	Sections 11.1, 11.2, 11.3. Homework 1 due Friday 21st of April
4	Mergesort, counting line intersections, counting inversions. Priority queues and heaps. HeapSort. Summary of comparison-based sorting.	Chapter 5, Sections 8.1, 8.3. Homework 2 due Friday 28th of April
5	Greedy Algorithms: Introduction. Fractional knapsack problem. Task scheduling.	Chapter 10. Midterm 1 on Thursday 4th of May
6	Graphs: basic concepts. Depth-first search, breadth-first search. Biconnected components. Strong connectivity. Topological sorting.	Sections 13.1, 13.2, 13.3, 13.4.1, 13.4.4, 13.5
7	Weighted graphs. Shortest paths, Dijkstra's algorithm. Minimum spanning trees, the Prim algorith, Kruskal's algorithm.	Sections 14.1, 14.2, 15.1, 15.2, 15.3. Homework 3 due Friday 19th of May
8, 9	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	Sections 12.1, 12.2, 12.3, 12.6, 14.3, 13.4.2 Midterm 2 on Thursday 1st of June
10	NP-complete problems. Reductions.	Chapter 17. Homework 4 due Friday 9th of June

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`