

Spring 2023

Rafail Ostrovsky

Introduction to Algorithms and Complexity

First lecture: Monday, April 3rd, 2pm-3:50PM

CS180

When/where: Spring 2023, M,W 2pm-3:50pm, Broad Art Center 2160E

Instructor: Prof. Rafail Ostrovsky, Email: rafail@cs.ucla.edu

Office: Egnineering VI, Office 475 (4th floor)

Office hours: Each Monday 4:15pm-5pm or by appointment, starting on 4/10/2023

TA's:

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Description: The focus of this course is on the design and analysis of algorithms, with an emphasis on teaching “algorithmic thinking.” My goal is to teach how to approach and solve computational problems, as well as how to demonstrate that certain problems are (most likely) unsolvable. Throughout the course, I will introduce various design techniques including divide-and-conquer, greedy methods, dynamic programming, network flow, reductions, and the choice of data structures and representations. We will also cover complexity measures such as time and space, upper and lower bounds, asymptotic complexity, NP-completeness, and the use of randomness. If we have enough time, we may also delve into more advanced topics such as interactive proofs, distributed algorithms and approximation algorithms.

Prerequisites: CS32 and CS61 (or permission of instructor.)

Textbook: *Algorithm Design* by Jon Kleinberg and Eva Tardos, published by Addison-Wesley. Towards the end of the quarter, I may also cover topics not covered in the textbook – in which case I will provide additional references that are available online.

Grading Policy: Homework: 15%. HW will be assigned most weeks on Wednesday, due the following Thursday evening (i.e. in eight days from assignment). You must solve the problems yourself without looking up answers on the internet or collaborating with other students. **Midterm:** 40%. The midterm will be held on **May 1st, 2023** during normal lecture hours. **Final:** 45%. The final will be held during finals week. All exams will be closed book with no electronics. ¹

Other Policies: While attendance and class participation in this course are not mandatory, I highly recommend them as they can greatly enhance your understanding of the material and some material will not be covered in textbook. Asking questions is an excellent way to learn, so please don't hesitate to ask me during class, I don't mind going slower even if we will cover less material as a result. Due to large class size, do not email me your questions regarding material after class, instead post your additional questions on *piazza* for TA's or ask them in person during recitations on Fridays. All re-grade requests should be made within one week of announced grade utilizing *gradescope* and addressed to TAs.

¹Academic honesty will be actively enforced (see <http://www.deanofstudents.ucla.edu/Student-Conduct>).