CS 301: Algorithms
Fall 2022

Lectures: Thu 17:40–19:30, Fri 14:40–15:30 (FENS G077)
Recitations: Thu 9:40–10:30 (FASS 1008–1010, FASS 1076–1078)
Instructor: Esra Erdem (TBA)
TAs: Aysu Boğatarkan (TBA), Baturay Yılmaz (TBA)

Course description. This course is about the analysis and design of computer algorithms. We will study various methods to analyze the correctness and asymptotic performance of algorithms, important algorithms (e.g., searching, sorting, path finding) and data structures (e.g., dynamic sets), algorithmic design paradigms (e.g., randomized, divide-and-conquer, dynamic programming, greedy), and hardness of problems (e.g., NP-completeness).

Course objectives. To prepare students 1) to analyze an algorithm's performance by asymptotic analysis methods, 2) to understand the role of data structures and programming paradigms on the performance of algorithms, and 3) to design efficient algorithms taking into account these important factors.

Prerequisites. A strong understanding of programming and data structures (e.g., CS300), and a solid background in discrete mathematics and probability (e.g., MATH204) are necessary for this course.

Lectures and Recitations. Students are expected to attend the lectures and the recitation sessions every week.

Textbook. We will study "Introduction to Algorithms" (3rd edition) by Cormen, Leiserson, Rivest and Stein.

Homework. There will be six assignments: A0, A1, A2, A3, A4, A5. One of the assignments (A4) will involve programming. Each student should write up the solutions on her/his own and should be able to explain the solutions to the instructor and/or the teaching assistants during the demo sessions. Late submissions will not be accepted.

Quizzes. Quizzes will be given almost every week.

Exams. There will be two exams: one midterm (E1) and one final examination (E2). There will be only one make-up exam (to be considered instead of one missing exam): it will be given on the next business day after the final exam, and only if requested with an official report before the final exam. In the exams, students are responsible for the material presented in lectures and recitations, and covered in the assignments.

Grading. Grades will be determined by the assignments (25%), the quizzes (5%), and the exams (70%). Assignment A0 will not be graded. Assignments A1, A2, A3, and A5 will contribute equally (15%), whereas assignment A4 will contribute more (10%). The quizzes will contribute equally; two of them with the least grades will be dropped. Exams E1 and E2 will contribute 30% and 40%, respectively.