

School: Efi Arazi School of Computer Science M.Sc.

Advanced Algorithms

Lectures:

Dr. Shay Mozes smozes@idc.ac.il

Instructor Assistants:

Mr. Ori Ben Dor ori.bendor@post.idc.ac.il

Dr. Shay Mozes smozes@idc.ac.il

Course No.:	Type Course :	Weekly Hours :	Credit Points:
3501	Lecture	4	4

Course Requirements :	Group Code :	Language:
Exam	161350101	Hebrew

Prerequisites

Prerequisite:

52 - Calculus I
53 - Calculus II
54 - Linear Algebra I
55 - Linear Algebra II
56 - Discrete Mathematics
59 - Data Structures
69 - Logic And Set Theory
77 - Algorithms
417 - Introduction To Computer Science

Course Details

An advanced course intended mainly for M.Sc. students. The course will cover a range of topics relating to algorithm design and analysis. The focus is more on breadth than on depth. As such we will cover many subjects that will give the students a taste of advanced and modern algorithmic techniques and approaches to solving problems algorithmically. Subjects covered include reviewing basic techniques such as greedy algorithms and dynamic programming, approximation algorithms for NP-hard problems, linear programming, randomized algorithms, online algorithms, parameterized complexity, and more.

Course Goals

The goal of this class is to introduce the students to various algorithmic techniques for solving problems, and to strengthen the students' ability to design, analyze and argue about algorithms.

Course Grading Method

The grade is composed of 30% homework assignments (about 6 biweekly problem sets)

and 70% final written exam.

Bonus points will be given to students preparing their problem sets using LaTeX.

Lecture Reception Hours

Thursdays 17:00-18:00

Instr. Assistance Details

Mr. Ori Ben-Dor will be the grader for this class. He can be contacted by email oribendor@gmail.com

Reading List

The course does not follow a single book. Relevant books for various topics we will cover are:

- Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Cliff Stein. MIT Press and McGraw-Hill.
- Approximation Algorithms by Vijay V. Vazirani. Springer.
- Randomized Algorithms by Rajeev Motwani and Prabhakar Raghavan. Cambridge University Press.
- Linear Programming by Vasek Chvatal
- Parameterized Algorithms by Marek Cygan. Fedor V. Fomin, Lukasz Kowalik, Daniel Lokshantov, Daniel Marx, Marcin Pilipczuk, Michal Pilipczuk and Saket Saurabh.