

# The Hebrew University of Jerusalem

Syllabus

## Algorithms - 67504

Last update 11-11-2021

<u>HU Credits:</u> 5

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Computer Sciences

<u>Academic year:</u> 0

Semester: 1st and/or 2nd Semester

<u>Teaching Languages:</u> Hebrew

<u>Campus:</u> E. Safra

Course/Module Coordinator: Alex Samorodnitsky

<u>Coordinator Email: salex@cs.huji.ac.il</u>

Coordinator Office Hours: Monday 16:00-17:00

Teaching Staff:

Prof Alex Samorodnitsky, Ms. Yarden Yagil, Mr. Elad Granot, Mr. Gilad Stern, Ms. Daniela Horan, Prof Yuval Rabani, Mr. Daniel Rotem, Mr. Guy Hacohen

#### Course/Module description:

The course describes a wide array of basic and advanced algorithms.

### Course/Module aims:

Developing "algorithmic thinking" by presenting a wide array of algorithmic problems and their solutions.

#### <u>Learning outcomes - On successful completion of this module, students should be</u> <u>able to:</u> know and apply the main algorithmic techniques

understand and apply the mathematical tools and ideas which underlie the algorithmic techniques

apply main algorithm analysis techniques to asses the complexity of an algorithm

recognize (some) problems to be computationally hard and design an approximation algorithm in this case

analyze an algorithmic problem and decide on an appropriate algorithmic technique for its solution

<u>Attendance requirements(%):</u> 0

Teaching arrangement and method of instruction: Lectures + tutorials

#### Course/Module Content:

Design and analysis of efficient algorithms for basic and advanced algorithmic

problems. This includes greedy algorithms, dynamic programming, approximation algorithms, network flow, fast Fourier transform and applications, number theoretical algorithms, cryptography, and computational linear algebra

<u>Required Reading:</u> none

Additional Reading Material:

Introduction to Algorithms, by T. Cormen, C. Leiserson, R. Rivest, and C. Stein. Second Edition.

Algorithm Design, by J. Kleinberg and E. Tardos

Algorithms, by S. Dasgupta, C.H. Papadimitriou, and U.V. Vazirani

<u>Course/Module evaluation:</u> End of year written/oral examination 80 % Presentation 0 % Participation in Tutorials 0 % Project work 0 % Assignments 20 % Reports 0 % Research project 0 % Quizzes 0 % Other 0 %

<u>Additional information:</u> NA