



The Hebrew University of Jerusalem

Syllabus

DATA STRUCTURES - SUMMER COURSE - 67110

Last update 31-10-2017

HU Credits: 4

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: computer sciences

Academic year: 0

Semester:

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Guy Kindler

Coordinator Email: gkindler@cs.huji.ac.il

Coordinator Office Hours: By appointment

Teaching Staff:

Prof Michael Ben-Or
Prof Guy Kindler

Course/Module description:

1. Sorting: insertion-sort, merge-sort and quick-sort. Lower bound for comparison sorting. 2. Asymptotic analysis of running time 3. Recurrence relations, and the divide and conquer paradigm 4. Dynamic data structures 5. Heaps: implementation with an array. Heapsort algorithm 6. Binary Search Trees, AVL trees 7. Huffman Coding 7. Hashing algorithms. 8. Graph algorithms: breadth first search, depth first search (BFS, DFS), minimum spanning tree (MST), strongly connected components (SCC), topological ordering.

Course/Module aims:

See learning outcomes

Learning outcomes - On successful completion of this module, students should be able to:

Learn and understand in-depth the basic algorithms and data structures in Computer Science:
sorting, graph search, coding schemes, trees, graphs, arrays, heaps.

Analyze existing algorithms and data structures.

Develop new algorithms and data structures

Understand the complexity of computational problems

Attendance requirements(%):

Teaching arrangement and method of instruction: Frontal lectures + recitation sessions

Course/Module Content:

Data Structures, course number 67109 Syllabus 1. Sorting: insertion-sort, merge-sort and quick-sort. Lower bound for comparison sorting. 2. Asymptotic analysis of running time 3. Recurrence relations, and the divide and conquer paradigm 4.

Dynamic data structures: 5. Heaps: implementation with an array. Heapsort algorithm 6. Binary Search Trees: AVL trees 7. Hash tables 8. Graph algorithms: breadth first search (BFS), minimum spanning tree (MST)

Required Reading:

Introduction to Algorithms, Second Edition . Thomas H. Cormen, Charles E. Leiserson, .Ronald L. Rivest

Additional Reading Material:

NA

Grading Scheme:

Additional information:

Home assignment will be checked either by an oral interview or in writing, during three meetings during the semester. The weight of these will be 15 points out of the final grade (5 for each meeting) There may be an additional quiz, whose grade will weigh 15 points out of the total, but will only be counted in if it is higher than the test grade.