The Hebrew University of Jerusalem

Syllabus

Data Structures - 67109

Last update 08-02-2022

HU Credits: 4

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Computer Sciences

Academic year: 0

Semester: 1st and/or 2nd Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Prof. Amit Daniely, Prof. Guy Katz

Coordinator Email: huji.dast.22b@gmail.com

Coordinator Office Hours: By appointment only

Teaching Staff:

Prof Amit Daniely,
Prof Katz Guy,
Ms. Mira Finkelstein,
Mr. Shahaf Bassan,
Mr. Jonathan Karin,
Mr. Evyatar Cohen,
Mr. Nir Vaknin,
Prof Leo Joskowicz,
Ms. noam shenwald,
Mr. David Ponarovsky

Course/Module description:

This course teaches common data structures, such as tree, graphs, and others. The course deals with describing data types, and applying them to efficiently solve various problems.

This course is given in parallel to course 67125 (Introduction to Object Oriented Programming), where students will apply the concepts taught here using the Java programming language. Still, this course can be taken without 67125, as a stand-alone course.

Course/Module aims:

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

Learn and understand in-depth some 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(%):

100

Teaching arrangement and method of instruction: Frontal lectures + exercises

Course/Module Content:

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

Course/Module evaluation:

End of year written/oral examination 85 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 15 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:

NA