Tel Aviv University
Faculty of Engineering
School of Electrical Engineering

אוניברסיטת תל אביב
הפקולטה להנדסה
בית הספר להנדסת חשמל

# Data Structures and Algorithms

**Spring Semester**

**LECTURER** **Liron David**

Office: Tochna Building, Room 313
E-mail: lirondavid@gmail.com

**GRADER** **Tom Mahler**

E-mail: tommahler@gmail.com

## COURSE DESCRIPTION

This course aims to introduce you some basic data structures and algorithms which are to be used as tools in designing solutions to problems. You will become familiar with the specification, usage, implementation and analysis of these data structures and algorithms.

## COURSE TOPICS

Weeks 1-2: Introduction: Searching an element in a sorted list, binary search. Rates of growth definitions: O(n), Ω(n), Θ(n). Algorithm Correctness and Run-time, complexity analysis.
Week 3-4: Sorting: Insertion Sort. Merge sort. Quick sort. Lower-bound on sorting by comparison and the notion of decision tree. Linear time sorting algorithms.
Week 5-8: Abstract Data types and data structures: list, stack and queue, priority queue and implementation with heaps. Binary search trees and 2-3 trees. Union-find.
Week 9-11: Algorithms Design Techniques: Divide and conquer. Greedy algorithms. Dynamic programming.
Week 12-14: Graph Algorithms: Definitions. Representations. Traversals, Finding minimum spanning tree. Maximum flow.

## ASSIGNMENTS

Homework assignments and solutions will be displayed continuously on the course site in MOODLE. Homework is calculated as 10% of the final grade and will be given out every one or two weeks.

**MIDTERM COURSE POLICY**

A midterm exam will be scheduled in the beginning of the semester. During an examination, student shall not use books, papers, or other materials not authorized by the instructor. The midterm count for 15% of the final grade.

**FINAL COURSE POLICY**

The final exam will cover the entire course material and will count for 75% of the total course grade. The duration will be 3 hours. During an examination, student shall not use books, papers, or other materials not authorized by the instructor.
Students will have a first exam, Moed A. If the student does not pass, they can retake the exam, Moed B. The last exam taken will be the student's final grade for the exam.

**REQUIRED READING**

*Introduction to Algorithms*. Corman, Leiserson and Rivest (CLR)

**ADDITIONAL READING**

*Data Structures and Algorithms*. Aho, Hopcroft and Ullman (AHU)