Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF224-A	Algorithms And Data Structures	3	2	0	2	3	5

Prerequisites	INF114
Admission Requirements	INF114

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	The aim of the course is to equip student with skills of choosing the most appropriate data structure, using these data structures into different types of algorithms, analyzing the performance of proposed algorithms and choosing the most efficient one and programming these algorithms in C.
Content	Week 1 — Introduction to Data Structures and Algorithms; C language review Week 2 — Arrays, pointers, linked lists, queues, stacks, recursive calls Week 3 — Linked lists; complexity, Big-O notation, running time, computability Week 4 — Search Methods and Trees 1: sequential search, binary search Week 5 — Search Methods and Trees 2: Red-Black Trees, AVL trees, n-ary trees Week 6 — Sorting Algorithms: Bubble sort, Quick sort, Insertion sort, Merge sort Week 7 — Heap sort and heap trees; Bucket/Radix sort; hash tables; Huffman coding Week 8 — Midterm Exam Week 9 — Graphs: multidimensional arrays, graphs with pointers, undirected and directed graphs Week 10 — Graphs: graph traversal (DFS, BFS), Kruskal, Prim, and Dijkstra algorithms Week 11 — Dynamic Programming 1: Bellman–Ford and Floyd–Warshall algorithms Week 12 — Matching Algorithms Week 13 — End-of-term research presentations / individual performance evaluation Week 14 — End-of-term research presentations / individual performance evaluation
References	1. M.A. Weiss, Data Structures & Algorithm Analysis in C++, 1999, Addison Wesley. 2. A.M. Tanenbaum, Data Structures using C, 1989, Prentice Hall. 3. A. Drozdek, Data Structures and Algorithmss in C++, 2004, Course Technology. 4. R. Sedgewick, Algorithms in C, Parts 1-4: Fundamentals, Data Structures, Sorting, Searching, 1997, Addison-Wesley. 5. Olcay Taner Yıldız, C && Java ile Veri Yapılarına Giriş, Boğaziçi Üniversitesi Yayınevi, 2013.

Theory Topics

Week	Weekly Contents
1	Introduction to Data Structures and Algorithms; C language review
2	Arrays, pointers, linked lists, queues, stacks, recursive calls
3	Linked lists; complexity, Big-O notation, running time, computability
4	Search Methods and Trees 1: sequential search, binary search
5	Search Methods and Trees 2: Red-Black Trees, AVL trees, n-ary trees
6	Sorting Algorithms: Bubble sort, Quick sort, Insertion sort, Merge sort
7	Heap sort and heap trees; Bucket/Radix sort; hash tables; Huffman coding
8	Midterm Exam
9	Graphs: multidimensional arrays, graphs with pointers, undirected and directed graphs
10	Graphs: graph traversal (DFS, BFS), Kruskal, Prim, and Dijkstra algorithms
11	Dynamic Programming 1: Bellman–Ford and Floyd–Warshall algorithms
12	Matching Algorithms
13	End-of-term research presentations / individual performance evaluation
14	End-of-term research presentations / individual performance evaluation