

Ministry of Higher Education and Scientific research



Department of Software and Informatics

College of Engineering

University of Salahaddin

Subject: Data Structure

Course Book (High Diploma Second Semester)

Lecturer's name: Bnar Faisal A. Daham

Academic Year: 2023/2024

Course Book

1. Course name	Data Structure
2. Lecturer in charge	Bnar Faisal A. Daham
3. Department/ College	Software and Informatics Engineering Department
4. Contact	bnar.abdulrahman@su.edu.krd
5. Time (in hours) per week	Theory three hours
6. Office hours	Office hours are stated in the time table
7. Course code	
8. Teacher's academic profile	Received the B.Sc. and M.Sc. degrees in Software Engineering, Salahaddin University, Erbil, Iraq, in 2006 and 2009, respectively.
9. Keywords	Algorithm, ADT, Complexity, Sorting, Searching, Tree, ...
<p>10. Course overview: This course provides an introduction to many of the basic data structures used in computer software, analyzes the algorithms that use them and apply them by writing programs. (although a review of the necessary basic programming notions is included).</p> <ul style="list-style-type: none"> - You will understand <ul style="list-style-type: none"> • What the tools are for storing and processing common data types. • Which tools are appropriate for which. - So that you will be able to <ul style="list-style-type: none"> • Justify your design decisions via formal reasoning. • Communicate ideas about programs clearly and precisely. 	
<p>11. Course objective: The students in this course will learn the concepts used to build data inside computer and how different searching and sorting techniques are applied to it. Finally, the student will be introduced to different techniques of building algorithms.</p>	
<p>12. Student's obligation Students are obliged to attend within the time stated in the lecture schedule for lessons that are many examples of solution during the lecture for closer understanding of the subject and that's what does not exist in the form reproduced obtained lectures, also the students responsible to solving home works and assignments.</p>	

13. Forms of teaching

There are three hours of scheduled instruction per week. New material will be formally presented in lectures. Students are expected to read in advanced the relevant sections and chapters from the essential text(s). Parts of some topics will not be lectured at all – instead, students will be expected to read the corresponding material from the textbook. In such cases, lecture time will be used for discussing the concepts, studying examples, and solving problems. Whiteboard and pen have been mostly used and frequently clear the subject step by step. Homework, report, seminars and assignments are normally given throughout the course.

14. Assessment scheme

10% Quizzes

10% Reports

10% Seminars

20% Midterm

50% Effort

50% Final exam

Note: There will be randomly quizzes. Each quiz will be given at the beginning of the class.

15. Student learning outcome:

At the end of this course, students will be able to:

1. Describe the data structures used in computer systems, how data is stored and retrieved in each structure (accessing protocols).
2. Write good algorithms with minimum cost analyze algorithms and compare them to choose the best one.
3. Know all sorting algorithms.
4. Understand the searching technique.

16. Course Reading List and References:

The following references are recommended:

1. Data Structure, Algorithms and Application in C++ by S. Sahni, any edition
2. Data Structure and Programming Design in C++ by Kruse and Ryba, Prentice Hall, any edition.
3. Algorithms and Data Structures by Kurt Mehlhorn and Peter Sanders, any edition.
4. Advanced Data Structures by Prof. Erik Demaine, Notes Collection.
5. Fundamentals of Data Structures by Ellis Horowitz and Sartaj Sahni
6. Notes on Data Structures and Programming Techniques by James

17. Topics	Lecturer's Name
<ul style="list-style-type: none"> ▪ Introduction, general overview of the course, and selecting language. ▪ Complexity, Abstract data types starting with stack, stack algorithms, and stack applications. ▪ Queue, queue algorithm, queue applications, and priority queue. ▪ Pointer and heap memory, starting with single linked list algorithms, and Double linked list algorithms. ▪ Tree Data structure terminology, and binary search tree operations, and algorithms. ▪ Sort algorithm types and divide and conquer mechanism. ▪ Search algorithm types. ▪ Graph Algorithms Basics. ▪ Breadth First Search BFS, Depth First Search DFS, and Dijkstra algorithms. 	<p>Bnar Faisal Daham</p>
18. Extra notes	
19. Peer review	