



Course Plan

Course No.: **50811203**

Course Name: **Data Structure**

Course Website:

Time Division:

3hr Theoretical and 2hr Practical

Semester & Year:

First , 2022/ 2023

Course Description

(**3 credit hours, Prerequisite:**)

This course include strategies and techniques that are required to store data (Data Structures) and perform operations on such data, as well as on the analysis and design of such techniques.

Course Intended Outcomes

At the end of the course, students are expected to learn:

1. Discuss the appropriate use of built-in data structures.
2. Understanding of Abstract data types and classes.
3. Describe common applications for each of the following data structures: stack, queue, circular queue priority queue, tree.
4. Write programs that use each of the following data structures: arrays, linked lists, stacks, queues, tree.
5. Compare and contrast the costs and benefits of dynamic and static data structure implementations.

Course Outline

Week	Theoretical	Practical
1	Introduction to Data Structures: <ul style="list-style-type: none"> - How to choose the suitable data structure - Types of data structures - Memory Representation - Introduction to Abstract Data Type 	Review of VC# language
2	<ul style="list-style-type: none"> - Introduction to Time Complexity : - Space Complexity - Time Complexity (Big –O Notation) 	Programming of stack
3	Stack <ul style="list-style-type: none"> - The Stack Abstract Data Type - Array Stack - Stack Operations - Time Complexity of these operations 	Examples of stack
4	Applications of stack: <ul style="list-style-type: none"> - Check for balancing of parenthesis - Convert infix expression to postfix 	Programming of Queue with Quiz

	<ul style="list-style-type: none"> - Evaluate postfix expression - Use of stack in Function calls 	
5	<p>Queue</p> <ul style="list-style-type: none"> - The Queue Abstract Data Type - Queue operations - Time Complexity of these operations 	Programming of Circular Queue
6	<p>Circular Queue and Priority Queues:</p> <ul style="list-style-type: none"> - The Abstract Data Type - Operations - Time Complexity of these operations 	Programming of Circular Queue
7- First Exam		
8	<p>Lists :</p> <ul style="list-style-type: none"> - Array list - The array List Abstract Data Type - Time Complexity of these operations - Array list operation 	Programming of array list
9	<p>Linked List</p> <ul style="list-style-type: none"> - Storage Allocation - Pointers - Linked List Abstract Data Type - Traversing a Linked List - Linked List Operations - Time Complexity of these operation 	Programming of Linked List
10	<p>Linked List Design Modification :</p> <ul style="list-style-type: none"> - Circular Linked List - Circular Linked List Operations - Traversing Circular Linked List - Time Complexity of these operation 	Programming of Linked List With quiz
11	<p>Linked List Design Modification :</p> <ul style="list-style-type: none"> - Doubly Linked List - Doubly Linked List Operations - Traversing Doubly Linked List - Time Complexity of these operation 	Examples on Linked List
12	<p>Linked Stack , Linked Queue , Linked Circular Queue</p> <ul style="list-style-type: none"> - Operations - Time Complexity of these operation - Recursion 	Programming of Recursion Factorial and power, Sum and Fibonacci
13- Second Exam		
14	Binary Tree:	Programming of Binary search Tree

	<ul style="list-style-type: none"> - Types of Binary Tree - Traversing Binary Tree: (post order , in order , preorder) 	
15	Binary Search Tree: <ul style="list-style-type: none"> - Building Binary Search tree - Finding Minimum and Maximum values in Binary Search tree - Delete value in Binary Search Tree - Representation of Arithmetic Expressions using Binary Tree 	Programming of Binary search Tree

Textbooks

1. Author: MICHAEL McMillan. Title : " Data Structures and Algorithms Using C#" , 2007
2. Author : Thomas H. Cormen , CHARLES E. LEISERSON Title : "Introduction to Algorithms " , third edition ,2009

Suggested references:

1. Author: Bruno R. Preiss Title : " Data Structures and Algorithms with Object-Oriented Design Patterns in C# " 2001
2. Author: Deitle and Deitle. Title : "C Sharp How To Program" , Prentic Hall , 2009

Marking

First Semester				Second Semester				Final Exam
1st exam	2nd exam	Practical	Activity	1st exam	2nd exam	Practical	Activity	
10	10	14	6					60

Regulations

1. There will be two term exams given during this semester.
2. There is 2 marks for quizzes.
3. Attendance is mandatory and University regulations will be enforced.
4. All Cheating incidents will be reported to the chair. The following activities are considered cheating:
 - a. Turning in assignment that includes parts of someone else work.
 - b. Turning in someone else assignment as your own.
 - c. Giving assignment to someone else to turn in as their own.
 - d. Copying answers in a test or quiz.
 - e. Taking a test or quiz for someone else.
 - f. Having someone else take a test or quiz for you.
5. See student handbook for other regulations.

Assignments and/or Projects

Assignment/Project	Description	Due Date	Marking
H.W. 1	Write program on stack application		2 Marks
H.W. 1	Solve the questions the chapter		2 Marks
Quizzes	Two quizzes	During the course	2 Marks

Instructor(s) information

Section: 1 Lecture Room: Time.

Instructor's Name: Dr. Ghassan Muslim E-Mail: gmhalsaddi@uomustansiriyah.edu.iq Office No.:
Dr. Bassam AlKindy E-Mail: dr.balkindy@uomustansiriyah.edu.iq

Office Hours: Posted on office door
Last Updated : 10/10/2022

Important: The content of this syllabus may not be changed during the current semester.

Lecturer Signature

Chair Signature

New syllabus