UNIVERSITI TEKNOLOGI MARA
CSC248: FUNDAMENTALS OF DATA STRUCTURES

Course Name (English)	FUNDAMENTALS OF DATA STRUCTURES `APPROVED`
Course Code	CSC248

MQF Credit	3

Course Description	This course provides the concept of information organization and manipulation in a computer to emphasize the use of the data structure in problem solving. An object-oriented approach will be used to develop the programming solutions.

Transferable Skills	Algorithms and data structures skills Programming skill

Teaching Methodologies	Lectures, Blended Learning, Lab Work

CLO	CLO1 Explain the concept of abstract data type (ADT) and data strutures CLO2 Manipulate the data structures using algorithms such as sorting and searching. CLO3 Differentiate between various data structure characteristics using appropriate data structure implementation in problem solving.

Pre-Requisite Courses	No course recommendations

Topics

1. Introduction to Data Structures
1.1) Abstract Data Type Concept
1.2) Data Structure Concept
1.3) Application of Data Structures
1.4) Basic Algorithms: (a) Sorting - Bubble Sort & Insertion Sort, (b) Searching - Binary Search
1.5) Implementation of Generic Classes

2. Sequential List
2.1) Basic Sequential List Concept
2.2) Implementation of Sequential List
2.3) Suitable Type of Problems Requiring the use of Sequential Lists

3. Linked List
3.1) Basic Linked List Concept
3.2) Implementation of Linked List
3.3) Concept in Variation of Linked List
3.4) Linked List Implementation with Head and Tail Pointers (Single, Double and Circular Linked List)
3.5) Suitable Type of Problems Requiring the use of Linked List

4. Queue
4.1) Basic Queue Concept
4.2) Suitable Type of Problems Requiring the use of Queue

5. Stack
5.1) Arithmetic Expression (Infix, Prefix and Postfix)
5.2) Basic Stack Concept
5.3) Suitable Type of Problems Requiring the use of Stack

6. Trees
6.1) Concept of Recursion and Recursive Function
6.2) Basic Tree Concept
6.3) Types of tree: Complete Binary Tree, Almost Complete Binary Tree, Strictly Binary Tree
6.4) Expression Tree
6.5) Binary Search Tree (BST) Concept (Including Inorder, Preorder and Postorder)
6.6) Implementation of BST

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	LAB ASSIGNMENT 1. Students are to apply the Sequential List and/or Linked List data structures implementation.	20%	CLO2
	Quiz	QUIZ 1. The question will evaluate or test the student's knowledge and understanding on topic LinkedList & Queue.	10%	CLO1
	Test	TEST 1. The question will cover the following topics: Introduction to Data Structures, Sequential List, Linked List and Queue.	30%	CLO3

Reading List	Recommended Text	Elliot B. Koffman and Paul A.T. Wolfgang 2015, *Data Structures: Objects, Abstraction and Design using Java*, 3rd Ed., John Wiley
	Reference Book Resources	Michael T. Goodrich, Roberto Tamassia and Michael H. Goldwasser 2014, *Data Structures and Algorithms in Java*, 6th Ed., John Wiley
		John Lewis and Joseph Chase 2014, *Java Software Structures: Designing and Using Data Structures*, 4th Ed., Pearson
		Mark J. Johnson 2014, *A Concise Introduction to Data Structures using Java*, Taylor & Francis Group
		Narashima Karumanchi 2015, *Data Structures and Algorithm Made Easy in Java: Data Structure and Algorithmic Puzzles*, CareerMonk Publications
		Priya Sen 2016, *Data Structures & Algorithms*, Tutorial Point (I) Pvt. Ltd.
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	