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

© Copyright Universiti Teknologi MARA

© Copyright Universiti Teknologi MARA

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

© Copyright Universiti Teknologi MARA