



## UNIVERSITI TEKNOLOGI MARA

### CSC438: FUNDAMENTAL OF DATA STRUCTURES

<b>Course Name (English)</b>	FUNDAMENTAL OF DATA STRUCTURES <b>APPROVED</b>
<b>Course Code</b>	CSC438
<b>MQF Credit</b>	3
<b>Course Description</b>	In this course, we attempt to understand the concept of information organization and manipulation in a computer, emphasizing the use of data structure in problem solving. The object-oriented approach will be followed to develop the programming solutions
<b>Transferable Skills</b>	Demonstrate ability to identify and articulate self skills, knowledge and understanding confidently and in a variety of contexts
<b>Teaching Methodologies</b>	Lectures, Lab Work, Discussion
<b>CLO</b>	CLO1 Explain the fundamental concepts of data structures (C2) CLO2 Construct fundamental data structures using abstract data types (ADTs)(P3) CLO3 Determine effective solutions using fundamental data structures in Object-Oriented Programming approach (C4)
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. Introduction to Data Structures</b> 1.1) Concept of Abstract Data Types 1.2) Concept of Data Structure 1.3) Application of structured data 1.4) Implementation of Generic classes	
<b>2. List</b> 2.1) Concept of List 2.2) Sequential List 2.3) Linked List 2.4) Concept in variation of linked list: Doubly linked list and Circular linked list	
<b>3. Queue</b> 3.1) Concept of Queue 3.2) Queue Implementation 3.3) Queue Application	
<b>4. Stack</b> 4.1) Concept of Stack 4.2) Stack Implementation 4.3) Stack Application	
<b>5. Recursion Technique</b> 5.1) Concept of Recursion 5.2) Recursion function 5.3) Application of Recursion using Stack	
<b>6. Tree</b> 6.1) Concept of Tree 6.2) Types of Binary Trees (BT): Complete BT, Strictly BT, Expression Tree 6.3) Concept of Binary Search Tree (BST) 6.4) Implementation of BST 6.5) Application of BST	

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Programming Assignment 1	5%	CLO2
	Assignment	Programming Assignment 2	5%	CLO2
	Assignment	Programming Assignment 3	5%	CLO2
	Assignment	Programming Assignment 4	5%	CLO2
	Quiz	Quiz 1(5%)	5%	CLO1
	Quiz	Quiz 2 (5%)	5%	CLO3
	Test	Test 1(10%)	10%	CLO1
	Test	Test 2 (10%)	10%	CLO3

Reading List	Recommended Text	<ul style="list-style-type: none"> <li>• Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser 2014, <i>Data Structures and Algorithms in Java 6th Edition International Student Version</i>, 6th Edition International Student Version Ed., Wiley [ISBN: 9781118808573]</li> <li>• Debasish Chawdhuri 2017, <i>Java 9 Data Structures and Algorithms</i>, Packt Publishing Birmingham, United Kingdom [ISBN: 1785889346]</li> </ul>
	Reference Book Resources	<ul style="list-style-type: none"> <li>• Allen Downey 2017, <i>Think Data Structures</i>, 3rd Edition Ed., O'Reilly Media Sebastopol, United States [ISBN: 9781491972397]</li> <li>• Kotiyana 2018, <i>Introduction To Data Structures and Algorithms in Java</i>, 3rd Edition Ed., Independently published [ISBN: 978179291346]</li> <li>• Narasimha Karumanchi 2016, <i>Data Structures and Algorithms Made Easy</i>, 3rd Edition Ed., Careermonk Publications Madinaguda, Hyderabad [ISBN: 9788193245279]</li> <li>• Frank M. Carrano, Timothy M. Henry 2018, <i>Data Structures and Abstractions with Java</i>, 3rd Edition Ed., Pearson Harlow, England [ISBN: 0134831691]</li> </ul>
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	