GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Bachelor of Vocation (B.Voc), 2nd Semester
Branch: Software Development
Subject Name: Data Structures
Subject Code: 1120201

With effective from academic year 2018-19

Type of course: Core

Prerequisite: Programming in C

Rationale: Data structure is a subject of primary importance in Information and Communication Technology. Organizing or structuring data is important for implementation of efficient algorithms and program development. Efficient problem solving needs the application of appropriate data structure during program development. Understanding of data structures is essential and this facilitates the understanding of the language. The practice and assimilation of data structure techniques is essential for programming.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks			Practical Marks			
L	T	P	C	ESE (E)	PA (M)		PA(V)		PA (I)	
					PA	ALA	ESE	OEP		
03	00	00	03	50	00	00	00	00	00	50

L- Lectures; P- Practical; OJT- On Job Training; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Sr. No.	Practical / Hands on Exercise	Teaching Hrs.	Module Weightage
1	**UNIT–I** An Overview of Computers and Programming-Simple program logic, The steps involved in the program development cycle, Pseudo code statements and flowchart symbols, Using a sentinel value to end a program, Programming and user environments, The evolution of programming models.	6	10
2	**UNIT–II** The concept of data structure, Abstract data structure, Analysis of Algorithm, The concept of List Introduction to stack & primitive operation on stack, Stack as an abstract data type, Multiple Stack, Stacks application: Infix, post fix, Prefix and Recursion, Introduction to queues, Primitive Operations on the Queues, Queues an abstract data type, Circular queue, Dequeue, Priority queue, Applications of queue	10	25
3	**UNIT–III** Introduction to the Linked List of Stacks, Basic operations on linked list, Stacks and queues as a circular linked list, Header nodes, Doubly Linked List, Circular Linked List, Stacks & Queues as a Circular Linked List, Application of Linked List.	10	25
4	**UNIT–IV** TREES - Basic Terminology, Binary Trees, Tree Representations as Array & Linked List, Basic operation on Binary tree, Traversal of binary trees: - In order, Preorder & post order, Application of Binary tree, threaded binary tree, B- tree & Height balanced tree, B+ & B* trees, 2-3 trees, Binary tree	8	20

	representation of trees, Counting binary trees		
5	**UNIT–V** Sequential Searching, Binary search, Insertion sort, Selection sort, Quick sort, Bubble sort, Heap sort, Comparison of sorting methods Hash Table, Collision resolution Techniques, Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversal-Depth first & Breadth first search, Spanning Trees, minimum spanning Tree, Shortest path algorithm	8	20
	Total	**42**	

Reference Books:

1. Data Structures, R.S. Salaria, Khanna Publishing House
2. An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill. Web Technologies, Black Book, dreamtech Press
3. Data and File Structures using C, Thareja,Reema Oxford University Press New Delhi 2011
4. Data Structures through C (A Practical Approach), G. S. Baluja, Dhanpat Rai & Co.

Course Outcomes:

Sr. No.	CO Statement	Marks % Weightage
CO-1	Understand and development the program development cycle.	10
CO-2	Differentiate primitive and non-primitive structures.	25
CO-3	Design and apply appropriate data structures for solving computing problems	25
CO-4	Apply appropriate data structures for developing various applications.	20
CO-5	Apply sorting and searching algorithms to the small and large data sets	20

Laboratory work: NA

List of Open Source Software/learning website:

Students must refer to following sites to enhance their learning ability.
1) Vlabs.iitb.ac.in
2) NPTEL tutorials
3) www.coursera.org
4) www.udacity.com