INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (COMPUTER ENGINEERING)
SEMESTER	3
COURSE TITLE	DATA STRUCTURE
COURSE CODE	09CE2303
COURSE CREDITS	5

Objective:

1 This subject will help to understand fundamental concepts of data structure. Data structure has high significance in the field of Computer and IT. Association of information is urgent for usage and for that it requires proficient calculations. Comprehension of information structures and their related applications are profoundly expected to build practical program.

Course Outcomes: After completion of this course, student will be able to:

1 Understand different data structures and their applications
2 Perceive the need of data structures.
3 Able to implement different type of sorting algorithm using data structure.
4 Able to distinguishing proper data structure for prerequisite application.

Pre-requisite of course: Basics of C

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	4	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction to basic of Data Structure** Data Structure, Data representation, data types-Primitive data type, non-primitive data type, algorithm, time complexity, space complexity	3
2	**Array & Stack** Study of linear data structure, representation of array, Two dimensional array, multidimensional array, sparse matrices, application of array, Introduction to stack, operation of stack-push, pop, peep, stack through array, application of array	5

Contents : Unit	Topics	Contact Hours
3	**Queue & Link List** Introduction to queue, operation on queue-insertion, deletion, type of queue-simple queue, Circular queue, double ended queue (dequeue), application of queue, Introduction to link list, memory allocation in link list, Operation of link list-creation, insertion, deletion, type of link list-singly link list, Doubly link list, circular link list, application of link list	5
4	**Tree** Non-linear data structure, introduction to binary tree, Operation on tree-insert, delete, search, Height of tree, no. of nodes, binary tree traversal- in-order, pre-order, post-order	4
5	**Sorting & Searching Techniques** Introduction to sorting, different kind of sorts, Bubble sort, insertion sort, Merge sort, Quick sort, Selection sort, Searching Concepts and Methods: Sequential Search, Binary Search	6
6	**Hashing** Introduction to hashing table, Various hash function- division method, Multiplication method, Mid-square method, Application of hashing	5
Total Hours		**28**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiments** Perform the malloc(), calloc(), free() function of dynamic memory allocation., Write a program which use the concept of call by value and call by reference., Perform the following operation of stack using array. I. Push II. Pop III. Peep, Write a program which converts postfix notation into infix notation using stack., Perform the following operation of simple queue using array. I. Inset II. Delete III. Display, Perform the following operation of circular queue using array. I. Inset II. Delete III. Display, Implement stack using link list., Implement queue using link list., Write a program to insert and delete node in singly link list., Write a program to count the no. of node and searching the specific node in singly link list., Write a program to insert a node at beginning of the doubly link list and delete a node at of the doubly link list., Write a program to insert an element at any position in doubly link list., Write a program to create a binary search tree., Write a program for binary tree traversal in-order, pre-order, post-order., Write a program for bubble sort., Write a program for insertion sort., Write a program for merge sort., Write a program for quick sort.	36
Total Hours		**36**

Textbook :

1 Data and File Structures using C, Reema Thareja, Oxford University Press, 2014

References:

1 Data and File Structures using C, Data and File Structures using C, Reema Thareja, Oxford University Press, 2014

2 Data Structures using C & C++, Data Structures using C & C++, Andrew S. Tanenbaum, PHI, 2015

3 An Introduction to Data Structures with Applications, An Introduction to Data Structures with Applications, Jean-Paul Tremblay and Paul G. Sorenson, Tata McGraw Hill, 2017

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
35.00	35.00	30.00	0.00	0.00	0.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Supplementary Resources:

1 https://visualgo.net/en