SYLLABUS:

DATA STRUCTURES

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
DS2102PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**1**	**0**	**4**	**30**	**70**	**100**
Contact classes: 45	**Tutorial Classes: 15**	**Practical classes: NIL**				**Total Classes :60**		
Prerequisites: A course on "Programming for Problem Solving".								

Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithm

Course Outcomes:

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs and AVL-trees.

COURSE SYLLABUS

MODULE- I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

MODULE- II

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

Hash Table Representation: Hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

MODULE- III

Search Trees: Binary Search Trees, Definition, Implementation, Operations-Searching, Insertion and Deletion, AVLTrees, Definition, Height of an AVL Tree, Operations–Insertion, Deletion and Searching, Red–Black, Splay Trees.

MODULE- IV

Graphs: Graph Implementation Methods. Graph Traversal Methods.

Sorting: Heap Sort, External Sorting - Model for external sorting, Merge Sort.

MODULE- V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer–Moore algorithm, the Knuth- Morris - Pratt algorithm, Standard Tries,

Compressed Tries, and Suffix tries.

TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C–A.S. Tanenbaum, Y. Langsam and M.J. Augenstein, PHI/Pearson Education.

REFERENCE BOOK:

1. Data Structures: A Pseudo code Approach with C, 2nd Edition, R.F. Gilberg and B.A. Forouzan, Cengage Learning.