JYOTI NIVAS COLLEGE AUTONOMOUS
SYLLABUS FOR 2021 BATCH AND THEREAFTER
PROGRAMME: BCA
SEMESTER: II -DATA STRUCTURES

COURSE CREDITS: 03 **NO. OF HOURS: 45**

COURSE OUTCOMES (COS):

1. The ability to visualize the problem and the data involved and to appropriately select the right data structure.
2. To understand how data can be stored in memory.
3. To understand how to learn and implement arrays, stacks, queues, linked list, trees, graphs
4. To understand the operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.
5. To analyze the complexity in terms of time and space and determine the best approach in solving the problem.

UNIT-I **12 Hours**

Introduction andOverview: Definition, Elementary data organization, Classification ofData Structures, data Structures operations, Abstract data types. Mathematical notations andfunctions, Algorithmic Notations, control structures, Complexity of algorithms, asymptoticnotations.

Arrays:Definition,Lineararrays,arraysasADT,RepresentationofLinearArraysinMemory,TraversingLineararrays,Insertinganddeleting,Multi-dimensionalarrays,Matricesand Sparsematrices.

UNIT-II **15 Hours**

Linked list: Definition, Representation of Singly Linked List in memory, traversing a Singlylinked list, searching in a Singly linked list, Memory allocation, Garbage collection, Insertioninto a singly linked list- insert beginning, end, given position, Deletion from a singly linkedlist;Doubly linked list, Header linkedlist, Circular linked list.

Stacks: Definition, Array representation of stacks, linked representation of stacks, ArithmeticExpressions:PolishNotation,Conversionofinfixexpressiontopostfixexpression, EvaluationofPost fixexpression,Application of Stacks, Recursion,TowersofHanoi.

Queues: Definition, Array representation of queue, Linked list representation of queues.Typesofqueue:Simplequeue,Circularqueue,Double-endedqueue,Priorityqueue,Operationson Queues, Applications of queues.

UNITIII **08 Hours**

BinaryTrees: Definitions,TreeSearch,TraversalofBinary,BuildingaBinarySearchTree,Heaps, Applications of Trees.

Graphs: Mathematical Back ground, Computer Representation, Graph Traversal,TopologicalSorting.

UNITIV **10 Hours**

Searching: Introduction, Sequential Search, Binary Search, Comparison of Methods.**Sorting:** Introduction, Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer, Mergesortfor linked list, Quick sort.
Hashing: ChoosingaHashfunction,CollisionResolutionwithOpenAddressing,CollisionResolutionby Chaining.

TextBooks:

1. Seymour Lipschutz, "Data Structures with C", Schaum's out Lines, Tata McGraw Hill,2011.
2. Robert Kruse, C.L.Tondo, Bruce Leung,ShashiMogalla,"Data Structures and ProgramDesignusingC", PearsonEducation, 2009.

ReferencesBooks:

1. MarkAllenWeiss,"DataStructuresandAlgorithmAnalysisin C",SecondEdition,PearsonEducation, 2013.
2. Forouzan,"A Structured Programming Approach using C", 2nd Edition, Cengage LearningIndia,2008.