**Lecture Schedule**

 **Department of Computer Science Engineering & Information Technology**

# Branch & Section : II B.Tech - I Sem & ECE Regulation : R16

**Subject : Data structures Academic Year : 2017 -2018**

**Name of the Faculty : M. SWAPNA**

**Course Objectives**

* Solve problems using data structures such as linear lists, stacks, queues, hash tables
* Be familiar with advanced data structures such as balanced search trees, AVLTrees, and

 B Trees.

**Course Outcomes:**

• Apply advanced data structure strategies for exploring complex data structures.

• Compare and contrast various data structures and design techniques in the area of

 Performance.

• Implement data structure algorithms through C

• Incorporate data structures into the applications such as binary search trees, AVL and B Trees

• Implement all data structures like stacks, queues, trees, lists and graphs and compare their

Performance and trade offs

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| Unit No | Topic No | Name of the Concept | No. of Classes Required |
| **UNIT-I: ARRAYS** |
| Unit - 1 | 1 | Abstract Data Types  | 1 |
| 2 | The Array as an Abstract Data Type | 1 |
| 3 | The Polynomial Abstract Data type | 1 |
| 4 | Polynomial Representation- Polynomial Addition | 2 |
| 5 | Spares Matrices, Introduction- Sparse Matrix Representation | 2 |
| 6 | Transposing a Matrix- Matrix Multiplication, Representation of Arrays. | 4 |
| Total number of hours  | 11 |
| Unit – II:  **STACKS AND QUEUES** |
| Unit 2 | 1 | The Stack Abstract Data Type | 3 |
| 2 | The Queue Abstract Data Type | 3 |
| 3 | Evaluation of Expressions, Expression- Postfix Notation- Infix to Postfix | 5 |
| Total number of hours  |  11 |
| Unit – III :  **LINKED LISTS** |
| Unit - 3 | 1 | Single Linked List and Chains | 1 |
| 2 | Designing a Chain  | 1 |
| 3 | Chain Manipulation Operations | 2 |
| 4 | Implementing Chains with Linked Lists | 2 |
| 5 | Available Space Lists, Linked Stacks and Queues, Polynomials,Polynomial Representation- Adding Polynomials | 2 |
| 6 | Circular List Representation of Polynomials, Equivalence Classes | 2 |
| 7 | Matrices, Sparse Matrix Representation- Sparse Matrix Input-Deleting a Sparse Matrix, Doubly Linked Lists | 3 |
| 8 | Generalized Lists, Representation of Generalized Lists- Recursive Algorithms for Lists- Reference Counts, Shared and Recursive Lists | 3 |
| Total number of hours  | 16 |
| Unit – IV:  **TREES** |
| Unit - 4 | 1 | Introduction, Terminology, Representation of Trees | 1 |
| 2 | Binary Trees, The Abstract Data Type, Properties of Binary Tress | 2 |
| 3 | Binary Tree Representations, Binary Tree Traversal and TreeIterators | 2 |
| 4 | Introduction, In order Traversal Preorder Traversal, Post order Traversal | 1 |
| 5 | Thread Binary Trees, Threads, In order Traversal of a Threaded Binary Tree | 2 |
| 6 | Inserting a Node into a Threaded Binary Tree, Heaps | 2 |
| 7 | Priority Queues, Definition of a Max Heap, Insertion into a Max Heap, Deletion from a Max Heap | 2 |
| 8 | Binary Search Trees, Definition, Searching a Binary Search Tree | 1 |
| 9 | Insertion into a Binary Search Tree, Deletion from a Binary Search Tree, Height of Binary Search Tree. | 1 |
| Total number of hours  | 14 |
| Unit – V:  **GRAPHS** |
| Unit - 5 | 1 | The Graph Abstract Data Type, Introduction, Definition, Graph Representation | 1 |
| 2 | Elementary Graph Operation, Depth First Search | 1 |
| 3 | Breadth First Search, Connected Components, SpanningTrees, Bi connected Components | 2 |
| 4 | Minimum Cost Spanning Trees, Kruskal S Algorithm | 1 |
| 5 | Prim s Algorithm Sollin’ s Algorithm | 1 |
| 6 | Shortest Paths and Transitive Closure, Single Source/AllDestination: Nonnegative Edge Cost | 2 |
| 7 | Single Source/All Destination: General Weights, All-PairsShortest Path, Transitive Closure. | 2 |
| Total number of hours  | 10 |
| Unit – VI:  **SORTING** |
| Unit – 6 | 1 | Insertion Sort, Quick Sort | 1 |
| 2 | Merge Sort Merging, Iterative Merge Sort | 2 |
| 3 | Recursive Merge Sort, Heap Sort | 1 |
| Total number of hours | 4 |

 **Overall Number of classes required: 66**

**Text Books:**

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition,

 Universities Press Orient Longman Pvt. Ltd.

2 . Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.

3. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson

**References:**

1 . Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.\_

2 . Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.\_

3. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education

Signature of Faculty