**Lesson Plan**

**Discipline :** Computer Engineering

**Semester :** 3rd Computer Engineering

**Subject :** Data Structure & Algorithm

**Lesson Plan Duration:** 15 weeks

Work Load (Lectutre/Practical) per week (in hours): **Lectures 03 hours**

|  |  |  |
| --- | --- | --- |
| **Week** | **Theory** | |
| Lecture Day |  |
| 1st | 1 | **Introduction to Data Structures**, Data Types, Built in and User Defined Data Structures, Applications of Data Structure |
| 2 | Algorithm Analysis, Worst, Best and Average Case Analysis |
| 3 | Notations of Space and Time Complexity |
| 2nd | 4 | **Arrays**, One Dimensional Arrays, Two Dimensional Arrays and Multi-Dimensional Arrays |
| 6 | Sparse Matrices, Storage Class, Basics of Recursion. |
| 7 | Searching from array using Linear and Binary Searching Algorithm, Sorting of array using Selection, |
| 3rd | 9 | Insertion, Bubble, Radix Algorithm |
| 10 | **Stacks**: Definition, Implementation of Stacks and Its Operations |
| 11 | Evaluation of Infix, prefix and Postfix Expression, Inter-conversion of Infix Expression, Prefix and Post-Fix Expression |
| 4th | 13 | Implementation of Merge Sort and Quick Sort Algorithm. |
| 14 | **Queues**: Definition, Sequential Implementation of Linear Queues and Its Operations |
| 15 | Circular Queue and Its Implementation, Priority Queues and Its Implementation, Applications of queues. |
| 5th | 17 | **Linked Lists**: Dynamic Implementations, Need of Dynamic Data Structures |
| 18 | Single Link List and Its Dynamic Implementation, Traversing, Insertion |
| 19 | Deletion Operations on Single Link Lists. Comparison between Static and Dynamic, Implementation of Linked List |
| 6th | 21 | Dynamic Implementation of Stacks and Queues |
| 22 | Circular Link Lists |
| 23 | Students Query |
| **7th** | **Minor Test** |  |
| 8th | 25 | Doubly Link List |
| 26 | Dynamic Implementation of Primitive Operations on Doubly Linked Lists and Circular Link List. |
| 27 | Dynamic Implementation of Primitive Operations on Doubly Linked Lists and Circular Link List. |
| 9th | 29 | **Trees**: Definition, Basic Terminology, Binary Tree |
| 30 | External and Internal Nodes, Static and Dynamic Implementation of a Binary Tree |
| 31 | Primitive Operations on Binary Trees |
| 10th | 33 | Binary Tree Traversals: Per-Order |
| 34 | In-Order |
| 35 | Post-Order Traversals |
| 11th | 37 | Representation of Infix, Post-Fix and Prefix Expressions using Trees |
| 38 | Introduction to Binary Search Trees |
| 39 | B trees, B+ trees |
| 12th | 41 | AVL Trees |
| 42 | Threaded Binary trees |
| 43 | Balanced Multi-way search trees |
| 13th | 45 | Implementation of Heap Sort Algorithm |
| 46 | **Graphs**: Basic Terminology, Definition of Undirected & Directed Graphs |
| 47 | Memory Representation of Graphs, |
| **14th** |  | **Minor Test** |
| 15th | 49 | Minimum-Spanning Trees, |
| 50 | Warshal Algorithm |
| 51 | Graph Traversals Algorithms: Breadth First and Depth First |