**SHAMBHUNATH INSTITUTE OF ENGINEERING & TECHNOLOGY, JHALWA PRAYAGRAJ**

**STUDY SCHEME**

**(Lecture- Plan: 2019-2020)**

**B. Tech.:5th Semester**

**Paper Code: RCS -502**

**Subject: “DESIGN & ANALYSIS OF ALGORITHM”**

**Branch: Computer Science & Engineering**

**Faculty Name: Mr. Amit Kumar Srivastava**

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| **UNIT-1** | **TOPIC** | **LECT.** | **REFE.** |
| Introduction to Design and analysis of algorithms, Types of algorithm approach and application in real life | L1 | R1 |
| Goal of analysis of the running time, Pseudo code | L2 | R1 |
| Case of analysis(Worst, average and best case running time ) | L3 | R1 |
| Growth of Functions | L4 | R1 |
| Asymptotic notations and their types | L5 | R1 |
| Numerical problem on big oh ,thetha and omega | L6 | R1 |
| Recurrences, Solution of Recurrences by substitution | L7 | R1 |
| Recursion tree method | L8 | R1 |
| Master Method | L9 | R1 |
| implementation of Merge sort & Quick sort | L10 | R1 |
| Analysis of quick sort & merge sort | L11 | R1 |
| Heap , Heapify property | L12 | R1 |
| Heap sort | L13 | R1 |
| Comparison of Sorting algorithm | L14 | R1 |
| Linear time sorting ,counting sort | L15 | R1 |
| Redix & Bucket sort | L16 | R1 |
| **UNIT-2** | Revision | L17 |  |
| Advanced Data Structure | L18 | R1,R2 |
| R-B Tree , its properties, Rotation | L19 | R1,R2 |
| R-B Tree Insertion & Deletion | L20 | R1,R2 |
| R-B Tree Example | L21 | R1,R2 |
| B-Tree ,its properties, Derivation | L22 | R1 |
| B-Tree Insertion & Deletion | L23 | R1 |
| B-Tree Example | L24 | R1 |
| Binomial Heap ,Representation, properties | L25 | R1 |
| Binomial Heap Operation | L26 | R1 |
| Binomial Heap as priority Queue | L27 | R1 |
| Fibonacci Heap ,Representation, properties | L28 | R1 |
| Fibonacci Heap Operation | L29 | R1 |
| Fibonacci Heap Application (Consolidation) | L30 | R1 |
| Trie | L31 |  |
|  | Skip list | L-32 |  |
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|  | Divide & Conquer With Binary Searching Matrix Multiplication | L-33 | R2 |
| UNIT-3 | Divide & Conquer With Convex Hull, | L34 | R2 |
| Greedy Methods , Properties | L35 | R1 |
| Activity Selection Problem | L36 | R1 |
| Knapsack , Huffman Codes | L37 | R1 |
| Minimum Spanning Tree , Prim’s Algorithm | L38 | R1 |
| Kruskal’ algorithms | L39 | R1 |
| Shortest Path Problem , Dijkstra’algorithm | L40 | R1 |
| Bellman Ford Algorithms | L41 | R1 |
| **UNIT-4** | Dynamic Programming ,properties ,Knapsack(0-1) | L42 | R1 |
| Longest Common Subsequence | L43 | R1 |
| Matrix Chain Multiplication | L44 | R1 |
| All Pair Shortest Path Problem ,Warshal’ & Floyd Algo. | L45 | R1 |
| Back tracking , Branch & Bound Technique | L46 | R2 |
| Graph Coloring, n-Queen | L47 | R2 |
| Hamiltonion Cycle & Sum of Subset Problem | L48 | R2 |
| Trevelling Salesman Problem | L49 | R2 |
| **UNIT-5** | String Matching , Simple Naïve & Rabin Karp Algorithm | L50 | R1 |
| Numerical Upon Rabin Karp algorithm | L51 | R1 |
| KMP Algorithm & Prefix Function | L52 | R1 |
| BM Moore Algorithm & Last Function | L53 | R1 |
| Finite Automaton Matcher | L54 | R1 |
| Approximation Algorithms | L55 | R1 |
| APPROX - Vertex Cover & TSP | L56 | R1 |
| Randomized Algorithm | L57 | R1 |
| Discrete Fourier Transform | L58 | R2 |
| Fast Fourier Transform | L59 | R2 |
| NP-Completeness | L60 | R1 |
| Polynomial time verification | L61 | R1 |
| NP-Complete Problems (without proofs) | L62 | R1 |
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| **References:**  **1: Thomas H.Coreman, Charles E. Leiserson and Ronald L. Rivest ,“Introduction To Algorithms “**  **2: E. Horowitz & S Sahni,” Fundamentals of Computer Algorithms”** | | | |