ATME College of Engineering

# Department of Computer Science and Design

## Lesson Plan & Work-done Diary for AY: 2024-25 EVEN Semester

| **Course with Code:** Analysis and Design of Algorithms – BCS401 | | | | **Faculty: Dr. Nasreen Fathima** | | | **Semester : IV** | |
|---|---|---|---|---|---|---|---|---|
| **Class No.** | **Date planned (DD/MM)** | **Topics to be covered** | **TLP Planned** | **Class No.** | **Date of Conduction (DD/MM)** | **Topics Covered** | **TLP Executed** | **Remarks if any deviation** |
| **MODULE-1** | | | | | | | | |
| 1 | | Introduction to course | Chalk & Talk | 1 | | | | |
| 2 | | Introduction: What is an Algorithm? Fundamentals of Algorithmic Problem solving, | Chalk & Talk | 2 | | | | |
| 3 | | Fundamentals of the Analysis of Algorithm Efficiency: Analysis Framework, Asymptotic Notations: Big-Oh notation (O), Omega notation (Ω), Theta notation ( ) with examples, Basic efficiency classes | Chalk & Talk | 3 | | | | |
| 4 | | Asymptotic Notations: Big-Oh notation (O), Omega notation (Ω), Theta notation ( ) with examples, Basic efficiency classes | Chalk & Talk | 4 | | | | |
| 5 | | Mathematical analysis of Non Recursive Algorithms. | Chalk & Talk | 5 | | | | |
| 6 | | Mathematical analysis of Non Recursive Algorithms. | Chalk & Talk | 6 | | | | |
| 7 | | Mathematical analysis of Recursive Algorithms. | Chalk & Talk | 7 | | | | |
| 8 | | Brute Force Approaches: Selection Sort and Bubble Sort, Sequential Search | Chalk & Talk | 8 | | | | |
| 9 | | Brute force string matching | Chalk & | 9 | | | | |

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| | | | Talk | | | | | |
| | | Discussion of expected questions & quiz | PPT | | | | | |
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| **MODULE-2** | | | | | | | | |
| 10 | | Brute Force Approaches (contd..) Exhaustive Search-Travelling Sales Person problem | Chalk & Talk | | | | | |
| 11 | | Knapsack Problem. Decrease and Conquer Approach: Introduction, | Chalk & Talk | | | | | |
| 12 | | Insertion sort, | Chalk & Talk | | | | | |
| 13 | | Topological Sorting | Chalk & Talk | | | | | |
| 14 | | Divide and Conquer: Merge sort | Chalk & Talk | | | | | |
| 15 | | Quick sort | Chalk & Talk | | | | | |
| 16 | | Binary tree traversals | Chalk & Talk | | | | | |
| 17 | | Multiplication of Large Integers and Strassen's Matrix Multiplication | Chalk & | | | | | |

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| **MODULE-3** | | | | | | | | |
| 18 | | **Transform and Conquer Approach:** Balanced Search Trees | Chalk & Talk | | | | | |
| 19 | | Balanced Search Trees | Chalk & Talk | | | | | |
| 20 | | Heaps and Heap Sort | Chalk & Talk | | | | | |
| 21 | | Heap Sort | Chalk & Talk | | | | | |
| 22 | | **Space-Time Tradeoffs:** Sorting by Counting: Comparison counting sort | Chalk & Talk | | | | | |
| 23 | | Comparison counting sort | Chalk & Talk | | | | | |
| 24 | | Input Enhancement in String Matching- Horspool's algorithm | Chalk & Talk | | | | | |
| 25 | | Horspool's algorithm | Chalk & Talk | | | | | |

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| **MODULE-4** | | | | | | | | |
| 26 | | **Dynamic Programming:** Three basic Examples | Chalk & Talk | 25 | | | | |
| 27 | | Knapsack Problem and Memory Functions | Chalk & Talk | 26 | | | | |
| 28 | | Warshall's Algorithm | Chalk & Talk | 27 | | | | |
| 29 | | Floyd's Algorithm | Chalk & Talk | 28 | | | | |
| 30 | | **Greedy Method:** Prim‟s Algorithm | Chalk & Talk | 29 | | | | |
| 31 | | Kruskal's Algorithm | Chalk & Talk | 30 | | | | |
| 32 | | Dijkstra's Algorithm | Chalk & Talk | 31 | | | | |
| 33 | | Huffman Trees and Codes | Chalk & Talk | 32 | | | | |

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| **MODULE-5** | | | | | | | | |
| 34 | | Limitations of Algorithmic Power: Decision Trees | Chalk & Talk | | | | | |
| 35 | | P, NP and NP-Complete problems | PPT | | | | | |
| 36 | | Coping with limitations of algorithmic power: Backtracking: N-Queens problem | Chalk & Talk | | | | | |
| 37 | | Sum of subsets problem | Chalk & Talk | | | | | |
| 38 | | Branch and Bound:Knapsack problem | Chalk & Talk | | | | | |
| 39 | | Knapsack problem | Chalk & Talk | | | | | |
| 40 | | Approximation algorithms for NP-Hard problems ( Knapsack problem) | Chalk & Talk | | | | | |

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| | | Discussion of expected questions & quiz | PPT | | | | | |

| | Activity | Planned | Actual | Remarks |
|---|---|---|---|---|
| **1** | Theory Classes | 40 | | |
| **2** | Assignments/ Quizzes/ Self-study | 2 + Quizzes | | |
| **3** | Tutorials/ Extra classes | - | | |
| **4** | Internal Assessments | 3 | | |
| **5** | ICT based Teaching (% of usage in Curriculum) | 15 | | |

| **Planning** | **Execution** |
|---|---|
| **Faculty Signature:** | **Faculty Signature:** |
| **HoD Signature:** | **HoD Signature:** |