



## DEPARTMENT OF COMPUTER SCIENCE & DESIGN

### Lesson Plan & Work-done Diary for AY: 2025-26 (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 |
| <b>BRIDGE COURSE</b>   |                      |   |              |                              |                            |                |               |                          |
| 1  |                      | Concepts of Data Structures   | Chalk & Talk | 1                            |                            |                |               |                          |
| 2  |                      |   |              | 2                            |                            |                |               |                          |
| 3  |                      |   |              | 3                            |                            |                |               |                          |
| 4  |                      |   |              | 4                            |                            |                |               |                          |
| <b>MODULE-1</b>  |                      |   |              |                              |                            |                |               |                          |
| 5  |                      | Introduction to course  | Chalk & Talk | 5                            |                            |                |               |                          |
| 6  |                      | Introduction: What is an Algorithm?<br>Fundamentals of Algorithmic Problem solving, | Chalk & Talk | 6                            |                            |                |               |                          |



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|    |   |              |    |  |  |  |  |
|----|---|--------------|----|--|--|--|--|
| 7  | Fundamentals of the Analysis of Algorithm Efficiency: Analysis Framework, Asymptotic Notations: Big-Oh notation (O), Omega notation ( $\Omega$ ), Theta notation ( $\Theta$ ) with examples, Basic efficiency classes | Chalk & Talk | 7  |  |  |  |  |
| 8  | Asymptotic Notations: Big-Oh notation (O), Omega notation ( $\Omega$ ), Theta notation ( $\Theta$ ) with examples, Basic efficiency classes   | Chalk & Talk | 8  |  |  |  |  |
| 9  | Mathematical analysis of Non Recursive Algorithms.  | Chalk & Talk | 9  |  |  |  |  |
| 10 | Mathematical analysis of Non Recursive Algorithms.  | Chalk & Talk | 10 |  |  |  |  |
| 11 | Mathematical analysis of Recursive Algorithms.  | Chalk & Talk | 11 |  |  |  |  |
| 12 | Brute Force Approaches: Selection Sort and Bubble Sort, Sequential Search   | Chalk & Talk | 12 |  |  |  |  |
| 13 | Brute force string matching   | Chalk & Talk | 13 |  |  |  |  |
| 14 | Discussion of expected questions & quiz   | PPT          | 14 |  |  |  |  |
|    |   |              |    |  |  |  |  |



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| <b>MODULE-2</b>  |                      |   |              |                              |                            |                |              |                          |
| 15   |                      | Brute Force Approaches (contd.)<br>Exhaustive Search-Travelling Sales<br>Person problem | Chalk & Talk |                              |                            |                |              |                          |
| 16   |                      | Knapsack Problem. Decrease and Conquer Approach: Introduction,                          | Chalk & Talk |                              |                            |                |              |                          |
| 17   |                      | Insertion sort,   | Chalk & Talk |                              |                            |                |              |                          |
| 18   |                      | Topological Sorting   | Chalk & Talk |                              |                            |                |              |                          |
| 19   |                      | Divide and Conquer: Merge sort  | Chalk & Talk |                              |                            |                |              |                          |
| 20   |                      | Quick sort  | Chalk & Talk |                              |                            |                |              |                          |
| 21   |                      | Binary tree traversals  | Chalk & Talk |                              |                            |                |              |                          |
| 22   |                      | Multiplication of Large Integers and Strassen's Matrix Multiplication                   | Chalk & Talk |                              |                            |                |              |                          |
| 23   |                      | Discussion of expected questions & quiz   | PPT          |                              |                            |                |              |                          |



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| <b>MODULE-3</b>  |                      |  |              |                              |                            |                |               |                          |
| 24   | 25-Mar-25            | <b>Transform and Conquer Approach:</b><br>Balanced Search Trees            | Chalk & Talk |                              |                            |                |               |                          |
| 25   | 26-Mar-25            | Balanced Search Trees  | Chalk & Talk |                              |                            |                |               |                          |
| 26   | 27-Mar-25            | Heaps and Heap Sort  | Chalk & Talk |                              |                            |                |               |                          |
| 27   | 1-Apr-25             | Heap Sort  | Chalk & Talk |                              |                            |                |               |                          |
| 28   | 2-Apr-25             | <b>Space-Time Tradeoffs:</b> Sorting by Counting; Comparison counting sort | Chalk & Talk |                              |                            |                |               |                          |
| 29   | 3-Apr-25             | Comparison counting sort   | Chalk & Talk |                              |                            |                |               |                          |
| 30   | 7-Apr-25             | Input Enhancement in String Matching- Horspool's algorithm                 | Chalk & Talk |                              |                            |                |               |                          |
| 31   | 8-Apr-25             | Horspool's algorithm   | Chalk & Talk |                              |                            |                |               |                          |
| 32   | 9-Apr-25             | Discussion of expected questions & quiz                                    | PPT          |                              |                            |                |               |                          |



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| <b>MODULE-4</b>  |                      |  |              |                              |                            |                |              |                          |
| 33   |                      | <b>Dynamic Programming:</b> Three basic Examples | Chalk & Talk |                              |                            |                |              |                          |
| 34   |                      | Knapsack Problem and Memory Functions            | Chalk & Talk |                              |                            |                |              |                          |
| 35   |                      | Warshall's Algorithm                             | Chalk & Talk |                              |                            |                |              |                          |
| 36   |                      | Floyd's Algorithm                                | Chalk & Talk |                              |                            |                |              |                          |
| 37   |                      | <b>Greedy Method:</b> Prim's Algorithm           | Chalk & Talk |                              |                            |                |              |                          |
| 38   |                      | Kruskal's Algorithm                              | Chalk & Talk |                              |                            |                |              |                          |
| 39   |                      | Dijkstra's Algorithm                             | Chalk & Talk |                              |                            |                |              |                          |
| 40   |                      | Huffman Trees and Codes                          | Chalk & Talk |                              |                            |                |              |                          |
| 41   |                      | Discussion of expected questions & quiz          | PPT          |                              |                            |                |              |                          |



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| <b>MODULE-5</b>  |                      |  |              |                              |                            |                |              |                          |
| 42   |                      | Limitations of Algorithmic Power: Decision Trees   | Chalk & Talk |                              |                            |                |              |                          |
| 43   |                      | P, NP and NP-Complete problems   | PPT          |                              |                            |                |              |                          |
| 44   |                      | Coping with limitations of algorithmic power: Backtracking: N-Queens problem                                 | Chalk & Talk |                              |                            |                |              |                          |
| 45   |                      | Sum of subsets problem   | Chalk & Talk |                              |                            |                |              |                          |
| 46   |                      | Branch and Bound:Knapsack problem  | Chalk & Talk |                              |                            |                |              |                          |
| 47   |                      | Knapsack problem   | Chalk & Talk |                              |                            |                |              |                          |
| 48   |                      | Approximation algorithms for NP-Hard problems ( Knapsack problem)<br>Discussion of expected questions & quiz | Chalk & Talk |                              |                            |                |              |                          |



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|                           | Activity   | Planned     | Actual                    | Remarks |
|---------------------------|--|-------------|---------------------------|---------|
| 1                         | Theory Classes                                   | 44          |                           |         |
| 2                         | Assignments/ Quizzes/<br>Self-study              | 2 + Quizzes |                           |         |
| 3                         | Tutorials/ Extra classes                         | 4           |                           |         |
| 4                         | Internal Assessments                             | 2           |                           |         |
| 5                         | ICT based Teaching<br>(% of usage in Curriculum) | 15          |                           |         |
| <b>Planning</b>           |  |             | <b>Execution</b>          |         |
| <b>Faculty Signature:</b> |  |             | <b>Faculty Signature:</b> |         |
| <b>HoD Signature:</b>     |  |             | <b>HoD Signature:</b>     |         |