

## Lesson Plan of the 5<sup>th</sup> semester for session 2020-21 (Jul - Dec)

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| <b>Name of the faculty:</b>         | Ms. Ayushi Chahal                        |
| <b>Designation:</b>                 | Assistant Professor                      |
| <b>Discipline:</b>                  | Computer Science and Engg.               |
| <b>Semester:</b>                    | III <sup>rd</sup> sem                    |
| <b>Subject:</b>                     | <b>DESIGN AND ANALYSIS OF ALGORITHMS</b> |
| <b>Subject Code:</b>                | PCC-CSE-307G                             |
| <b>Lesson Plan duration:</b>        | 15 weeks                                 |
| <b>Work Load per week in hours:</b> | Lectures- 03, Practical-03               |

| Week             | Lecture day | Topic (Including Assignment/Test)                            |
|------------------|-------------|--|
| <b>UNIT – I</b>  |             |  |
| 1                | 1           | <b>Introduction to Algorithms:</b> Algorithm                 |
|                  | 2           | Performance Analysis (Time and Space complexity)             |
|                  | 3           | Asymptotic Notation (Big OH, Omega and Theta)                |
| 2                | 4           | Asymptotic Notation : best, average and worst-case behaviour |
|                  | 5           | Elementary Data Structures: Stack and Queues                 |
|                  | 6           | Elementary Data Structures: Tree, Graph                      |
| 3                | 7           | Sets and Disjoint Set Union.                                 |
|                  | 8           | <b>Divide and Conquer:</b> General method, Binary Search     |
|                  | 9           | Merge Sort algorithm and analysis                            |
| 4                | 10          | Quick Sort algorithm and analysis                            |
|                  | 11          | Strassen's Matrix Multiplication algorithm and analysis      |
|                  | 12          | Revision Unit 1  |
| <b>UNIT – II</b> |             |  |
| 5                | 13          | <b>Greedy Method:</b> General method                         |
|                  | 14          | Fractional Knapsack problem                                  |
|                  | 15          | Job Sequencing with Deadlines                                |
| 6                | 16          | Minimum Cost Spanning Trees : Prim's Algorithm               |
|                  | 17          | Minimum Cost Spanning Trees : Krushkal Algorithm             |
|                  | 18          | Single source shortest paths : Dijkstra Algorithm            |
| 7                | 19          | <b>Dynamic Programming:</b> General method                   |
|                  | 20          | Optimal Binary Search Trees                                  |
|                  | 21          | 0/1 knapsack   |
| 8.               | 22          | The Traveling Salesperson problem                            |

|                   |    |   |
|-------------------|----|---|
|                   | 23 | Revision unit 2   |
|                   | 24 | Class Test  |
| <b>UNIT – III</b> |    |   |
| 9.                | 25 | <b>Back Tracking:</b> General method                    |
|                   | 26 | The 8-Queen's problem                                   |
|                   | 27 | Sum of subsets  |
| 10.               | 28 | Graph Colouring   |
|                   | 29 | Hamiltonian Cycles.                                     |
|                   | 30 | <b>Branch and Bound:</b> The method                     |
| 11.               | 31 | 0/1 knapsack problem                                    |
|                   | 32 | Traveling Salesperson problem                           |
|                   | 33 | Efficiency considerations.                              |
| 12.               | 34 | Revision Unit 3   |
|                   | 35 | Class Test Unit 3                                       |
| <b>UNIT – IV</b>  |    |   |
| 12.               | 36 | <b>NP Hard and NP Complete Problems:</b> Basic concepts |
| 13.               | 37 | Cook's theorem  |
|                   | 38 | NP hard graph problems                                  |
|                   | 39 | NP hard scheduling problems                             |
| 14.               | 40 | NP hard code generation problems                        |
|                   | 41 | Some simplified NP hard problems                        |
|                   | 42 | Revision unit 4   |
| 15.               | 43 | Class Test Unit 4                                       |
|                   | 44 | All syllabus revision                                   |
|                   | 45 | All syllabus test                                       |