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| |  |  |  | | --- | --- | --- | | 13CS3101 | - | DESIGN AND ANALYSIS OF ALGORITHMS | | | | | | | | |
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| Hours / Week | : | 4 | |  | Sessional Marks | : | 40 |
| Credits | : | 4 | |  | End Examination Marks | : | 60 |

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| **UNIT – I** |
| **Introduction**: Algorithm, Algorithm Specification, Space Complexity, Time Complexity, Asymptotic notation.  **Divide and Conquer**: General Method, Merge Sort, Quick Sort, Binary Search, Strassen’s Matrix Multiplication. |
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| **UNIT – II** |
| **Greedy Method**: General Method, Knapsack Problem, Optimal Storage on Tapes, Minimum cost Spanning Trees, Single-Source Shortest Paths.  **Dynamic Programming**: General Method, Multistage Graphs, 0/1 Knapsack Problem, Reliability Design Problem. |
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| **UNIT – III** |
| **Back Tracking**: General Method, Graph Coloring, 8-Queen’s problem, Knapsack Problem.  **Basic Traversal & Search Techniques**: Techniques for Binary Trees and Graphs, Connected Components and Spanning Tress, Bi-Connected Components and DFS. |
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| **UNIT – IV** |
| **Branch and Bound**: General Method, FIFO Branch and Bound, LC Branch and Bound, 0/1 Knapsack Problem, Travelling Sales Person Problem.  **Lower Bound Theory**: Comparison Tress, Lower Bounds through Reductions (Finding the Convex Hull, Disjoint Sets Problem, Inverting Lower Triangular Matrices) |
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| **UNIT – V** |
| **NP-Hard and NP-Complete Problems**: Basic Concepts, NP-Hard Problems (Clique Decision Problem, Chromatic Number Decision Problem, And/or Graph Decision Problem) and NP-Hard Scheduling Problems.  **PRAM Algorithms**: Introduction, Computational Model, Fundamental Techniques and Algorithms. |
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| TEXT BOOKS |
| 1. Fundamentals of Computer Algorithms --Ellis Horowitz, Sartaj Sahni, S Rajasekharan, Galgotia Publications (2 nd Edition) 2007. |
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| REFERENCE BOOKS |
| 1. Introduction to the Design & Analysis of Algorithms -- Levitin A, Pearson Education, 2003. 2. Introduction to algorithms, Cormen T H, Leiserson C E, Rivest R L, and Stein C, 2nd edition, Prentice-Hall of India,2001. 3. Fundamentals of Sequential and parallel Algorithms, Berman K A, and Paul J L, Thomson Brook/Cole, 1997. |