|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | 13CS1101 | - | ADVANCED DATA STRUCTURES AND ALGORITHMS | | | | | | | | |
|  |  | |  | | | | |
| Hours / Week | : | 4 | |  | Sessional Marks | : | 40 |
| Credits | : | 4 | |  | End Examination Marks | : | 60 |

|  |
| --- |
| **UNIT - I** |
| **Overview of Data Structures:** Review of Arrays, Stacks, Queues, linked lists, Linked stacks and Linked queues, Applications  **Algorithm Analysis :** Efficiency of algorithms, Apriori Analysis, Asymptotic Notations, Time complexity of an algorithm using O notation, Polynomial Vs Exponential Algorithms, Average, Best, and Worst Case Complexities |
|  |
| **UNIT – II** |
| **Trees and Graphs:** Introduction, Definition and Basic terminologies of trees and binary trees, Representation of trees and Binary trees, Binary tree Traversals, Graphs-basic concepts, representation and traversals.  **Binary Search Trees, AVL Trees and B Trees:** Introduction, Binary Search Trees: Definition, Operations and applications. AVL Trees: Definition, Operations and applications. B Trees: Definition, Operations and applications. |
|  |
| **UNIT – III** |
| Red – Black Trees, Splay Trees and Hash Tables: Red – Black Trees, Splay Trees and its applications. Hash Tables: Introduction, Hash Tables, Hash Functions and its applications. |
|  |
| **UNIT – IV** |
| **Divide – and – Conquer & Greedy Method :** General Method, Binary Search, Finding Maximum and Minimum, Quick Sort, Merge sort, Strassen’s Matrix Multiplication, Greedy Method**-** General Method, Minimum Cost Spanning Trees, Single Source Shortest Path. |
|  |
| **UNIT – V** |
| **Dynamic Programming :** General Method, All Pairs Shortest Path, Single Source Shortest Path, 0 / 1 Knapsack problem, Reliability Design, Travelling Sales Person’s Problem.  **Back Tracking and Branch – and – Bound:** General Method, 8 – Queen’s Problem, Graph Coloring. Branch – and – Bound: The Method, LC Search, Control Abstraction, Bounding, 0/1 Knapsack Problem |
|  |
|  |
| TEXT BOOKS |
| 1. Data Structures and Algorithms by G.A.V. Pai, 2009, TMH. 2. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, 2nd edition, University Press. |
|  |
| REFERENCE BOOKS |
| 1. Classic Data Structures by D. Samanta, 2005, PHI 2. Design and Analysis of Computer Algorithms by Aho, Hopcraft, Ullman 1998, PEA. 3. Introduction to the Design and Analysis of Algorithms by Goodman, Hedetniemi, TMG. 4. Design and Analysis of Algorithms by E. Horowitz, S. Sahani, 3rd Edition, Galgotia. 5. Data Structures and Algorithms in C++ by Drozdek 2nd Edition, Thomson |