| Course Title | :DESIGN AND ANALYSIS OF ALGORITHMS |
|---|---|
| Course Code | :24CS2203 |
| L-T-P-S Structure | : 3-0-2-2 |
| Pre-requisite | : |
| Credits | : 4.5 |
| Course Coordinator | :Dr.JARAJAPU SIRISHA DEVI |
| Team of Instructors | : |
| Teaching Associates | : |

**Syllabus ::**Introduction: Definition of an Algorithm- Algorithm Specification - Analysis of Algorithm. PRAM Algorithms: MergingSorting. String Algorithms: The naïve string matching algorithm, Robin – Karp algorithm. Divide and Conquer: Merge Sort-Quick - Sort- Strassen's Matrix Multiplication – Convex Hull. Greedy Method: The General Method - Job Sequencing with Deadlines -Knapsack Problem - Minimum Cost Spanning Trees - Huffman Codes - Single Source Shortest Path Method. Dynamic Programming: The General Method - Optimal Binary Search Tree - 0/1 Knapsack - Traveling Sales Person Problem. Ford Fulkerson. Backtracking: The Eight Queens Problem - Sum Of Subset Problem - Graph Coloring - Knapsack Problem. Brand Bound: 0/1 Knapsack Problem- Traveling Sales Person Problem. NP-Hard and NP-Complete Problems: Basic Concepts - Cook's Theorem, NP-Hard Graph Problems - CDP, NCDP, AOG

**Text Books :**1. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, "Fundamentals of Computer Algorithms", 2nd Edition, University Press, 2008. 2. Cormen, Leizerson&Rivest, "Introduction to algorithms", 3rd Edition, Prentice-Hall, 2002. 3. Jon Kleinberg and Eva Tardos, "Algorithm Design", Pearson Education, 2006.

**Reference Books :**1. Robert Sedgewick and Kevin Wayne," Algorithms", 4th edition, Addison Wesley Prof., (2011). 2. Anny Levitin, "Introduction to Design and Analysis of Algorithms", 2nd Edition, Person Education Press. (2007). 3. Michael T.Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis and Internet Examples, Second Edition, Wiley-India, (200)6. 4. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, (2008)

**Web Links :**1. MIT Open Courseware : https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithmsspring-2015/ 2. Pearson: https://www.cs.princeton.edu/~wayne/kleinberg-tardos/ 3. Berkeley: https://www2.eecs.berkeley.edu/Courses/CS170/ 4. Illinois: https://jeffe.cs.illinois.edu/teaching/algorithms/ 5. Khan Academy: https://www.khanacademy.org/computing/computer-science/algorithms

**MOOCS :**1. Algorithms Part-1: https://www.coursera.org/learn/algorithms-part1 2. Dynamic Programming, Greedy Algorithms: https://www.coursera.org/learn/dynamic-programming-greedy-algorithms/home/info

**Course Rationale :**If we try to identify those contributions of Computer Science, that will be long-lasting, surely one of these will be the refinement of the algorithm concept. Ever since man invented the idea of a machine that could perform basic mathematical operations, the study of what can be computed and how it can be done well was launched. This study, inspired by the computer, has led to the discovery of many important algorithms and design methods. The computer Science and Engineering program has embraced the study of algorithms as its own. The purpose of this course is to learn these methods to devise and analyze new algorithms on their own.

**Course Objectives :**The objective of this course is to study paradigms and approaches used to analyze and design algorithms and to appreciate the impact of algorithm design in practice.

**COURSE OUTCOMES (COs):**

| CO NO | Course Outcome (CO) | PO/PSO | Blooms Taxonomy Level (BTL) |
|---|---|---|---|
| CO1 | Apply concepts of mathematics to find space and time complexities of various algorithms including string-matching algorithm | PO1,PO2,PSO1 | 3 |
| CO2 | Analyze the problems that can be solved by using the Divide and Conquer and the Greedy Method | PSO2,PO2,PO5 | 4 |
| CO3 | Analyze the problems that can be solved by using Dynamic Programming and Backtracking | PSO2,PO2,PO5 | 4 |
| CO4 | Analyze the problems that can be solved by using Branch and Bound and NPHard Graph problems | PSO2,PO5,PO2 | 4 |
| CO5 | Analyze the various design techniques to solve any real-world problems. | PSO2,PO2,PO5 | 4 |
| CO6 | Analyze the various design techniques to solve any real-world problems. | PSO2,PO2,PO5 | 4 |

**COURSE OUTCOME INDICATORS (COIs)::**

| Outcome No. | Highest BTL | COI-2 | COI-3 | COI-4 |
|---|---|---|---|---|
| CO1 | 3 | **Btl-2** Understanding the concepts of merging and sorting using parallel algorithms | **Btl-3** Apply string algorithms to check whether a pattern exists in the text or not. | |
| CO2 | 4 | **Btl-2** Understanding the concepts of the Greedy method. | **Btl-3** Apply the divide and conquer technique to solve problems. | **Btl-4** Analyze the problems that can be solved by using the greedy method. |
| CO3 | 4 | **Btl-2** Understanding dynamic programming and backtracking Techniques | **Btl-3** Apply dynamic Programming to solve problems. | **Btl-4** Analyze the state space tree for the problems that can be solved by using the backtracking method. |
| CO4 | 4 | **Btl-2** Understanding the concepts of NP-Hard and NPComplete | **Btl-3** Apply branch and bound technique to solve 0/1 knapsack, traveling salesperson proble | **Btl-4** Analyze NP-Hard and NPcomplete concepts to solve decision problems |
| CO5 | 4 | | | **Btl-4** The student will be able to analyze and apply suitable design techniques to implement given real-world problem |
| CO6 | 4 | | | **Btl-4** The student will be able to analyze and apply suitable design techniques to implement given real-time skilling problems. |

**PROGRAM OUTCOMES & PROGRAM SPECIFIC OUTCOMES (POs/PSOs)**

| Po No. | Program Outcome |
|--------|-----------------|
|        |                 |

**Lecture Course DELIVERY Plan:**

| Sess.No. | CO | COI | Topic | Book No[CH No] [Page No] | Teaching-Learning Methods | EvaluationComponents |
|----------|-----|-----|-------|--------------------------|---------------------------|----------------------|
| 1 | CO1 | COI-2 | Course Handout,Definition of An Algorithm, Algorithm specification | T1 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,Global Challenges,MOOCs Review,SEM-EXAM1 |
| 2 | CO1 | COI-2 | Space complexity,time complexity of algorithms | T1 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,Global Challenges,MOOCs Review,SEM-EXAM1 |
| 3 | CO1 | COI-2 | Asymptotic Notations | T1 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 4 | CO1 | COI-2 | PRAM Algorithms:Merging, PRAM Algorithms: Sorting | T1 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 5 | CO1 | COI-3 | Naïve's string algorithm | T1 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 6 | CO1 | COI-3 | Robin Karp String Algorithm | T1 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 7 | CO1 | COI-3 | Knuth Morris Pratt algorithm | T1 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 8 | CO2 | COI-2 | Introduction to Divide and Conquer Method, Merge Sort | T1 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,Global Challenges,MOOCs Review,SEM-EXAM1 |
| 9 | CO2 | COI-2 | Quick Sort | T1 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 10 | CO2 | COI-2 | Strassen's Matrix Multiplication | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 11 | CO2 | COI-2 | Convex Hull | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 12 | CO2 | COI-3 | Greedy Method Introduction | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |

| Sess.No. | CO | COI | Topic | Book No[CH No] [Page No] | Teaching-Learning Methods | EvaluationComponents |
|---|---|---|---|---|---|---|
| 13 | CO2 | COI-3 | Knapsack Problem | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 14 | CO2 | COI-3 | Job Sequencing with Deadlines | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 15 | CO2 | COI-4 | Minimum Cost Spanning Trees-Kruskal's algorithm | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 16 | CO2 | COI-4 | Minimum Cost Spanning Trees-Prims algorithm | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 17 | CO2 | COI-4 | Huffman Codes | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 18 | CO2 | COI-4 | Single Source Shortest Path Method | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM1 |
| 19 | CO3 | COI-2 | Introduction to Dynamic Programming | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,Global Challenges,MOOCs Review,SEM-EXAM2 |
| 20 | CO3 | COI-2 | Optimal Binary search trees | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,Global Challenges,MOOCs Review,SEM-EXAM2 |
| 21 | CO3 | COI-3 | 0/1 Knapsack problem | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 22 | CO3 | COI-3 | Travelling Sales Person Problem | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 23 | CO3 | COI-3 | Ford Fulkerson | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 24 | CO3 | COI-3 | BFS and DFS Algorithms | T2 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 25 | CO3 | COI-2 | Introduction of Backtracking methodology,Solution Space and Tree Organization | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 26 | CO3 | COI-4 | 8-Queens Problem,Graph coloring | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,Global |

| Sess.No. | CO | COI | Topic | Book No[CH No] [Page No] | Teaching-Learning Methods | EvaluationComponents |
|---|---|---|---|---|---|---|
| | | | | | | Challenges,MOOCs Review,SEM-EXAM2 |
| 27 | CO3 | COI-4 | Sum of Subsets | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 28 | CO3 | COI-4 | 0/1 Knapsack problem | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 29 | CO4 | COI-2 | Introduction to Branch and Bound Technique | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,Global Challenges,MOOCs Review,SEM-EXAM2 |
| 30 | CO4 | COI-4 | 0/1 Knapsack problem – FIFO | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 31 | CO4 | COI-4 | Travelling salesperson Algorithm | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,Global Challenges,MOOCs Review,SEM-EXAM2 |
| 32 | CO4 | COI-2 | NP-H and NP-C Problems: Basic concepts, Cook's Theorem | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 33 | CO4 | COI-3 | NP-Hard Graph problems: Clique Decision Problem(CDP), Node Cover Decision Problem (NCDP) | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 34 | CO4 | COI-4 | And or Graph Problem (AOG) | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 35 | CO4 | COI-4 | Approximation Algorithms:Introduction, Planar Graph Coloring | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |
| 36 | CO4 | COI-4 | Maximum Programs Stored Problem, NP-hard Absolute Approximations | T3 | Chalk,LTC,PPT,Talk | ALM,End Semester Exam,SEM-EXAM2 |

**Lecture Session wise Teaching – Learning Plan**

**SESSION NUMBER** : 1

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Explanation about course hand out.Definition of an algorithm, characteristics & areas of algorithm | 2 | PPT | Seminars |
| 20 | Representation and structure of an algorithm | 2 | PPT | Quiz/Test Questions |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 2

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Space Complexity,Time complexity and Finding space for the given algorithm | 2 | PPT | --- NOT APPLICABLE --- |
| 20 | Representation and structure of an algorithm | 2 | PPT | Quiz/Test Questions |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 3

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Questio | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Asymptotic notations | 2 | PPT | --- NOT APPLICABLE --- |
| 20 | Problems solving using asymptotic notations | 2 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 4

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | PRAM Algorithms: Merging | 2 | PPT | --- NOT APPLICABLE --- |
| 20 | Problem Solving using PRAM Algorithms: Merging | 2 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 5

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | String algorithms,Naive's String Algorithm | 2 | PPT | --- NOT APPLICABLE --- |
| 20 | Finding pattern in the given text | 3 | PPT | Fish Bowl |
| 5 | Conclusion & Summary | 2 | PPT | Quiz/Test Questions |

**SESSION NUMBER** : 6

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Robin karp introduction and algorithm | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Finding pattern in the given text | 3 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 7

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Knuth Morris String Algorithm | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Finding pattern in the given text | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 8

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Introduction to Divide and Conquer Method & Master's theore | 2 | PPT | --- NOT APPLICABLE --- |
| 20 | Merge Sort and its time complexity,Sorting numbers using Merge Sort | 3 | PPT | Quiz/Test Questions |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 9

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Quick Sort and Sorting Numbers using Quick Sort | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Time complexity for Quick Sort | 3 | PPT | Debate |

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

## SESSION NUMBER : 10

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Strassen's matrix multiplication using divide and conquer method | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Finding product of two matrices using strassen's method | 3 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

## SESSION NUMBER : 11

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Convex hull problem and Graham's scan algorithm | 2 | PPT | --- NOT APPLICABLE --- |
| 20 | Finding convex hull using Graham Scan algorith | 3 | PPT | Quiz/Test Questions |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

## SESSION NUMBER : 12

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Introduction to Optimization problem and Greedy Strategy – Subset paradigm, Ordering paradigm | 2 | PPT | --- NOT APPLICABLE |

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| | | | | --- |
| 20 | Applications of Greedy Method | 2 | PPT | --- NOT APPLICABLE --- |
| 20 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 13

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Knapsack Problem, its solution using Greedy methodology | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Finding optimal solution for knapsack problem and time complexity | 3 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 14

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Job Sequencing problem definition, formulation & Greedy methodology and Finding optimal solution | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Job sequencing algorithm with time complexity | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 15

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Spanning tree definition,Kruskal's algorithm Explanation | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Finding MST using Kruskal's algorithm | 4 | PPT | Quiz/Test Questions |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 16

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Prim's algorithm defination,Finding MST using Prim's algorithm | 4 | PPT | --- NOT APPLICABLE --- |
| 20 | Comparison between Kruskals and prims algorithm | 2 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summar | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 17

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Data compression,Huffman codes | 3 | PPT | Quiz/Test Questions |
| 20 | Generating tree using Huffman codes | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 18

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Definition of single source shortest path problem (SSSP) & Greedy methodology for SSSP | 3 | PPT | Quiz/Test Questions |
| 20 | Finding shortest path using Dijkstras algorithm | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 19

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Dynamic Programming- Principle of optimality, methodology | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Differentiate Greedy method, Dynamic Programming and Divide & Conquer | 2 | PPT | Quiz/Test Questions |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 20

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | binary search trees,optimal binary search trees | 2 | PPT | --- NOT APPLICABLE --- |
| 20 | Generating OBST for the given set of identifiers | 3 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 21

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Apply dynamic programming for solving 0/1 Knapsack problem | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Finding optimal solution for knapsack problem | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 22

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Recursive definition of Travelling Sales Person Problem and time complexity | 3 | PPT | Quiz/Test Questions |
| 20 | Finding optimal solution for TSP | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 23

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Recursive representation of Max flow and Ford Fulkerson algorithm | 3 | PPT | Case Study |
| 20 | Finding max flow for the given graph | 3 | PPT | --- NOT APPLICABLE --- |

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 20 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 24

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | BFS and DFS Concepts with Examples | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Generating spanning tree using BFS and DFS | 4 | PPT | Quiz/Test Questions |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 25

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Backtracking methodology and State space tree terminology | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Applications of backtracking | 2 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 26

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | 8-Queen's Problem definition and Graph colouring problem and boundary conditions | 3 | PPT | --- NOT APPLICABLE |

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| | | | | --- |
| 20 | Generating state space tree for 4-Queens problem | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 27

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Sum of subsets problem definition and Boundary condition formulation | 2 | PPT | --- NOT APPLICABLE --- |
| 20 | Generating state space tree for sum of subsets problem | 3 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 28

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Questio | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | 0/1 knapsack problem using Backtracking methodology | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Generating state space tree for 0/1 Knapsack problem | 3 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 29

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Branch and Bound Technique and its variations and LC Search | 2 | PPT | Quiz/Test Questions |
| 20 | Applications of branch and bound | 2 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 30

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | 0/1 knapsack problem and algorithm | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Finding optimal solution for knapsack problem | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 31

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Travelling salesperson Problem and boundary condition | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Difference between dynamic TSP and branch and bound TSP | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 32

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Introduction and Relationship between P,NP,NP-Hard and NP-Complete | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Cooks theorem | 3 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 33

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | CDP definition & Prove that CDP is NP-Hard and V | 3 | PPT | Statement-Opinion-Summary |
| 20 | Prove that NCDP is NP-Hard | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 34

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | And or Graph Decision Problem(AOG) Theore,Finding optimal solution for AOG graph | 3 | PPT | Quiz/Test Questions |
| 20 | Prove that AOG is NP-Hard | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 35

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Introduction and algorithm for Planar Graph Coloring | 3 | PPT | --- NOT APPLICABLE --- |
| 20 | Problem Solving on Planar Graph Coloring | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 36

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 2 | Talk | --- NOT APPLICABLE --- |
| 20 | Problems on Maximum Programs Stored Problem,NP-hard Absolute Approximations | 3 | PPT | Quiz/Test Questions |
| 20 | Problems on NP-hard Absolute Approximation | 4 | PPT | --- NOT APPLICABLE --- |
| 5 | Conclusion & Summary | 2 | PPT | --- NOT APPLICABLE --- |

**Tutorial Course DELIVERY Plan:** NO Delivery Plan Exists

**Tutorial Session wise Teaching – Learning Plan**

No Session Plans Exists

**Practical Course DELIVERY Plan:**

| Tutorial Session no | Topics | CO-Mapping |
|---|---|---|
| 1 | Implement on Basic Programs on Arrays | CO5 |
| 2 | Implement programs on Performance analysis of Time and Space complexity | CO5 |

| Tutorial Session no | Topics | CO-Mapping |
|---|---|---|
| 3 | Implementation of programs on Sorting and Searching problems. | CO5 |
| 4 | Implementation of Program on Naïve Based and KMP Algorithm. | CO5 |
| 5 | Implementation of Programs on Divide and Conquer Problems. | CO5 |
| 6 | Implement logic building or programs on Greedy Method: The General Method-Job Sequencing with Deadlines, Knapsack Problem | CO5 |
| 7 | Implement programs on Minimum Spanning Tree, Single Source Shortest PathMethod | CO5 |
| 8 | Implement the programs on Dynamic Programming - OBST, 0/1 knapsackproblem, TSP | CO5 |
| 9 | Implement programs on Graph Coloring Problem. Sum of subset problem | CO5 |
| 10 | Implement Programs on Backtracking problem-eight queen problem, 0/1knapsack problem | CO5 |
| 11 | Implementation Programs on the branch and Bound problems - TSP and 0/1knapsack | CO5 |
| 12 | Implement programs on NP-Hard and NP-Complete Problems | CO5 |
| 13 | Implement Programs on CDP, NCDP and ANDOR Graph Problem (AOG) | CO5 |

**Practical Session wise Teaching – Learning Plan**

**SESSION NUMBER** : 1

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ /Poll/Pop Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Basic Programs on Arrays | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Advanced Programs on Ayyays | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 2

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance/ Recap /Poll/Pop Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Time Complexity | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Space Complexity | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 3

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Chalk | --- NOT APPLICABLE --- |
| 45 | Programs on Sortings | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Searching | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 4

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Strings | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Finding pattern matching using string algorithms | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 5

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|-----------|-------|-----|---------------------------|-------------------------|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | programs on Divide and conquer | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | programs on Divide and conquer | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 6

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|-----------|-------|-----|---------------------------|-------------------------|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Greedy Method - Job Sequence With Deadlines | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Greedy Method - Knapsack Problem | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 7

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|-----------|-------|-----|---------------------------|-------------------------|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Greedy Method - Minimum Spanning Tree | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Greedy Method - Single Souce Shortest Path | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 8

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|-----------|-------|-----|---------------------------|-------------------------|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 45 | Programs on Dynamic Programming - Optimal BinarySearch Tree | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Dynamic Programming - 0/1 KnapsackProblem Programs on Dynamic Programming - Travelling SalesPerson Problem | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 9

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | programs on Graph Coloring Problem. Sum of subsetproblem | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | programs on Graph Coloring Problem. Sum of subsetproblem | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 10

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Back Tracking - eight queen problem | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Back Tracking - 0/1 knapsack problem | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 11

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on branch and bound technique - Travelling SalesPerson | 4 | PPT | --- NOT APPLICABLE --- |

| 45 | Programs on branch and bound technique - 0/1 Knapsack | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 12

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Non-Deterministic Algorithms | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Non-Deterministic Algorithms | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 13

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Clique Decision Problems | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Program on Node Cover Decision Problems Programs on And Or Graph Problem | 4 | PPT | --- NOT APPLICABLE --- |

**Skilling Course DELIVERY Plan:**

| Skilling session no | Topics/Experiments | CO-Mapping |
|---|---|---|
| 1 | Basic data structures | CO6 |
| 2 | strings and pattern-matching problems | CO6 |
| 3 | Sorting and Searching | CO6 |
| 4 | Divide and conquer | CO6 |
| 5 | Greedy Method | CO6 |

| Skilling session no | Topics/Experiments | CO-Mapping |
|---|---|---|
| 6 | Greedy Method | CO6 |
| 7 | Dynamic Programming | CO6 |
| 8 | Dynamic Programming | CO6 |
| 9 | Dynamic Programming | CO6 |
| 10 | Backtracking | CO6 |
| 11 | Branch and Bound | CO6 |
| 12 | Non-Deterministic Algorithms | CO6 |

**Skilling Session wise Teaching – Learning Plan**

**SESSION NUMBER** : 1

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Arrays | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Basic data structures | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 2

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | programs on strings | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | programs on strings | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 3

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Sortings | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Searching | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 4

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | programs on Divide and conquer | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | programs on Divide and conquer | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 5

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Greedy Method | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Greedy Method | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 6

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Greedy Method | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Greedy Method | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 7

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Dynamic Programming | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Dynamic Programming | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 8

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Dynamic Programming | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Dynamic Programming | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 9

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | programs on Graph Coloring Problem. Sum of subsetproblem | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | programs on Graph Coloring Problem. Sum of subsetproblem | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 10

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on Back Tracking | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Back Tracking | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 11

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |
| 45 | Programs on branch and bound technique | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on branch and bound technique | 4 | PPT | --- NOT APPLICABLE --- |

**SESSION NUMBER** : 12

**No Session Outcomes are mapped**

| Time(min) | Topic | BTL | Teaching-Learning Methods | Active Learning Methods |
|---|---|---|---|---|
| 5 | Attendance /Poll Question | 1 | Talk | --- NOT APPLICABLE --- |

| 45 | Programs on Non-Deterministic Algorithms | 4 | PPT | --- NOT APPLICABLE --- |
| 50 | Programs on Non-Deterministic Algorithms | 4 | PPT | --- NOT APPLICABLE --- |

**WEEKLY HOMEWORK ASSIGNMENTS/ PROBLEM SETS/OPEN ENDEDED PROBLEM-SOLVING EXERCISES etc:**

| Week | Assignment Type | Assignment No | Topic | Details | co |
|------|-----------------|---------------|-------|---------|----|
|      |                 |               |       |         |    |

**COURSE TIME TABLE:**

| Day | Hour / Component | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----|------------------|---|---|---|---|---|---|---|---|---|
| Mon | Theory | --- | --- | -- | -- | -- | --- | -- | --- | --- |
|     | Tutorial | --- | --- | -- | -- | -- | --- | -- | --- | --- |
|     | Lab | --- | --- | H-S1,H-S1 | H-S1,H-S1 | -- | --- | -- | --- | --- |
|     | Skilling | --- | --- | -- | -- | H-S11,H-S11,H-S12,H-S12 | --- | H-S11,H-S11,H-S12,H-S12 | --- | --- |
| Tue | Theory | --- | --- | --- | --- | -- | --- | -- | --- | --- |
|     | Tutorial | --- | --- | --- | --- | -- | --- | -- | --- | --- |
|     | Lab | --- | --- | --- | --- | -- | --- | -- | --- | --- |
|     | Skilling | --- | --- | --- | --- | H-S6,H-S6 | --- | H-S6,H-S6 | --- | --- |
| Wed | Theory | H-S11,H-S12 | H-S11,H-S12 | --- | --- | -- | --- | -- | --- | --- |
|     | Tutorial | -- | -- | --- | --- | -- | --- | -- | --- | --- |
|     | Lab | -- | -- | --- | --- | H-S11,H-S11,H-S12,H-S12 | --- | H-S11,H-S11,H-S12,H-S12 | --- | --- |
|     | Skilling | -- | -- | --- | --- | -- | --- | -- | --- | --- |
| Thu | Theory | --- | --- | H-S6 | H-S6 | --- | --- | --- | --- | H-S11,H-S12 |
|     | Tutorial | --- | --- | -- | -- | --- | --- | --- | --- | -- |
|     | Lab | --- | --- | -- | -- | --- | --- | --- | --- | -- |

| Day | Type | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Skilling | --- | --- | H-S1,H-S1 | H-S1,H-S1 | --- | --- | --- | --- | -- |
| Fri | Theory | H-S1 | H-S1 | --- | --- | -- | --- | -- | --- | --- |
| | Tutorial | -- | -- | --- | --- | -- | --- | -- | --- | --- |
| | Lab | -- | -- | --- | --- | H-S6,H-S6 | --- | H-S6,H-S6 | --- | --- |
| | Skilling | -- | -- | --- | --- | -- | --- | -- | --- | --- |
| Sat | Theory | --- | --- | H-S6 | --- | --- | --- | --- | --- | H-S1 |
| | Tutorial | --- | --- | -- | --- | --- | --- | --- | --- | -- |
| | Lab | --- | --- | -- | --- | --- | --- | --- | --- | -- |
| | Skilling | --- | --- | -- | --- | --- | --- | --- | --- | -- |
| Sun | Theory | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Tutorial | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Lab | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Skilling | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**REMEDIAL CLASSES:**

Supplement course handout, which may perhaps include special lectures and discussions that would be planned, and schedule notified according

**SELF-LEARNING:**

Assignments to promote self-learning, survey of contents from multiple sources.

| S.no | Topics | CO | ALM | References/MOOCS |
|---|---|---|---|---|

**DELIVERY DETAILS OF CONTENT BEYOND SYLLABUS:**

Content beyond syllabus covered (if any) should be delivered to all students that would be planned, and schedule notified accordingly.

| S.no | Advanced Topics, Additional Reading, Research papers and any | CO | ALM | References/MOOCS |
|---|---|---|---|---|

**EVALUATION PLAN:**

| Evaluation Type | Evaluation Component | Weightage/Marks | | Assessment Dates | Duration (Hours) | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| End Semester Summative | Skill Sem-End Exam | Weightage | 8 | | 90 | | | | | | 8 |
| | | Max Marks | 50 | | | | | | | | 50 |

| Evaluation Category | Component | Metric | Value | | Total | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Evaluation Total= 40 % | Lab End Semester Exam | Weightage | 8 | | 90 | | | | | 8 | |
| | | Max Marks | 50 | | | | | | | 50 | |
| | End Semester Exam | Weightage | 24 | | 180 | 6 | 6 | 6 | 6 | | |
| | | Max Marks | 100 | | | 25 | 25 | 25 | 25 | | |
| In Semester Formative Evaluation Total= 24 % | Global Challenges | Weightage | 5 | | 90 | 1.25 | 1.25 | 1.25 | 1.25 | | |
| | | Max Marks | 100 | | | 25 | 25 | 25 | 25 | | |
| | Skilling Continuous Evaluation | Weightage | 5 | | 90 | | | | | | 5 |
| | | Max Marks | 50 | | | | | | | | 50 |
| | MOOCs Review | Weightage | 5 | | 90 | 1.25 | 1.25 | 1.25 | 1.25 | | |
| | | Max Marks | 100 | | | 25 | 25 | 25 | 25 | | |
| | Continuous Evaluation - Lab Exercise | Weightage | 5 | | 90 | | | | | 5 | |
| | | Max Marks | 50 | | | | | | | 50 | |
| | ALM | Weightage | 4 | | 90 | 1 | 1 | 1 | 1 | | |
| | | Max Marks | 100 | | | 25 | 25 | 25 | 25 | | |
| In Semester Summative Evaluation Total= 36 % | Skill In-Sem Exam | Weightage | 6 | | 90 | | | | | | 6 |
| | | Max Marks | 50 | | | | | | | | 50 |
| | Lab In Semester Exam | Weightage | 6 | | 90 | | | | | 6 | |
| | | Max Marks | 50 | | | | | | | 50 | |
| | Semester in Exam-II | Weightage | 12 | | 90 | | | 6 | 6 | | |
| | | Max Marks | 50 | | | | | 25 | 25 | | |
| | Semester in Exam-I | Weightage | 12 | | 90 | 6 | 6 | | | | |
| | | Max Marks | 50 | | | 25 | 25 | | | | |

**ATTENDANCE POLICY:**

Every student is expected to be responsible for regularity of his/her attendance in class rooms and laboratories, to appear in scheduled tests and examinations and fulfill all other tasks assigned to him/her in every course
In every course, student has to maintain a minimum of 85% attendance to be eligible for appearing in Semester end examination of the course, for cases of medical issues and other unavoidable circumstances the students will be condoned if their attendance is between 75% to 85% in every course, subjected to submission of medical certificates, medical case file and other needful documental proof to the concerned departments

**DETENTION POLICY :**

In any course, a student has to maintain a minimum of 85% attendance and In-Semester Examinations to be eligible for appearing to the Semester End Examination, failing to fulfill these conditions will deem such student to have been detained in that course.

**PLAGIARISM POLICY :**

Supplement course handout, which may perhaps include special lectures and discussions

**COURSE TEAM MEMBERS, CHAMBER CONSULTATION HOURS AND CHAMBER VENUE DETAILS:**

Supplement course handout, which may perhaps include special lectures and discussions

| Name of Faculty | Delivery Component of Faculty | Sections of Faculty | Chamber Consultation Day (s) | Chamber Consultation Timings for each day | Chamber Consultation Room No: | Signature of Course faculty: |
|---|---|---|---|---|---|---|
| Debnath Bhattacharyya | P | 11-B | - | - | - | - |
| Debnath Bhattacharyya | S | 11-B | - | - | - | - |
| Rani Medidha | L | 11-MA,1-MA | - | - | - | - |
| Rani Medidha | P | 1-A,6-B,11-A | - | - | - | - |
| Rani Medidha | S | 11-A,1-A | - | - | - | - |
| KATANGURI SWANTHANA | P | 12-B | - | - | - | - |
| Dr.JARAJAPU DEVI | L | 6-MA,12-MA | - | - | - | - |
| Dr.JARAJAPU DEVI | P | 12-A,6-A | - | - | - | - |
| Dr.JARAJAPU DEVI | S | 6-A,12-A | - | - | - | - |
| yerragudipadu subbarayudu | P | 1-B | - | - | - | - |
| yerragudipadu subbarayudu | S | 1-B | - | - | - | - |
| Ravva Sahithi Arjun | S | 6-B,12-B | - | - | - | - |

**GENERAL INSTRUCTIONS**

Students should come prepared for classes and carry the text book(s) or material(s) as prescribed by the Course Faculty to the class.

**NOTICES**

Most of the notices are available on the LMS platform.

All notices will be communicated through the institution email.

All notices concerning the course will be displayed on the respective Notice Boards.

**Signature of COURSE COORDINATOR**

(Dr.JARAJAPU SIRISHA DEVI)

**Signature of Department Prof. Incharge Academics & Vetting Team Member**

Department Of CSE-1

**HEAD OF DEPARTMENT:**


**Approval from: DEAN-ACADEMICS**
(Sign with Office Seal) [object HTMLDivElement]