Design and Analysis of Algorithms

Lecture # 1

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INTRODUCTION
TO
DAA COURSE
(CS205)

Introduction to DAA Course

- Credits Teaching & Exam Scheme
- Academic Engagement
- Evaluation Scheme
- DAA Course Outcomes
- Text Books and Syllabus

Teaching Scheme, Credits & Examination Scheme

✓DAA Theory and Lab – Teaching Scheme and Credits

L	T	P	O	E
3	0	2	5	10

L	T	P	Credits
3	0	1	4

✓DAA Theory Examination Scheme

ISE	MSE	ESE	Total
75	75	150	300

✓DAA Lab - Examination Scheme

ISE	MSE	ESE	Total
50	--	50	100

Academic Engagement

✓ Theory Session

Day	Time	Google Meet Link
Mon	12:15 PM - 01:15 PM	-
Tue	10:00 AM - 11:00 AM	-
Wed	11:15 AM - 01:15 PM	

✓ Lab Sessions

Day	Time	Batch
Mon	09:00 AM - 11:00 AM	C
Tue	11:15 AM - 12:15 PM	D
Thu	09:00 AM - 11:00 AM	A
Fri	11:15 AM - 12:15 PM	B

Evaluation Scheme of DAA Theory

✓DAA Theory – Evaluation Scheme

Sr. No.	Components	Breakup Tests	Marks	Percentage (Weightage)
1	ISE	ISE-1 (Open House)	15	75
		ISE-2 (MCQ)	10	
2	MSE	Decided at Dept Level	50	75
3	ESE	Decided at Institute Level	100	150
			Total	300

Evaluation Scheme of DAA Lab

✓DAA Lab - Evaluation Scheme

Sr. No.	Components	Percentage (Weightage)	Marks
1	ISE (Laboratory Experiments)	50	100
2	ESE	50	20
Total		100	100

DAA Course Outcomes

✓Analyze time and space complexity of an algorithm.

✓Apply divide and conquer strategy to solve problems.

✓Apply the concept of dynamic programming and greedy approach to solve problems.

✓Apply the idea of backtracking, branch and bound strategy to solve problems.

✓Apply various string matching algorithms.

Text Books

1) T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C Stein, "Introduction to Algorithms", MIT Press, 3rd Edition, 2009

2) Horowitz E, Sahni S and S. Rajasekaran, " Fundamentals of Computer Algorithms", Galgotia Publications, 2nd Edition, 2010

3) Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “The Design and analysis of algorithms”, Pearson Education India, 1st, 2006

DAA Theory Syllabus

- ✓ **Introduction to Analysis of algorithm**
  - ✓ Reference 1,2
- ✓ **Dynamic Programming and Amortized Analysis**
  - ✓ Reference 1
- ✓ **Greedy Method**
  - ✓ Reference 1,2
- ✓ **Backtracking, Branch and Bound**
  - ✓ Reference 2
- ✓ **Approximation and String Matching algorithms**
  - ✓ Reference 1
- ✓ **Self-Study Topics – NP Completeness Theory**
  - ✓ Reference 1

DAA Lab Experiments

- ✓Experiment on finding the running time of an algorithm.
- ✓Experiment based on divide and conquer approach.
- ✓Experiment on Recurrence relation.
- ✓Experiment using dynamic programming approach
- ✓Experiment based on greedy approach
- ✓Experiment based on graph Algorithms
- ✓Experiment using Backtracking strategy
- ✓Experiment using branch and bound strategy
- ✓Experiment based on Approximation Algorithms
- ✓Experiment on string matching algorithms.

DAA Lab Experiments

- ✓**To implement Divide and conquer method**

  Quick Sort
  Merge Sort

- ✓**To implement Greedy Technique**

  Prim's Minimal Spanning Tree Algorithm.
  Travelling Salesman Problem.
  Graph – Map Coloring.
  Kruskal's Minimal Spanning Tree Algorithm.
  Dijkstra's Minimal Spanning Tree Algorithm.
  Graph – Vertex Cover.
  Knapsack Problem.
  Job Scheduling Problem.

DAA Lab Experiments

- **To implement dynamic algorithms**
  - Floyd Warshall Algorithm
  - 0-1 Knapsack Problem
  - Egg Dropping Puzzle
  - Box Stacking Problem
  - Partition problem
  - Travelling Salesman Problem
  - Longest Palindromic Subsequence
  - Longest alternating subsequenc

DAA Lab Experiments

- **To implement Backtracking algorithm**
  - Eight queens puzzle
  - crosswords
  - verbal arithmetic
  - Sudoku
  - Peg Solitaire
  - To implement branch and bound algorithm
  - To implement Single source shortest path
  - To implement All pair shortest path

DAA Lab Experiments

- ✓**To implement branch and bound algorithm**

  0/1 Knapsack
  8 puzzle Problem
  Job Assignment Problem
  N Queen Problem
  Traveling Salesman Problem