COURSE HANDOUT

B. Tech (CSE) –7th Semester

(Applicable for the Batches Admitted from 2014-15, Non – FSI & FSI Model)

Course Title	:**Design and Analysis of Algorithms Lab**	Dated	: 27-11-2017
Course Code	:CSE4227	Academic Year	: 2017-18
Course Structure	: 0-0-3-2		
Course Coordinator	**:** Dr. R Priya Vaijayanthi		
Instructor(s)	**:** Dr. R Priya Vaijayanthi		

CourseObjectives:
The course content enables students to:
1. Implement searching and sorting techniques efficiently.
2. Put into practice algorithms using greedy strategy and dynamic programming optimally.
3. Design and execute the algorithms using search space and optimization problem techniques for findingglobally best solution.
4. Realize basic computability concepts and the complexity and to implement number theoretic algorithms.

Course Outcomes:
At the end of the course students are able to:
1. Implement searching and sorting techniques efficiently to retrieve data.
2. Put into practice algorithms using greedy strategy and dynamic programming optimally.
3. Design and execute the algorithms using search space and optimization problem techniques for findingglobally best solution.
4. Realize basic computability concepts and the complexity and to implement number theoretic algorithmsto work in information security.

Lab Manuals:
TextBooks:

Reference Books:

SYLLABUS:(List of Experiments)

1. Implement Fibonacci Search to search a given key.
2. Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.Also use same set of data to sort using merge sort and compare with quick sort.
3. A) From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijikstra's algorithm.
B) Compute the transitive closure of a given directed graph using Warshall's algorithm.
4. Implement 0/1 Knapsack problem using Dynamic Programming.
5. Find a subset of a given set S = {sl, s2... sn} of n positive integers whose sum is equal to a given

positive integer d. For example, if S= {1, 2, 5, 6, 8} and d = 9 there are two solutions {1, 2, 6} and {1, 8}. A suitable message is to be displayed of a problem instance with all possible solution.
6. Implement any scheme to find the optimal solution for the Traveling Salesperson problem and then solve the same problem.
7. A) Implement non-deterministic method to sort a given set of numbers.
B) Implement 0/1 Knapsack problem using non-deterministic method.
8. A) Implement the Chinese remainder theorem
B) Implement Modular Exponentiation Algorithm to compute ab mod n where a, b, and n are positive integers

Course Plan:

Experiment No.	Learning Objectives	Topic(s) to be Covered
1	To implement searching algorithm and to analyze it	Implement Fibonacci Search to search a given key.
2	To implement various sorting algorithms and to compare their performance	Sort a given set of elements using the Quick sort method and determine the time required to sort theelements. Repeat the experiment for different values of n, the number of elements in the list to besorted and plot a graph of the time taken versus n.Also use same set of data to sort using merge sort and compare with quick sort.
3	To implement Greedy method and to analyze its performance	From a given vertex in a weighted connected graph, find shortest paths to other vertices usingDijikstra's algorithm.
4	To implement Greedy method and to analyze its performance	Compute the transitive closure of a given directed graph using Warshall's algorithm.
5	To implement DP method and to analyze its performance	Implement 0/1 Knapsack problem using Dynamic Programming
6	To implement DP method and to analyze its performance	Find a subset of a given set S = {sl, s2... sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S= {1, 2, 5, 6, 8} and d = 9 there are two solutions {1, 2, 6} and{1, 8}. A suitable message is to be displayed of a problem instance with all possible solution.
7	To implement BB to solve TSP and to analyze its performance	Implement any scheme to find the optimal solution for the Traveling Salesperson problem and thensolve the same problem.
8	To implement non-deterministic algorithm	Implement non-deterministic method to sort a given set of numbers.

9	To implement non-deterministic algorithm	Implement 0/1 Knapsack problem using non-deterministic method.
10	To implement number theory algorithm	Implement the Chinese remainder theorem
11	To implement algorithm in modular arithmetic	Implement Modular Exponentiation Algorithm to compute ab mod n where a, b, and n arepositive integers

Evaluation Scheme:

Component	Particulars	Marks	Date & Time
Lab Regularity	No. of Experiments completedand recorded	15	Every week during thesemester
Internal Examination	150 Minutes	10	26-03-2018 to 31-03-2018
External Examination	180 Minutes	50	02-04-2018 to 07-04-2018
Total		**75**	

Venue : Programming Lab /Networks Lab
Notices: CSEMain Notice Board

Signature of the Instructors **Signature of the Course-Coordinator**