MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	:	Information and Communication Technology
Course Name & code	:	Design and Analysis of Algorithms & ICT 2257
Semester & branch	:	IV & B.Tech (CCE) & B.Tech (IT)
Name of the faculty	:	Dr. Ajitha Shenoy K B, Mr. Rajesh Rao, Ms. Aiswarya
No of contact hours/week:		

L	T	P	C
3	1	0	4

Course Outcomes (COs)

	At the end of this course, the student should be able to:	No. of Contact Hours	Marks
CO1:	Understand asymptotic notations to represent the complexities of algorithms	4	9
CO2:	Understand the basic concepts of graph traversal methods	6	12
CO3:	Apply various algorithm designing techniques for a given problem	24	50
CO4:	Comprehend the basic concepts of trees and hashing techniques	10	21
CO5:	Understand NP complete and NP hard problems	4	8
	Total	48	100

Assessment Plan

Components	Assignments	Sessional Tests	End Semester/ Make-up Examination
Duration	20 to 30 minutes	60 minutes	180 minutes
Weightage	20 % (4 X 5 marks)	30 % (2 X 15 Marks)	50 % (1 X 50 Marks)
Typology of Questions	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation	Knowledge/ Recall; Understanding/ Comprehension; Application	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation
Pattern	Answer one randomly selected question from the problem sheet (Students can refer their class notes)	MCQ: 10 questions (0.5 marks) Short Answers: 5 questions (2 marks)	Answer all 5 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks
Schedule	4, 7, 10, and 13th week of academic calendar	Calendared activity	Calendared activity
Topics Covered	Quiz 1 (L 1-8 & T 1-2) (CO1,2)	Test 1 (L 1-14 & T 1-4) (CO1,2,3)	Comprehensive examination covering full syllabus. Students are expected to answer all questions (CO1-5)
	Quiz 2 (L **9-18** & T 3-5) (CO3)		
	Quiz 3 (L 19-28 & T 6-9) (CO3,4)	Test 2 (L 15-28 & T 5-9) (CO3,4)	
	Quiz 4 (L 29-36 & T 10-12) (CO4,5)		

Lesson Plan

L. No.	Topics	Course Outcome Addressed
L0	Introduction to the course	--
L1	Asymptotic Notations	CO1
L2	Space Complexity	CO1
L3	Time Complexity	CO1
T1	Problems on Space and Time Complexity	CO1
L4	Graphs: Definitions, Digraphs, Applications	CO2
L5	Graph Representation, ADTs	CO2
L6	Graph search Methods – Breadth First Search, Depth-First Search	CO2
T2	Problems on graph search methods	CO2
L7	Finding a path, connected Graphs & Components	CO2
L8	Spanning Trees	CO2

L9	Greedy Methods, Optimization Problems, Applications	CO3
T3	Problem solving using greedy method	CO3
L10	0/1 Knapsack Problem : profit by density method, heuristic method	CO3
L11	Topological sorting, Bipartite Cover	CO3
L12	Single Source Shortest Paths	CO3
T4	Problems on shortest path and topological sorting	CO3
L13	Minimum cost spanning tree: Kruskals's and Prim's Method	CO3
L14	Divide and Conquer method, Strassen's matrix multiplication	CO3
L15	Merge Sort	CO3
T5	Complexity analysis of Strssen's matrix multiplication and merge sort algorithm.	CO3
L16	Quick Sort	CO3
L17	Closest pair of points	CO3
L18	Solving recurrence equation, Master theorem	CO3
T6	Solving recurrence equations using substitution method and master theorem	CO3
L19	Dynamic Programming Method, Applications - 0/1 Knapsack Problems	CO3
L20	Matrix Multiplication Chains	CO3
L21	All pair's shortest path	CO3
T7	Problem solving using dynamic programming	CO3
L22	Backtracking and Branch and Bound Method, Applications	CO3
L23	Backtracking: Container Loading Problem, 0/1 Knapsack Problem	CO3
L24	Backtracking: Max Clique Problem, Travelling sales person problem	CO3
T8	Problem solving using backtracking method	CO3
L25	Branch and Bound: Container Loading Problem, 0/1 Knapsack Problem	CO3
L26	Branch and Bound: Max Clique Problem, Travelling sales person problem	CO3
L27	Binary Search Trees (BST)	CO3
T9	Complexity analysis of BST, Problem solving using branch and bound	CO4
L28	Heap Trees, Hight Balanced Tree	CO4
L29	Avl Tree, Red Black Tree, Splay Tree	CO4
L30	B Trees, B+ Trees	CO4

T10	Complexity analysis of different tree structure learnt	CO4
L31	Hashing function, Address Calculation Techniques, Common hashing functions	CO4
L32	Collision resolution techniques: Open addressing, closed addressing , separate chaining	CO4
L33	Linear and Quadratic Probing, double hasing	CO4
T11	Problem solving using Hashing Technique and its complexity analysis	CO4
L34	Introduction to P, NP, NP-Complete and NP-hard problems	CO5
L35	Approximation Algorithms - Vertex Cover Problem	CO5
L36	Approximation Algorithms - TSP	CO5
T12	Problem solving using approximation agorithm	CO5
L/T	Click or tap here to enter text.	

References:

1.	Sartaj Sahni "Data Structures, Algorithms and Applications in C++", McGraw- Hill 2000.
2.	Mark Allen Weiss, " Data Structures and Algorithm Analysis in C", Pearson Education, Second Edition, 2009.
3.	Thomas H Cormen, Charles E Leiserson& Ronald L Rivest, "Introduction to Algorithms (3e)", Prentice – Hall India, 2009.
4.	Debasis Samanta, "Classic Data Structures", PHI Learning, Second Edition, 2010.
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Submitted by: DR. AJITHA SHENOY K B, MR. RAJESH RAO AND MS. AISWARYA

(Signature of the faculty)

Date: 06-01-2020

Approved by: DR. BALACHANDRA

(Signature of HOD)

Dr. Balachandra
Professor & Head
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Date: 01-06-2020

FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

FACULTY	SECTION	FACULTY	SECTION
DR. AJITHA SHENOY K B	CCE - A		
MR. RAJESH RAO	IT - A		
MS. AISHWARYA	CCE - B, IT - B		

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