SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Accredited by National Board of Accreditation, AICTE, New Delhi,Accredited by
NAAC with "A" Grade – 3.32 CGPA,Recognized under 2(f) & 12(B) of UGC Act 1956,
Approved by AICTE, New Delhi,Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
16CS6T02	**Design And Analysis Of Algorithms**	VI	CSE – A,B, C	5	2019-2020	25-11-2019

COURSE OUTCOMES	
1	Estimate the correctness of algorithms using inductive proofs and invariants.(K2)
2	Analyse the asymptotic runtime complexity of algorithms for real world problems(K4).
3	Identify the optimal solutions by using advanced design and analysis of algorithm techniques.(K3)
4	Describe the dynamic-programming paradigm and explain when an algorithmic design Situation calls for it (K1)
5	Identify the search space and optimization problem techniques.(K3)
6	Distinguish the problems and its complexity as polynomial and NP problem(K4)

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
			UNIT 1: INTRODUCTION			
I	CO1: Estimate the correctness of algorithms using inductive proofs and invariants. (K2)	1.1	Algorithm	T1	1	Chalk & Talk
		1.2	Pseudo code for expressing algorithms	T1	1	PPT
		1.3	Performance Analysis	T1	1	PPT
			1.3.1Space,Time complexity	T1	1	PPT
		1.4	Asymptotic Notation- Big oh notation, Omega notation	T1	1	PPT
			1.4.1Theta notation and Little oh notation	T1	1	PPT
		1.5	Probabilistic Analysis	T1	1	PPT

		1.6	Disjoint Sets	T1	1	PPT
		1.7	Disjoint set operations	T1	1	Chalk & Talk
		1.8	Union and find algorithms	T1	1	PPT
		1.9	Spanning trees	T1	1	Chalk & Talk
		1.10	Connected and bi-connected components	T1	1	Chalk & Talk PPT
		Content beyond Syllabus	Randomized Algorithms	T1	1	PPT
				Total		13
UNIT II: DIVIDE AND CONQUER						
II	CO2:. Analyse the asymptotic runtime complexity of algorithms for real world problems(K4).	2.1	Divide and conquer General method	T1	1	Chalk & Talk
			Applications	T1	1	Chalk & Talk
		2.2	Binary search	T1	1	NPTEL
		2.3	Quick sort	T1	1	NPTEL
			2.3.1 Randomized quick sort	T1	1	NPTEL
		2.4	Merge sort	T1	1	NPTEL
		2.5	Stassen's matrix multiplication	T1	1	Chalk & Talk PPT
		2.6	Greedy method: General method	T1	1	Chalk & Talk PPT
		2.7	Job sequencing with deadlines	T1	1	NPTEL
		2.8	Knapsack problem	T1	1	Chalk & Talk
		2.9	Minimum cost spanning trees	T1	1	Chalk & Talk
		2.10	Single source shortest path problem	T1	1	Chalk & Talk
		Content beyond Syllabus	Tree vertex splitting	T1	1	PPT
				Total	13	

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				UNIT III: DYNAMIC PROGRAMMING			
III	CO3:Identify the optimal solutions by using advanced design and analysis of algorithm techniques.(K3)		3.1	Dynamic Programming General Method	T2	1	Chalk & Talk
			3.2	Matrix chain multiplication	T2	1	PPT
			3.3	Optimal binary search trees	T2	1	Chalk & Talk PPT
				3.3.1 Optimal binary search tree exercises	T2	1	Chalk & Talk
			3.4	0/1 knapsack	T2	1	Chalk & Talk PPT
				3.4.1 0/1 knapsack problem	T2	1	Chalk & Talk PPT
			3.5	All pairs shortest paths	T2	1	Chalk & Talk PPT
				All pairs shortest paths problems	T2	1	Chalk & Talk PPT
			3.6	Travelling sales person problem	T2	1	PPT
			3.7	Reliability design	T2	1	WebResources
			Content beyond Syllabus	Multi stage graphs	T2	1	PPT
					Total		11
				UNIT IV: BACK TRACKING			
IV	CO4: Describe the dynamic-programming paradigm and explain design Situation when an algorithmic calls for it (K1)		4.1	Backtracking General method	T2	1	Chalk & Talk
			4.2	Backtracking method example& applications	T2	1	PPT
			4.3	n-queen problem	T2	1	Chalk & Talk
			4.4	n-queen problem examples	T2	1	PPT
			4.5	sum of subsets problem	T2	1	Chalk & Talk
			4.6	Example problems on sum of subsets	T2	1	PPT
			4.7	graph coloring	T2	1	PPT
			4.8	graph coloring procedure practices	T2	1	PPT

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		4.9	Hamiltonian cycles	T2	1	PPT
			4.9.1Generating next vertex	T2	1	PPT
			4.9.2 Finding of Hamiltonian cycles	T2	1	PPT
		Content beyond Syllabus	Cryptarithmetic puzzels	T2	1	PPT
				Total	12	
UNIT V: BRANCH AND BOUND						
V	CO5:Analyze the various data lossless and lossy compression techniques(K4)	5.1	Branch and Bound General Method	T1	1	Chalk & Talk
		5.2	Applications	T1	1	Chalk & Talk
		5.2	Travelling sales person problem	T1	1	PPT
			5.2.1 State space tree for traveling sales person	T1	1	PPT
		5.3	0/1 knapsack problem	T1	1	Chalk & Talk
		5.4	LC Branch and Bound solution	T1	1	PPT
			5.4.1 LC Branch and Bound Tree	T1	1	PPT
		5.5	FIFO Branch and Bound solution	T1	1	PPT
			5.5.1 FIFO Branch and Bound tree	T1	1	PPT
		Content beyond Syllabus	LIFO Branch and Bound solution	T1	1	PPT
				Total	10	
UNIT VI: NP- HARD AND NP- COMPLETE PROBLEMS						
VI	CO6: Distinguish the problems and its complexity as polynomial, NP problem(K4)	6.1	Basic concepts	T1	1	Chalk & Talk
		6.2	Non deterministic algorithms	T1	1	PPT
			6.2.1 Search and sort	T1	1	PPT
			6.2.2 Sum of subset& knapsack algorithms	T1	1	PPT
		6.3	NP - Hard and NP Complete classes	T1	1	Chalk & Talk
			6.3.3 Relationship between P and NP	T1	1	PPT
			6.3.3 Relationship between P,NP,NP complete& hard	T1	1	PPT

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		6.4	Cook's theorem	T1	1	PPT
			NP hard problems	T1	1	PPT
				Total		9
			CUMULATIVE PERIODS			68

Text Books:

S.No.	BOOK TITLE ,AUTHORS, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Ellis Horowitz, Satraj Sahni and Rajasekharam ,Fundamentals of Computer Algorithms, , 2nd edition Universities Press 2013
2	Steven S. Skiena, The Algorithm Design Manual, 2nd edition, Springer. 2010
3	T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein , Introduction to Algorithms, second edition, PHI Pvt. Ltd 2010

Reference Books:

S.No.	BOOK TITLE, AUTHORS, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	AnanyLevitin ,Introduction to the Design and Analysis of Algorithms, ,3rd edition ,Technical Publications 2017
2	Parag Himanshu Dave, Himansu B Alachandra Dave ,Design and Analysis of Algorithms, , 2nd edition,Pearson Education,2013
3	R.C.T. Lee S.S.Tseng, R.C.Chang and T.Tsai , Introduction to Design and Analysis of Algorithms A strategic approach , 2nd edition, McGraw Hill.2018
4	Aho, Ullman ,Hop ,Design and Analysis of algorithms, ,1st edition, Pearson education 2010

Web Details

1	http://https://nptel.ac.in/
2	https://www.geeksforgeeks.org/fundamentals-of-algorithms/
3	https://www.coursera.org/specializations/data-structures-algorithms

		Name	Signature with Date
i.	Faculty	Mr.N.Tulasi Raju	
ii.	Faculty II (for common Course)	Ms.G.Lalitha	
iii.	Course Coordinator	Mr.N.Tulasi Raju	
iv.	Module Coordinator	Mr.K.Dileep kumar	
v.	Programme Coordinator	Dr.P.Srinivasulu	

Principal