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SASURIE COLLEGE OF ENGINEERING

Approved by AICTE, New Delhi. Affiliated to Anna University, Chennai

SASURIE INSTITUTIONS

Near NH544, Coimbatore Bypass, Near Vijayamangalam Tollgate,Tirupur 638056

NAAC DOCUMENTS

QUALITY INDICATOR FRAME WORK

CRITERION - 1

CURRICULAR ASPECTS

SUBMITTED BY

IQAC

INTERNAL QUALITY ASSURANCE CELL

SASURIE COLLEGE OF ENGINEERING

SASURIE
COLLEGE OF ENGINEERING
Vijayamangalam, Tiruppur.

Criterion 1	Curricular Aspects	100

1.1 Curricular Planning and Implementation (20)

1.1.1The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment
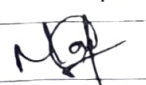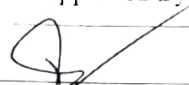
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14	Assignment Answer Sheet

SASURIE
College of Engineering
Vijayamangalam, Tiruppur.

Department : AI & DS

Subject Code & Name: AD 3351 & Design and Analysis of Algorithms.

Class & Batch : II α 1

Semester : III

CONTENTS – COURSE FILE

S.NO	PARTICULARS	REMARKS
1	Time Table	
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3	Subject Information Record	
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10	Internal test mark sheet(Consolidated)	
11	Internal test question paper	
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14	Content beyond the syllabus	
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20	Sample university question papers(min 5 QP-recent exam)	
21	Personal Log book – Updated	
22	Lecture Note	
23	Special Class if any, Approval letter, Schedule, content covered.	

	Prepared By	Approved By
Sign:		
Name:	P.M. Manochitra	S. Prabakaran.
	Faculty	HOD

Head, Dept. of CSE

SASURIE
College of Engineering

Dr.M.VIJAYAKUMAR ME., Ph.D.,
PRINCIPAL
SASURIE COLLEGE OF ENGINEERING,
Vijayamangalam - 638 056. Tirupur (Dt).

SASURIE
INSTITUTIONS

CLASS TIME TABLE - Academic year 2022-23 ODD Sem

Department : AI&DS

w.e.f : 10.2022

Year&Sem: II&III

Name of the faculty : Mrs.P.M.MANOCHITRA- AP / CSE

HOUR	I	II		III	IV		V	VI		VII	VIII
DAY / TIME	09.30a.m TO 10.15 a.m.	10.15a.m. TO 11.00a.m.	11.00a.m TO 11.10 a.m.	11.10 a.m. TO 11.55 a.m.	11.55 a.m. TO 12.40p.m.	12.40 p.m. TO 1.20 p.m.	1.20 p.m. TO 2.00p.m.	2.00 p.m TO 2.40p.m.	2.40 p.m. TO 2.50p.m.	2.50 p.m. TO 3.35 p.m.	3.35 p.m. TO 4.20 p.m.
MONDAY							DAA	DAA			
TUESDAY			BREAK			LUNCH			BREAK		
WEDNESDAY				DAA	DAA						
THURSDAY											
FRIDAY							DAA	DAA			
SATURDAY					DAA						

S.No.	Subject Code	Name of the Subject	Class	No. of
1	AD3351	Design Analysis And Algorithm	Mrs.P.M.MANOCHITRA AP/CSE	7
		TOTAL		7

	Prepared by	Verified by	Authorized by
Sign:			
Name:	Mrs.P.M.MANOCHITRA	Mr.S.PRABAKARAN	Dr.M.VIJAYAKUMAR
	FACULTY	HOD	PRINCIPAL

Head, Dept. of CSE
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Dr.M.VIJAYAKUMAR ME., Ph.D.,
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SUBJECT INFORMATION RECORD

Department : AI & DS

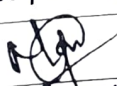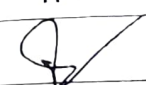Subject : DESIGN AND ANALYSIS OF ALGORITHM

Year : II

Semester : III

Last year handled by : —

Percentage of Result (last year) : —

Quality Objectives : To Produce result more than 95% in university Exam.

Reference Book:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++,Second Edition, Universities Press, 2019.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, Introduction toAlgorithms, Third Edition, PHI Learning Private Limited, 2012.
3. S. Sridhar, Design and Analysis of Algorithms, Oxford university press, 2014.
4. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, Data Structures and Algorithms,Pearson Education, Reprint 2006.

	Prepared By	Approved By
Sign:		
Name:	P.M. Manochitra.	S.Prabakaran.
	Faculty	HOD

Head, Dept. of CSE
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AD3351   **DESIGNANDANALYSISOFALGORITHMS**

COURSEOBJECTIVES:

- Tocriticallyanalyzetheefficiencyofalternativealgorithmicsolutionsforthesameproblem
- Toillustratebruteforceanddivideandconquer designtechniques
- Toexplaindynamic programmingandgreedytechniquesforsolvingvariousproblems.

UNITI   INTRODUCTION   8

NotionofanAlgorithm−FundamentalsofAlgorithmicProblemSolving−ImportantProblemTypes −Fundamentals of the Analysis of Algorithm Efficiency − Analysis Framework - Asymptotic Notationsand their properties − Empirical analysis - Mathematical analysis of Recursive and Non-recursivealgorithms− Visualization

UNITII   BRUTE FORCEANDDIVIDEAND CONQUER   10

Brute Force − String Matching - Exhaustive Search - Traveling Salesman Problem - KnapsackProblem - Assignment problem. Divide and Conquer Methodology − Multiplication of Large Integersand Strassen's Matrix Multiplication − Closest-Pair and Convex - Hull Problems. Decrease andConquer:-TopologicalSorting− TransformandConquer:Presorting−Heaps andHeapSort.

UNITIII   DYNAMICPROGRAMMINGANDGREEDYTECHNIQUE   10

Dynamic programming − Principle of optimality - Coin changing problem − Warshall's and Floyd'salgorithms − Optimal Binary Search Trees - Multi stage graph - Knapsack Problem and Memoryfunctions. Greedy Technique − Dijkstra's algorithm -Huffman Trees and codes - 0/1 Knapsackproblem.

UNITIV   ITERATIVE IMPROVEMENT   8

The Simplex Method-The Maximum-Flow Problem − Maximum Matching in Bipartite Graphs- TheStablemarriage Problem.

UNITV   LIMITATIONS OFALGORITHMPOWER   9

Lower - Bound Arguments - P, NP, NP- Complete and NP Hard Problems. Backtracking − N-Queenproblem - Hamiltonian Circuit Problem − Subset Sum Problem. Branch and Bound − LIFO Searchand FIFO search - Assignment problem − Knapsack Problem − Traveling Salesman Problem -ApproximationAlgorithmsforNP-HardProblems− TravelingSalesmanproblem−Knapsackproblem.

                                                            TOTAL:45PERIODS

TEXTBOOKS:
    1.AnanyLevitin,IntroductiontotheDesignandAnalysisofAlgorithms,ThirdEdition,Pearson Education, 2012.

REFERENCES:
1. EllisHorowitz.SartajSahni andSanguthevarRajasekaran,Computer Algorithms/C++,SecondEdition,UniversitiesPress,2019.
2. ThomasH.Cormen,CharlesE.Leiserson,RonaldL.RivestandCliffordStein,Introduction toAlgorithms,ThirdEdition,PHILearningPrivateLimited,2012.

LESSON PLAN

Faculty Name : Mrs P M Manachitra

Department : CSE

Subject / Code : AD3351 /DESIGN AND ANALYSIS OF ALGORITHMS

Academic Year : 2021-2022(ODD)

Designation Assistant Professor

Semester/ Year : III/II

S.No	Proposed Date	Period	Details of Topic Covered	TA	Ref.	Actual Date	Period	Remarks	HOD sign
UNIT I THE INTRODUCTION									
1	10.08.2022	1	Notion of Algorithm	1	1	19.9.22	5		
2	11.08.2022	4	Fundamentals of Algorithmic Problem Solving	1	1	19.9.22	6		
3	12.08.2022	5	Important Problem Types	1	1	21.9.22	3		
4	16.08.2022	4	Fundamentals of the Analysis of Algorithm Efficiency	1	1	21.9.22	4		
5	17.08.2022	1	Analysis Framework	1	1	23.9.22	5		
6	18.08.2022	4	Asymptotic Notations and their properties	1	1	23.9.22	6		
7	22.08.2022	2	Empirical analysis	1	1	26.9.22	5		
8	23.08.2022	4	Mathematical analysis of Recursive and Non-recursive algorithms and Visualization	1	1	28.9.22	3		
UNIT II BRUTE FORCE AND DIVIDE AND CONQUER									
9	25.08.2022	4	Brute Force	1	1	30.9.22	5		
10	26.08.2022	5	String Matching	1	1	30.9.22	6		
11	29.08.2022	2	Exhaustive Search , Traveling Salesman Problem	1	1	7.10.22	5		
12	30.08.2022	4	Knapsack Problem , Assignment problem	1	1	7.10.22	6		
13	01.09.2022	4	Divide and Conquer Methodology	1	1	10.10.22	3		
14	02.09.2022	5	Multiplication of Large Integers and Strassen's Matrix Multiplication	1	1	10.10.22	4		
15	05.09.2022	2	Closest-Pair and Convex - Hull Problems	1	1	12.10.22	5		
16	06.09.2022	4	Decrease and Conquer	1	1	12.10.22	6		
17	07.09.2022	2	Topological Sorting , Transform and Conquer	1	1	14.10.22	5		
18	07.09.2022	1	Presorting , Heaps and Heap Sort.	1	1	14.10.22	6		
UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE									
19	08.09.2022	4	Dynamic programming	1	1	19.10.22	3		
20	12.09.2022	2	Principle of optimality	1	1	19.10.22	4		
21	13.09.2022	4	Coin changing problem	1	1	24.10.22	5		
22	14.09.2022	1	Warshall's and Floyd's algorithms	1	1	24.10.22	6		
23	15.09.2022	4	Optimal Binary Search Trees	1	1	28.10.22	5		

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Designation: Assistant Professor
Semester/ Year: III/II

Faculty Name : Mrs P. M. Manochitra
Department : CSE
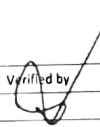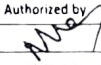Subject / Code : AD3351 /DESIGN AND ANALYSIS OF ALGORITHMS
Academic Year : 2022-2023(ODD)

S.No	Planned Date	Planned Period	Details of Topic Covered	TA	Ref.	Actual Date	Actual Period	Remarks	HOD sign
24	19.09.2022	2	Multi stage graph	1	1	31.10.22	3		
25	20.09.2022	4	Knapsack Problem and Memory functions.	1	1	31.10.22	4		
26	28.09.2022	1	Greedy Technique	1	1	2.11.22	5		
27	28.09.2022	1	Dijkstra's algorithm	1	1	2.11.22	6		
28	29.09.2022	4	Huffman Trees and codes , 0/1 Knapsack problem.	1	1	4.11.22	5		
UNIT IV ITERATIVE IMPROVEMENT									
29	06.10.2022	4	The Simplex Method	1	1	7.11.22	5		
30	07.10.2022	5	Introduction toThe Maximum-Flow Problem	1	1	9.11.22	3		
31	10.10.2022	2	The Maximum-Flow Problem	1	1	11.11.22	6		
32	11.10.2022	4	Introduction to Maximum Matching in Bipartite Graphs	1	1	14.11.22	5		
33	19.10.2022	1	Maximum Matching in Bipartite Graphs	1	1	16.11.22	5		
34	20.10.2022	4	Introduction to The Stable marriage Problem.	1	1	16.11.22	6		
35	21.10.2022	5	The Stable marriage Problem.	1	1	18.11.22	3		
36	26.10.2022	1	The Stable marriage Problem. Continuation	1	1	21.11.22	5		
UNIT V LIMITATIONS OF ALGORITHM POWER									
37	28.10.2022	5	Lower - Bound Arguments - P, NP, NP- Complete and NP	1,3	2	25.11.22	5		
38	31.10.2022	2	Backtracking , N-Queen problem	1	2	25.11.22	6		
39	01.11.2022	4	Hamiltonian Circuit Problem , Subset Sum Problem.	1	2	28.11.22	3		
40	02.11.2022	1	LCD and keyboard interfacing.	1,3	2	30.11.22	5		
41	03.11.2022	4	Branch and Bound , LIFO Search and FIFO search	1,3	2	30.11.22	6		
42	04.11.2022	5	Assignment problem , Knapsack Problem	1,3	2	2.12.22	5		
43	07.11.2022	2	Traveling Salesman Problem , Approximation Algorithm	3	2	5.70.22	3		
44	08.11.2022	4	Hard Problems	3	2	7.12.22	5		
45	09.11.2022	1	Traveling Salesman problem , Knapsack problem	3	2	9.12.22	5		

Reference books (Ref):

1. Anany Levitin, Introduction to the Design and Analysis of Algorithms, Third Edition, Pearson Education, 2012.

2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2019.

Teaching Aids (TA):
1. Black Board with Chalk
2. Overhead Projector
3. LCD Projector

	Prepared by	Verified by	Authorized by
Sign:			
Name:	Mrs.P. M Manochitra	Mr.S.PRABAKARAN	Dr.M.VIJAYAKUMAR
	Faculty	HOD	Principal

TEST PLAN FOR SUBJECT

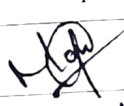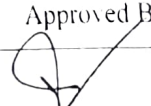Subject : AD3351| Design Analysis and Algorithm

Faculty: P.M. Mano chitra

Semester : III

Year: II

Department : AI&DS

S. No.	Description	Planned Date/Month	Actual Conducted Date / Month	Remarks
1.	Internal test - I	14.10.22	14.10.22	college reopens data 29-8-22 only
2.	Internal Test - II	16.12.22	16.12.22	college reopen date 29-8-22 only.

	Prepared By	Approved By
Sign:		
Name:	P.M. Manochitra.	S. Prabakaran.
	Faculty	HOD

RESULT ANALYSIS OF TEST - I

Subject : AD3351/Design Analysis & Algorithm   Date : 14.10.22

Class : II   Department : AI&DS

Semester : III

Exam details & date : 11.00 to 12.30 & 14.10.22.

Faculty : P.M. Manochitra.

Number of students : 4

No. of students attended : 4

No. of students absent : NIL

No. of students passed : 4

No. of students failed : NIL

Percentage of failures : NIL

RESULT DATA:

Marks	0-25	26-50	51-75	76-90	91-100
No. of Students	-	-	-	3	1

	Prepared By	Approved By
Sign:		
Name:	P.M Manochitra	S. Prabakaran
	Faculty	HOD

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Head, Dept. of CSE
SASURIE
College of Engineering

SASURIE INSTITUTIONS

RESULT ANALYSIS OF TEST – II

Subject : AD 3351 / Design Analysis & Algorithm   Date : 16.12.22

Class : II   Department : AI & DS

Semester : III

Exam details & date : 16.12.22 ". 1.30 to 4.30 'Pm

Faculty : P.M. Manochitra

Number of students : 4

No. of students attended : 4

No. of students absent : NIL

No. of students passed : 4

No. of students failed : NIL

Percentage of failures : NIL

RESULT DATA:

Marks	0-25	26-50	51-75	76-90	91-100
No. of Students	—	—	3	1	—

	Prepared By	Approved By
Sign:	P.M	
Name:	P.M. Manochitra	
	Faculty	HOD

Dr.M.VIJAYAKUMAR ME., Ph.D.,
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Head, Dept. of CSE
SASURIE
College of Engineering

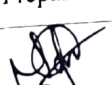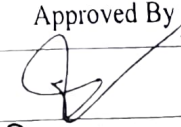# QUALITY OBJECTIVE MONITORING RECORD

Department : AIKDS.

Year : II

Semester : III

Subject : Design Analysis and Algorithms

S.No	Quality Objective	Internal Test-I		Internal Test-II		Model exam	
		Expecting result	Obtained result	Expecting result	Obtained result	Expecting Result	Obtained result
1	To make student obtain knowledge on Design and Analysis of Algorithms.	95%	100%	90%	100%	—	—

	Prepared By	Approved By
Sign:		
Name:	P.M. Manochitra.	S. Prabakaran.
	Faculty	HOD

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College of Engineering

Academic Year 2022 - 2023 ODD Semester

STUDENTS NAME LIST

Department: AI&DS

Year/Sem:II / III

Sl.	Register Number	Student's Name	INTERNAL MARK 1	INTERNAL MARK 2	MODEL EXAM MARK
1	732421243001	Arun.A	82	60	—
2	732421243003	Santhosh kumar	88 76	65	—
3	732421243004	Sivakumar.A	96	78	—
4	L1	Madankumar	88	60	

SIGN		
NAME	P.M.Manochitra	Mr.S.PRABAKARAN
	CLASS ADVISOR	HOD

Head, Dept. of CSE
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Vijayamangalam-638 056.

Dr.M.VIJAYAKUMAR ME., Ph.D.,
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Vijayamangalam, Tiruppur

INTERNAL ASSESMENT - II			Date/Session	16.12.2022/AN	Marks		100
Course code	AD3351	Course Title	DESIGN AND ANALYSIS OF ALGORITHM				
Regulation	2021	Duration	3 Hours	Academic Year		2022-2023	
Year	II	Semester	III	Department		AI&DS	

COURSE OUTCOMES

CO1:	Analyze the efficiency of recursive and non-recursive algorithms mathematically.
CO2:	Analyze the efficiency of brute force, divide and conquer, decrease and conquer, Transform and conquer algorithmic techniques.
CO3:	Implement and analyze the problems using dynamic programming and greedy algorithmic techniques.
CO4:	Solve the problems using iterative improvement techniques for optimization.
CO5:	Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques.

Q.No.	Question	CO	BTS
	PART A		
	(Answer all the Questions 10 x 2 = 20 Marks)		
1	State the principle of backtracking.	CO5	R
2	What is state space tree?	CO2	U
3	What is heuristics?	CO3	R
4	Define Knapsack problem.	CO2	U
5	Define Blocking pair.	CO2	U
6	Define extreme point theorem.	CO5	U
7	State the general principle of greedy algorithm .	CO3	R
8	What do you mean by "Perfect Matching in bipartite graphs?	CO4	R
9	Define the single source shortest paths problem.	CO3	R
10	List out the memory functions used under Dynamic programming	CO3	U

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PART B
(Answer all the Questions 5 x 13 = 65 Marks)

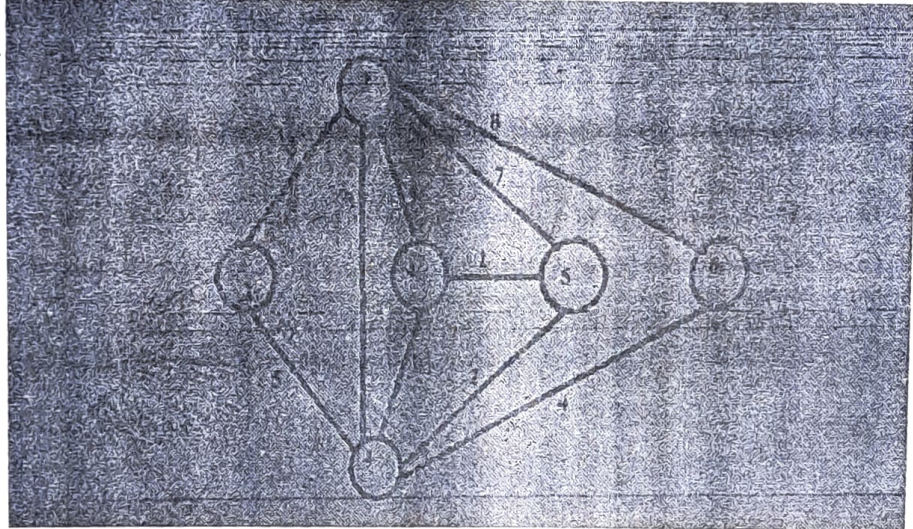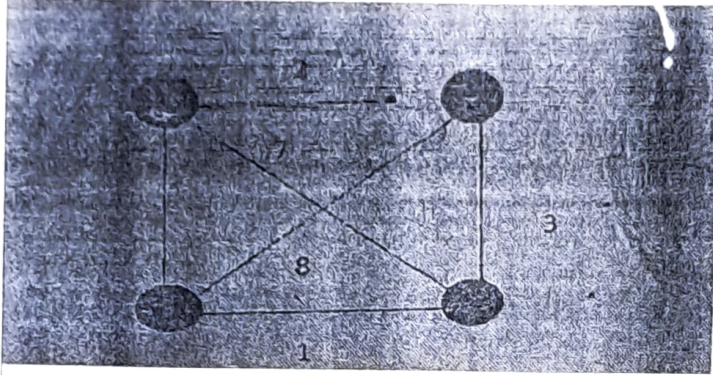|			
11a	Explain the method for finding the minimum spanning tree for a connected graph using Prim's algorithm with an example.	CO2	E
	OR		
11b	How will find the shortest path between two given vertices using Dijkstra's algorithm? Explain the pseudo code with an example.	CO2	E
12a	Explain stable marriage algorithm with suitable example.	CO1	C
	OR		
12b	Explain n-queen's problem. Draw a portion of the state space tree and perform backtracking search for a solution to 4-queens problem.	CO1	U
13 a	Analyze the shortest path and the corresponding distance from the source node to the destination node as indicated in each of the cases 1-6, 5-1 and 5-2.	CO3	E
	OR		
13 b	Comparison between Prim's and Kruskal's algorithm and identify the time complexity of those algorithms.	CO3	E
14 a	Analyze all edges that form the minimum cut. And also analyze the maximum flow problem.	CO4	E
	OR		
14 b	Evaluate and solve the following problem using simplex method: Maximize p = 2x+3y+z Subject to x+y+z≤40,2x+y-z≥10,-y-z≥10 where x≥0, y≥0, z≥0,	CO4	E
15 a	What is Class NP? Discuss about any five problems for which no polynomial-time algorithm has been found.	CO5	E
	OR		

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15 b Design Branch and Bound algorithm to solve the Travelling Salesman Problem for the following graph.

CO5 | C

PART C
(Answer all the Questions 1 x 15 = 15 Marks)

| 16 a | Write an algorithm for quick sort and write its time complexity with example list are 5,3,1,9,8,2,4,7. | CO3 | A |

OR

| 16 b | Write the Huffman's Algorithm. Construct the Huffman's tree for the following data and obtain its Huffman's code. | CO3 | A |

Character	A	B		D	E	
Probability	0.5	0.35		0.1	0.4	0.2

Course Faculty

(Name/Sign/Date)

P. M. Mana Chrthia

HoD

(Name/Sign/Date)

(S. Prasar cevren)

Principal

(Name/Sign/Date)

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Internal Assessment Test Answer Book

Name	Parthashkumar . A		Year/ Semester/Section	II/III/A
Register Number	732421243003	Date/Session	16 12 2022/AN Department	AI & DS
Course code	AD3351	Course Title	Design and Analysis of Algorithm	
Internal Assessment Test	IAT 1 ☐	IAT 2 ☑	IAT 3 ☐	Model ☐
Name and Signature of the Invigilator with date			16/12/22 S.Prabakaran	

Instruction to the Student: Put tick mark to the question attended in the column against question.

Part A			Part B/ Part C						Total Marks
Q. No.	✓	Marks	Q. NO.	✓	a Marks	✓	b Marks		
1	✓	2	11	✓	10				10
2	✓	2	12			✓	10		10
3	✓	2	13			✓	10		10
4	✓	2	14						
5	✓	2	15						
6	✓	2	16			✓	15		15
7	✓	2				Grand Total			45
8	✓	2							
9	✓	2							
10	✓	2	65/100						
Total		20	Grand Total						

P. M. Manochitra

May 20/12/22

Name and Signature
of the Examiner with date

To be filled by the examiner

Course Outcomes	1	2	3	4	5	6	Total
Marks allotted	13	19	36	15	17	—	100
Marks Obtained	10	16	33	2	4	—	65

IQAC Audit - Remarks

Marks are verified.

Name and Signature
of the IQAC member
(S. Prabakaran)

SASURIE
College of Engineering
Vijayamangalam, Tiruppur.

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Assignment Question Paper

Assignment – 01			Date of Issue:	11.10.2022	Marks	10
Course code	AD3351	Course Title	DESIGN AND ANALYSIS OF ALGORITHM			
Year	II	Semester/Section	III/ A	Date of Submission:	19.10.2022	

Q.No	Questions	CO
1	Write an algorithm using recursion that determines the GCD of two numbers.	CO2
2	Explain in detail about closest pair problem, travelling sales man problem.	CO2

P. M. Manochitra

Name and Signature of the Faculty Incharge

HoD/AI&DS

Dr.M.VIJAYAKUMAR ME., Ph.D.,
PRINCIPAL
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Vijayamangalam - 638 056, Tirupur (Dt).

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Assignment Answer Sheet

Name of the Student : T.V. Siva kumar

AU Register Number: 732421243004

Assignment – 01			Date of Issue:	11.10.2022	Marks	10
Course code	AD3351	Course Title	DESIGN AND ANALYSIS OF ALGORITHM			
Year	II	Semester/Section	III/ A	Date of Submission:	19.10.2022	

Q.No	Questions	CO
1	Write an algorithm using recursion that determines the GCD of two numbers.	CO2
2	Explain in detail about closest pair problem, travelling sales man problem.	CO2

Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Content Quality	6	6
Presentation Quality	2	2
Timely submission	2	2
Total marks	10	10

P. M. Manochitra

Name and Signature of the Faculty Incharge

HoD/AI&DS

Dr.M.VIJAYAKUMAR ME., Ph.D.,
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