

COURSE PLAN & COURSE DATA SHEET

PROGRAM: B.Tech	DEGREE: Bachelor of degree
COURSE: Design & Analysis of Algorithm	SEMESTER: 4 th sem CREDITS: 4 credit
COURSE CODE: CS-206 REGULATION:	COURSE TYPE: CORE /ELECTIVE / BREADTH/ S&H
COURSE AREA/DOMAIN: Computer science	CONTACT HOURS: 3+1 (Tutorial) hours/Week.3+1
CORRESPONDING LAB COURSE CODE (IF ANY):	LAB COURSE NAME (IF ANY):

PROGRAM EDUCATIONAL OBJECTIVES:

SYLLABUS:

UNIT	DETAILS	HOURS
I	BRIEF REVIEW: Growth of functions, Asymptotic Notations, Representation of Graphs, Breadth First Search, Depth First Search and Data Structures for Disjoint Sets.	11
II	DIVIDE AND CONQUER: General method; binary search; merge sort; quick sort; Strassen's matrix multiplication algorithms and analysis of algorithms for these problems.	11
III	GREEDY METHOD: General method; knapsack problem, job sequencing with deadlines; minimum spanning trees Algorithm of Kruskal's and Prim's; single source paths and analysis of these problems	11
IV	DYNAMIC PROGRAMMING AND BACK TRACKING: General method; optimal binary search trees; 0/1 knapsack; the traveling salesperson problem, 8 queens 'problem; graph coloring; Hamiltonian cycles	11
V	NP HARD AND NP COMPLETE PROBLEMS: Basic concepts; Cook's theorem; NP hard graph and NP scheduling problems; some simplified NP hard problems.	11
VI		
VII		
VIII		
TOTAL HOURS		55



Lingaya's Vidyapeeth

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Teacher Centric Approach			
TC1: Chalk and Talk, Blended learning	TC2: PPT,	TC3: Video Lectures	TC4:
Learner Centric Approach:			
LC1: Assignment.	LC2: Mini project.	LC3: Quiz/Class test.	LC 4: Seminar on recent trends.
LC5: Group Task.	LC6: Others		

DETAILED SESSION PLAN

Lecture session/ Number	Topics to be covered	CO addressed	Teacher Centric Approach	Learner Centric Approach	References	Relevance with POs and PSOs
1	Intoduction of basic algorithm		TC1, TC2	LC1,LC2,LC3	T1/R1/W1	
2	Growth of functions		TC1	LC1,LC3	T1/R1/W1	
3	Growth of functions		TC1	LC1,LC3	T1/T2/R1/W1	
4	Asymptotic Notations		TC1,TC2	LC1,LC3	T1/T2/R1/W1	
5	Asymptotic Notations		TC1,TC2	LC1,LC3	T1/T2/R1/W1	
6	Representation of Graphs		TC1,TC2	LC1,LC3	T1/T2/R1/W1	
7	Representation of Graphs		TC1,TC2	LC1,LC3	T1/T2/R1/W1	
8	Representation of Graphs		TC1	LC1,LC3	T1/T2/R1/W1	
9	Breadth First Search		TC1	LC1,LC3	T1/T2/R1/W1	
10	Depth First Search		TC1,TC2	LC1,LC3	T1/T2/R1/W1	

11	Data Structures for Disjoint Sets	TC1	LC1,LC3	T1/T2/R1/W1
12	Data Structures for Disjoint Sets	TC1	LC1,LC3	T1/T2/R1/W1
13	DIVIDE AND CONQUER	TC1	LC1,LC3	T1/T2/R1/W1
14	General method	TC1	LC1,LC3	T1/T2/R1/W1
15	binary search	TC1	LC1,LC3	T1/T2/R1/W1
16	merge sort	TC1	LC1,LC3	T1/T2/R1/W1
17	quick sort	TC1	LC1,LC3	T1/T2/R1/W1
18	Strassen's matrix multiplication	TC1,TC2	LC1,LC3	T1/T2/R1/W1
19	Strassen's matrix multiplication	TC1	LC1,LC3	T1/T2/R1/W1
20	analysis of algorithms for	TC1	LC1,LC3	T1/T2/R1/W1
21	analysis of algorithms for	TC1	LC1,LC3	T1/T2/R1/W1
22	analysis of algorithms for	TC1,TC2	LC1,LC3	T1/T2/R1/W1
23	GREEDY METHOD: General method	TC1,TC2	LC1,LC3	T1/T2/R1/W1
24	GREEDY METHOD: General method	TC1,TC2	LC1,LC3	T1/T2/R1/W1
25	GREEDY METHOD: General method	TC1	LC1,LC3	T1/T2/R1/W1
26	knapsack problem	TC1,TC2	LC1,LC3	T1/T2/R1/W1
27	job sequencing with deadlines	TC1	LC1,LC3	T1/T2/R1/W1
28	minimum spanning trees Algorithm of	TC1	LC1,LC3	T1/T2/R1/W1
29	minimum spanning trees Algorithm of	TC1,TC2	LC1,LC3	T1/T2/R1/W1
30	minimum spanning trees Algorithm of	TC1,TC2	LC1,LC3	T1/T2/R1/W1
31	single source paths	TC1	LC1,LC3	T1/T2/R1/W1
32	single source paths	TC1,TC2	LC1,LC3	T1/T2/R1/W1
33	analysis of these problems	TC1,TC2	LC1,LC3	T1/T2/R1/W1
34	analysis of these problems	TC1	LC1,LC3	T1/T2/R1/W1
35	analysis of these problems	TC1	LC1,LC3	T1/T2/R1/W1
36	DYNAMIC PROGRAMMING	TC1,TC2	LC1,LC3	T1/T2/R1/W1

37	DYNAMIC PROGRAMMING		TC1,TC2	LC1,LC3	T1/T2/R1/W1
38	General method		TC1,TC2	LC1,LC3	T1/T2/R1/W1
39	optimal binary search trees		TC1	LC1,LC3	T1/T2/R1/W1
40	O/I knapsack		TC1	LC1,LC3	T1/T2/R1/W1
41	the traveling salesperson		TC1	LC1,LC3	T1/T2/R1/W1
42	8 queens 'problem;		TC1,TC2	LC1,LC3	T1/T2/R1/W1
43	graph coloring		TC1,TC2	LC1,LC3	T1/T2/R1/W1
44	NP HARD		TC1	LC1,LC3	T1/T2/R1/W1
45	NP HARD		TC1	LC1,LC3	T1/T2/R1/W1
46	NP COMPLETE PROBLEMS		TC1	LC1,LC3	T1/T2/R1/W1
47	NP COMPLETE PROBLEMS		TC1,TC2	LC1,LC3	T1/T2/R1/W1
48	Cook's theorem		TC1	LC1,LC3	T1/T2/R1/W1
49	NP hard graph		TC1	LC1,LC3	T1/T2/R1/W1
50	NP hard graph		TC1	LC1,LC3	T1/T2/R1/W1
51	NP scheduling problems		TC1,TC2	LC1,LC3	T1/T2/R1/W1
52	NP scheduling problems		TC1	LC1,LC3	T1/T2/R1/W1
53	some simplified NP hard problems		TC1	LC1,LC3	T1/T2/R1/W1
54	Doubt session		TC1	LC1,LC3	T1/T2/R1/W1
55	Doubt session		TC1,TC2	LC1,LC3	T1/T2/R1/W1

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
1	Horowitz Ellis and Sahni Sartaj, – Fundamental of Computer Algorithms , Galgotia Publications, 1978
2	Cormen Thomas H., Leiserson Charles E. and Rivest Ronald L., – Introduction to Algorithms , Tata McGraw Hill, 1990
3	Aho A. V. and Hopcroft J. E., – The Design and Analysis of Computer Algorithm , Addison Wesley, 1974
4	Berlion P., and Bizard P., Algorithms – The Construction, Proof and Analysis of Programs, John

	Wiley & Sons, 1986.
5	

WEB SOURCE REFERENCES (W):

1	Design and Analysis of Algorithms - GeeksforGeeks
2	DAA Tutorial Design and Analysis of Algorithms Tutorial - javatpoint
3	Design and Analysis of Algorithms Tutorial (tutorialspoint.com)
4	
5	
6	
7	

COURSE PRE-REQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
CS-101	Programming for Problem Solving Using C	Knowledge of fundamentals of basic computer programming for implementing algorithms	1 st sem

COURSE OBJECTIVES:

1	To relay the theoretical and practical aspects of design of algorithms
2	
3	
4	

COURSE OUTCOMES:

S.NO	DESCRIPTION	PO(1..12) MAPPING	PSO(1..3) MAPPING
Cxxx.1	Define the basic concepts of algorithms and analyze the performance of algorithms	PO1,PO2,PO3,PO4,PO9,PO11	PSO1,PSO2
Cxxx.2	Discuss various algorithm design techniques for developing algorithms	PO1,PO2,PO3,PO9,PO11	PSO1,PSO2
Cxxx.3	Discuss various searching, sorting and graph traversal algorithms.	PO1,PO8,PO9,PO10	PSO2,PO3
Cxxx.4	Understand NP completeness and identify different NP complete problems	PO2,PO3,PO4,PO8	PSO1,PSO2
Cxxx.5	Discuss various advanced topics on algorithms.	PO1,PO2,PO3,PO10	PSO1,PSO2

COURSE OVERALL PO/PSO MAPPING:

COURSE OUTCOMES VS POs MAPPING (DETAILED; HIGH:3; MEDIUM:2; LOW:1):

S.NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3

Cxxx.1	2	1	2	2	1	-	-	-	-	-	-	-	2	-	1
Cxxx.2	2	2	1	2	2	-	-	-	-	-	-	1	2	-	1
Cxxx.3	2	1	2	1	2	-	-	-	-	-	-	1	1	-	1
Cxxx.4	1	2	1	2	2	-	-	-	-	-	-	1	2	-	1
Cxxx.5	2	2	2	1	2	-	-	-	-	-	-	1	2	-	1
Cxxx*															

* For Entire Course, PO & PSO Mapping

POs & PSO REFERENCE:

PO1	Engineering Knowledge	PO7	Environment & Sustainability	PSO1
PO2	Problem Analysis	PO8	Ethics	PSO2
PO3	Design & Development	PO9	Individual & Team Work	PSO3
PO4	Investigations	PO10	Communication Skills		
PO5	Modern Tools	PO11	Project Mgt. & Finance		
PO6	Engineer & Society	PO12	Life Long Learning		

COs VS POs MAPPING JUSTIFICATION:

S.NO	PO/PSO MAPPED	LEVEL OF MAPPING	JUSTIFICATION
Cxxx.1			
Cxxx.2			
Cxxx.3			
Cxxx.4			
Cxxx.5			
Cxxx*			

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS, POs & PSOs:

SNO	DESCRIPTION	PROPOSED ACTIONS
1		
2		
3		
4		
5		

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

1	
2	
3	
4	

5	
6	
7	

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

<input type="checkbox"/> CHALK & TALK	<input type="checkbox"/> STUD. ASSIGNMENT	<input type="checkbox"/> WEB RESOURCES	<input type="checkbox"/> NPTEL/OTHERS
<input type="checkbox"/> LCD/SMART BOARDS	<input type="checkbox"/> STUD. SEMINARS	<input type="checkbox"/> ADD-ON COURSES	<input type="checkbox"/> WEBNIARS

ASSESSMENT METHODOLOGIES-DIRECT

<input type="checkbox"/> ASSIGNMENTS	<input type="checkbox"/> STUD. SEMINARS	<input type="checkbox"/> TESTS/MODEL EXAMS	<input type="checkbox"/> UNIV. EXAMINATION
<input type="checkbox"/> STUD. LAB PRACTICES	<input type="checkbox"/> STUD. VIVA	<input type="checkbox"/> MINI/MAJOR PROJECTS	<input type="checkbox"/> CERTIFICATIONS
<input type="checkbox"/> ADD-ON COURSES	<input type="checkbox"/> OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

<input type="checkbox"/> ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	<input type="checkbox"/> STUDENT FEEDBACK ON FACULTY (TWICE)
<input type="checkbox"/> ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	<input type="checkbox"/> OTHERS

INNOVATIONS IN TEACHING/LEARNING/EVALUATION PROCESSES:

- 1.
- 2.
- 3.
- 4.
- 5.

Ms.Shivani Gupta

**Prepared by
(Faculty)**

Dr.Ritu Sindhu

**Approved by
(HOD)**

Additionally, the details to be compiled separately by the Departmental Coordinator for the entire Department.