DEPARTMENT

OF

COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)

Lesson Plan

Session: Aug. –Dec., 2025

Semester: 3RD

Name: _____

University Roll Number: _____

BUDDHA INSTITUTE OF TECHNOLOGY

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Index

TIME TABLE

BUDDHA INSTITUTE OF TECHNOLOGY, GIDA, GORAKHPUR

CLASS TIME TABLE: 2025-26 (ODD)

Dept.: CSE-DS	w.e.f.: 18 AUGUST, 2025	Semester: 3RD	Section: C	Room No.: 412

Day / Time	9:10-10:05 AM	10:05-11:00 AM	SHORT BREAK (15 Min.)	11:15-12:10 PM	12:10-01:05PM	LUNCH BREAK (40 Min.)	01:45-02:40 PM	2:40-3:35 PM	3:35-4:30 PM
MON	COA (KY)	DS (SS)		CSS (PS)	ESE (AK)		DSTL (SKP)	WD-LAB-(C1)-KJ-L-301	
								MP-LAB-(C2)-RS-L-302	
TUES	DS-LAB-(C1)-SS-L-304			DS (SS)	COA (KY)		DSTL (SKP)	TECH EDGE-LAB-(C1+C2)-VM-L-306	
	COA-LAB-(C2)-PV-L-412								
WED	DSTL (SKP)	CSEP (PC)		COA (KY)	CSS (PS)		DS (SS)	MP-LAB-(C1)-RS-L-402	
								WD-LAB-(C2)-KJ-L-401	
THU	UHVPE (RKT)	DSTL (SKP)		DS (SS)	COA (KY)		ESE (AK)	TECH EDGE-LAB-(C1+C2)-VM-L-307	
FRI	ESE (AK)	COA (KY)		DS (SS)	DSTL (SKP)		PPC (AKT)	COA-LAB-(C1)-PV-L-412	
								DS-LAB-(C2)-SS-L-402	
SAT	COA (KY)	DS (SS)		DSTL (SKP)	CSS (PS)				

	SUBJECT CODE	SUBJECT NAME	FACULTY NAME	LECTURE / WEEK
ACADEMICS	BCS - 301	DATA STRUCTURE (DS)	DR. SHASHANK SRIVASTAV (SS)	6
	BCS - 302	COMPUTER ORGANIZATION & ARCHITECTURE (COA)	MS. KANCHAN YADAV (KY)	6
	BCS - 303	DISCRETE STRUCTURES & THEORY OF LOGICS (DSTL)	MR. SHRAWAN KUMAR PANDEY (SKP)	6
	BCC - 301	CYBER SECURITY (CSS)	MS. POOJA SINGH (PS)	3
	BOE - 304	ENERGY SCIENCE & ENGINEERING (ESE)	MR. ARUN KUMAR (AK)	3
	BVE - 301	UNIVERSAL HUMAN VALUES (UHVPE)	DR. RAKESH KUMAR TIWARI (RKT)	1
	BCS - 351	DS LAB	DR. SHASHANK SRIVASTAV (SS)	2
	BCS - 352	COA LAB	MS. KANCHAN YADAV (KY)	2
	BCS - 353	WEB DESIGNING WORKSHOP (WD LAB)	MR. KRISHNA JAISWAL (KJ)	2
	BCC - 351	MINI PROJECT LAB (MP LAB)	MR. RANJEET SINGH (RS)	2
SKILL DEVELOPMENT	-	CSEP	MR. PRASHANT CHATURVEDI (PC)	1
	-	PRE-PLACEMENT CLASS (PPC)	MS AKRITI TRIPATHI (AKT)	1
	-	TECHEDGE LAB	MR. VIVEK MISHRA (VM)	4
SELF- LEARNING	-	LIBRARY	--	0
			TOTAL	39

Dr. Shashank Srivastav
HOD

EVALUATION SCHEME

Subject Code	Subject	Sessional Marks	Exam Marks	Total Marks
THEORY SUBJECTS				
BCS 301	**DATA STRUCTURES (DS)**	30	70	100
BCS 302	**COMPUTER ORGANIZATIONS AND ARCHITECTURE (COA)**	30	70	100
BCS 303	**DISCRETE STRUCTURES AND THEORY OF LOGIC (DSTL)**	30	70	100
BCC 301	**CYBER SECURITY**	30	70	100
BOE 304	**ENERGY SCIENCE AND ENGINEERING**	30	70	100
BVE 301	**UNIVERSAL HUMAN VALUE**	30	70	100
PRACTICAL/DESIGN/DRAWING				
BCS 351	**DS LAB**	50	50	100
BCS 352	**COA LAB**	50	50	100
BCS 353	**WD LAB**	50	50	100

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (AIML)

ACADEMIC YEAR 2025-26 (ODD Semester)

LESSON PLAN DETAILS

Semester: III	Section: C	Course Code: BCS 301	Contact Hours /week**: 6**
Course Name: **DATA STRUCTURE**			# of credits: 3
Faculty name: **Dr. Shashank Srivastav**			Designation: Associate Professor
Sessional Marks: 30		End Semester Examination Marks:70	University Exam Hours: 3

Prerequisites if any:
Programming concepts of conditional statements, loops, functions etc.

Content delivery methods:	By Face to face delivery, Presentation, Tutorial, Chalk & Board, PPT etc.

COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	**INTRODUCTION:** Basic Terminology, Elementary Data Organization, Built in Data Types in C. Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: Big Oh, Big Theta and Big Omega, Time-Space trade-off. Abstract Data Types (ADT) **Arrays:** Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Derivation of Index Formulae for 1-D,2-D,3-D and n-D Array Application of arrays, Sparse Matrices and their representations. **Linked lists:** Array Implementation and Pointer Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition Subtraction & Multiplications of Single variable & Two variables Polynomial.	**14**	**CO1**
2	**Stacks:** Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Iteration and Recursion- Principles of recursion, Tail recursion, Removal of recursion Problem solving using iteration and recursion with examples such as binary search, Fibonacci numbers, and Hanoi towers. Tradeoffs between iteration and recursion.	**12**	**CO2**

	Queues: Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.		
3	**Searching:** Concept of Searching, Sequential search, Index Sequential Search, Binary Search. Concept of Hashing & Collision resolution Techniques used in Hashing**.** **Sorting:** Insertion Sort, Selection, Bubble Sort, Quick Sort, Merge Sort, Heap Sort and Radix Sort.	**13**	**CO3**
4	**Trees:** Basic terminology used with Tree, Binary Trees, Binary Tree Representation: Array Representation and Pointer (Linked List) Representation, Binary Search Tree, Strictly Binary Tree, Complete Binary Tree, An Extended Binary Trees, Tree Traversal algorithms: In-order, Pre-order and Post-order, Constructing Binary Tree from given Tree Traversal, Operation of insertion, Deletion, Searching & Modification of data in Binary Search. Threaded Binary trees, Traversing Threaded Binary trees. Huffman coding using Binary Tree. Concept & Basic Operations for AVL Tree, B Tree & Binary Heaps.	**14**	**CO4**
5	**Graphs:** Terminology used with Graph, Data Structure for Graph Representations: Adjacency Matrices, Adjacency List, Adjacency. Graph Traversal: Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transitive Closure and Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm.	**17**	**CO5**

COURSE OUTCOMES: At the end of the Course, the Student will be able to:

CO1	Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications.
CO2	Discuss the computational efficiency of the sorting and searching algorithms.
CO3	Implementation of Trees and Graphs and perform various operations on these data structure.
CO4	Understanding the concept of recursion, application of recursion and its implementation and removal of recursion.
CO5	Identify the alternative implementations of data structures with respect to its performance to solve a real world problem.

Mapping of CO v/s PO:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	1	1	1	1	2
CO2	3	3	2	2	2	1	1	1	1	1	1	3

CO3	3	3	3	3	3	1	1	1	2	2	2	2
CO4	3	3	2	3	2	1	1	1	1	1	1	2
CO5	3	3	3	3	3	2	2	1	2	2	3	3
Average	3.00	3.00	2.40	2.60	2.40	1.20	1.20	1.00	1.40	1.40	1.60	2.40

Mapping of CO v/s PSO:

	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1
Average	1.00	1.00	1.00

Correlation levels: **1-Slight (Low)** **2-Moderate (Medium)** **3-Substantial (High)**

Topics to be covered beyond syllabus	

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (AIML)

ACADEMIC YEAR 2025-26 (ODD Semester)

LESSON PLAN

Lecture	Module	Scheduled				Conducted			
		Topic	*RBT Levels	C O Mapping	Date	Topic	Date	No. Of Students	Faculty Sign
1	I	Introduction: Basic Terminology, Elementary Data Organization, Built-in Data types in C	L2	CO1, CO2, CO4					
2		Algorithm definition, Efficiency of an Algorithm, Asymptotic notations: Big Oh,	L2						
3		Big Theta and Big Omega, Time-Space trade-off, Abstract Data Types (ADT)	L2						
4		Arrays: Definition, Single and Multidimensional Arrays,	L2						
5		Representation of Arrays: Row Major Order & Column Major Order	L2						
6		Derivation of Index Formulae for 1-D,2-D,3-D and n-D Array Application of arrays	L2						
7		Exercises to address calculation in 1D, 2D and 3D arrays	L2						
8		**Tutorial - 1**							
9		Introduction to Linked List, Advantages and disadvantages over Arrays.	L2						

10		Implementation of Singly Linked Lists, Implementation of Doubly Linked Lists	**L3**						
11		Implementation of Circular Linked Lists, Implementation of Doubly Circular Linked Lists	**L3**						
12		Polynomial Representation and Implementation, Addition/Subtraction of Polynomial	**L3**						
13		Multiplications of Single variable & Two variables Polynomial	**L3**						
14		**Tutorial - 2**							
15	II	Stacks: Abstract Data Type, Stack operations: Push & Pop	**L3**	CO2, CO3, CO4					
16		Array Implementation and Linked List Implementation of Stack in C	**L3**						
17		Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression	**L3**						
18		Iteration and Recursion- Principles of recursion, Types of recursion and Tail recursion	**L3**						
19		Difference between Iteration and Recursion, Removal of recursion Problem solving using iteration	**L3**						
20		Problem of Hanoi towers and its solution, Tradeoffs between iteration and recursion.	**L3**						

21		**Tutorial - 3**							
22		Introduction to Queue & types of queues, Operations on Queue: Create, Add, Delete, Full and Empty	**L3**						
23		Array Implementation of various Queues in C	**L3**						
24		Linked List Implementation of various Queue in C	**L3**						
25		Introduction and Implementation of Priority Queue	**L3**						
26		**Tutorial – 4**							
27	III	Searching: Concept of Searching, Sequential search,	**L3**	CO2, CO4					
28		Index Sequential Search, Binary Search.	**L3**						
29		Concept of Hashing, Types of Hashing	**L2**						
30		Collision resolution Techniques used in Hashing.	**L3**						
31		**Tutorial – 5**							
32		Introduction to Sorting Techniques, Types of sorting	**L3**						
33		Implementation of Insertion Sort, Selection Sort	**L3**						

34		Implementation of Bubble Sort	**L3**						
35		Implementation of Quick Sort	**L3**						
36		Implementation of Merge Sort	**L3**						
37		Implementation of Heap Sort	**L3**						
38		Implementation of Radix Sort	**L3**						
39		**Tutorial – 6**							
40	IV	Trees: Basic terminology used with Tree,	**L3**	CO2, CO4, CO5					
41		Binary Trees, types of Binary tree	**L3**						
42		Array Representation and Linked List Representation of Binary Tree	**L3**						
43		Operation of Binary Tree	**L3**						
44		Introduction to Binary Search Tree and its operation	**L3**						
45		Introduction to Strictly Binary Tree and its operation	**L3**						
46		Introduction to Complete Binary Tree and its operation	**L3**						
47		Introduction to An Extended Binary Trees and its operation	**L3**						

48		Tree Traversal algorithms: In-order, Pre-order and Post-order	**L3**						
49		**Tutorial – 7**							
50		Constructing Binary Tree from given Tree Traversal,	**L3**						
51		Operation of insertion in BST	**L3**						
52		Operation of Deletion in BST	**L3**						
53		Operation of Searching in BST	**L3**						
54		Modification of data in Binary Search.	**L3**						
55		Threaded Binary trees, Traversing Threaded Binary trees	**L3**						
56		Huffman coding using Binary Tree	**L3**						
57		Concept of AVL Tree, Basic Operations for AVL Tree	**L3**						
58		Concept of B Tree	**L3**						
59		Concept of Binary Heaps	**L3**						
60		**Tutorial – 8**							
61	V	Graphs: Terminology used with Graph	**L3**	CO2, CO4,					

62		Data Structure for Graph Representations	**L3**	CO5					
63		Adjacency Matrices, Adjacency List	**L3**						
64		Graph Traversal- Depth First Search	**L3**						
65		Graph Traversal-Breadth First Search	**L3**						
66		Connected and disconnected Component	**L3**						
67		**Tutorial – 9**							
68		Concept of spanning trees	**L3**						
69		Minimum Cost Spanning Trees	**L3**						
70		Concept of Prims algorithm	**L3**						
71		Concept of Kruskals algorithm	**L3**						
72		Transitive Closure and Shortest Path	**L3**						
73		All pair shortest path: Warshal Algorithm	**L3**						

74		Single pair shortest path: Dijikstra Algorithm	**L3**						
75		**Tutorial – 10**							
76		**Revision Class 1**							
77		**Revision Class 2**							
78		**Revision Class 3**							
79		**Revision Class 4**							
80		**Revision Class 5**							

Class Test	Syllabus
CT-01	Class 1-Class 20
CT-02	Class 21-Class 45
PRE-AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**

L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

Text Books:

T1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, "Data Structures Using C and C++",PHI Learning Private Limited, Delhi India.

T2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publications Pvt Ltd Delhi India.

Faculty Sign **HOD's Sign**

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING-DS

ACADEMIC YEAR 2025-26 (ODD Semester)

LESSON PLAN

Semester: III	Section: C	Course Code: BCS 302	Contact Hours /week**: 6**
Course name: **Computer Organization & Architecture**			# of credits: 4
Teacher's name: **Ms. Kanchan Yadav**			Designation: Asst. Prof.
Sessional Marks:30	End Semester Examination Marks: 70		University Exam Hours: 3

Prerequisites if any:			
Course Code	**Course Name**	**Topic/s**	**Semester**
-	-	-	-

Content delivery by using	Chalk and Board, PPT

COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	**Introduction:** Functional units of digital system and their interconnections, buses, bus architecture, types of buses and bus arbitration. Register, bus and memory transfer. Processor organization, general registers organization, stack organization and addressing modes.	**15**	**CO1**
2	**Arithmetic and logic unit:** Look ahead carries adders. Multiplication: Signed operand multiplication, Booths algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation, Arithmetic & logic unit design. IEEE Standard for Floating Point Numbers.	**14**	**CO2**
3	**Control Unit:** Instruction types, formats, instruction cycles and sub cycles (fetch and execute etc), micro-operations, execution of a complete instruction. Program Control, Reduced Instruction Set Computer, Pipelining. Hardwire and micro programmed control: micro programme sequencing, concept of horizontal and vertical microprogramming.	**17**	**CO3**
4	**Memory:** Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2D memory organization. ROM memories. Cache memories: concept and design issues & performance, address mapping and replacement Auxiliary memories: magnetic disk, magnetic tape and optical disks Virtual memory: concept implementation.	**16**	**CO4**
5	**Input / Output:** Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors. Serial Communication: Synchronous & asynchronous communication, standard communication interfaces.	**12**	**CO5**

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING-DS

ACADEMIC YEAR 2025-26 (ODD Semester)

COURSE OUTCOMES: At the end of the Course, the Student will be able to:

CO1	Explain the basic structure and operation of a digital computer system.
CO2	Apply the fixed point and floating-point arithmetic operations in number system.
CO3	Explain the concept of pipelining in control unit.
CO4	Solve the problem related to various memory mapping techniques in memory system.
CO5	Illustrate the ways of communication between various Input/ Output devices in computer system.

Mapping of CO v/s PO:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	1	1	1	1	-	-	-	-	-	-	-	2
CO2	2	2	1	1	-	-	-	-	-	-	-	2
CO3	1	1	1	1	-	-	-	-	-	-	-	2
CO4	2	2	1	1	-	-	-	-	-	-	-	2
CO5	1	1	1	1	-	-	-	-	-	-	-	2
Average	1.4	1.4	1.0	1.0	-	-	-	-	-	-	-	2.0

	PSO1	**PSO2**	**PSO3**
CO1	1	1	-
CO2	1	2	-
CO3	1	1	-
CO4	1	2	-
CO5	1	1	-
Average	1.0	1.4	-

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Gap in the syllabus	NA

Topics to be covered beyond syllabus	Introduction to Digital Logic Circuits and Digital Components.

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING-DS

ACADEMIC YEAR 2025-26 (ODD Semester)

LESSON PLAN

Lecture #	Module#	Topics	*RBT Levels	Course Outcome Mapping	Planned Date	Actual Date	Faculty Sign	Remarks
1	I	Introduction about COs &Pos related to the course and subject	L2	CO1				
2		Functional units of digital system and their interconnections	L2					
3		Buses, bus architecture	L2					
4		Types of buses	L2					
5		Bus arbitration	L2					
6		**Tutorial-1**						
7		**Introduction to digital logic circuits, Multiplexer**	L2					
8		**Decoder, Encoder**	L2					
9		Register, bus and memory transfer	L2					
10		Processor organization	L2					
11		Stack organization	L2					
12		General registers organization	L2					
13		Addressing modes	L2					
14		Addressing modes (contd..)	L2					
15		**Tutorial-2**						
16		**Arithmetic and logic unit:** Lookahead carries adders	L3					
17		Multiplication: Signed operandmultiplication	L3					
18		Booth algorithm	L3					
19		Booth algorithm (contd..)	L3					
20		Array multiplier	L2					

21	II	**Tutorial-3**		CO2				
22		Division: Restoring	L3					
23		Non- Restoring	L3					
24		Logic operations	L3					
25		Floating point arithmetic operation	L3					
26		Arithmetic & logic unit design	L3					
27		IEEE Standard for Floating Point Numbers	L3					
28		IEEE Standard for Floating Point Numbers (contd..)	L3					
29		**Tutorial-4**						
30	III	**Control Unit:** Instruction types	L2	CO3				
31		Instruction Formats	L2					
32		Instruction cycles	L2					
33		Sub cycles (fetch and execute etc)	L2					
34		Micro operations	L2					
35		**Tutorial-5**						
36		Execution of a complete instruction	L2					
37		**Revision Class 1**						
38		Program Control	L2					
39		RISC, CISC	L2					
40		Pipelining	L2					
41		Pipelining (contd..)	L2					
42		Hardwire control	L2					
43		Micro programmed Control	L2					
44		Concept of horizontal and vertical microprogramming	L2					
45		**Revision Class 2**						
46		**Tutorial-6**						

47	IV	**Memory:** Basic concept and hierarchy.	L2	CO4				
48		Semiconductor RAM memories	L2					
49		ROM and RAM chip	L2					
50		2D&2.5 D memory organization	L2					
51		**Revision Class 3**						
52		**Tutorial-7**	L2					
53		ROM memories	L2					
54		Cache memories: concept and design issues & performance	L2					
55		**Revision Class 4**						
56		Address mapping	L3					
57		Address mapping: Associative & Direct Mapping	L3					
58		Set-Associative Mapping, Replacement Algorithm	L3					
59		Auxiliary memories: magnetic disk, Magnetic tape and Optical disks	L2					
60		Virtual memory: concept, Implementation	L2					
61		**Revision Class 5**						
62		**Tutorial-8**						
63	V	**Input / Output:** Peripheral devices, I/O interface	L2	CO5				
64		I/O ports, Interrupts: Interrupt hardware	L2					
65		Types of Interrupts: Exception	L2					
66		Modes of Data Transfer: Programmed I/O	L2					
67		**Revision Class 6**	L2					
68		Interrupt initiated I/O	L2					
69		**Tutorial 9**						

70		Direct Memory Access, DMA Controller	L2					
71		I/O channels and processors	L2					
72		Serial Communication: Synchronous &asynchronouscommunication	L2					
73		Standard communication interfaces	L2					
74		**Tutorial 10**	L2					
75		**Revision Class 6**	L2					

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

References:
Text books :(As per University / Board syllabus)

T1. Computer System Architecture - M. Mano
T2. Carl Hamacher, ZvonkoVranesic, SafwatZaky Computer Organization, McGraw-Hill, Fifth Edition, Reprint 2012
T3. John P. Hayes, Computer Architecture and Organization, Tata McGraw Hill, Third Edition, 1998.

Faculty Sign **HOD's Sign**

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING Allied (DS)

ACADEMIC YEAR 2025-26 (ODD Semester)

LESSON PLAN DETAILS

Semester: III	Section: C	Course Code: BCS 303	Contact Hours /week**: 6**
Course Name: Discrete Structures and Theory of Logic			# of credits: 3
Faculty name: Mr. Shrawan Kumar Pandey			Designation: Assistant Professor
Sessional Marks: 30		End Semester Examination Marks:70	University Exam Hours: 3

Prerequisites if any:
Set Theory

Content delivery methods:	By Face to face delivery, Presentation, Tutorial etc.

COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	**Set Theory & Relations:** Introduction, Combination of sets. **Relations:** Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Recursive definition of relation, Order of relations. **POSET & Lattices:** Hasse Diagram, POSET, Definition & Properties of lattices – Bounded, Complemented, Distributed, Modular and Complete lattice.	**14**	**CO1**
2	**Functions:** Definition, Classification of functions, Operations on functions. Growth of Functions. **Boolean Algebra:** Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean expressions. Simplification of Boolean Functions, Karnaugh maps.	**12**	**CO2**
3	**Theory of Logics:** Proposition, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition, Theory of Inference. Predicate Logic: First order predicate, wellformed formula of predicate, quantifiers, Inference theory of predicate logic.	**13**	**CO3**
4	**Algebraic Structures:** Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups, Permutation and Symmetric groups, Group Homomorphisms, Definition and elementary properties of Rings and Fields.	**14**	**CO4**

5	**Graphs:** Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring. **Combinatorics:** Introduction, Counting Techniques, Pigeonhole Pigeonhole Principle	**17**	**CO5**

COURSE OUTCOMES: At the end of the Course, the Student will be able to:

CO1	Make use of Knowledge of sets and relations for solving the problems of POSET and lattices.
CO2	Apply fundamental concepts of functions and Boolean algebra for solving the problems of logical abilities.
CO3	Utilize the rules of propositions and predicate logic to solve the logical problems.
CO4	Apply the concepts of group theory and their applications for solving the problems.
CO5	Utilize the principles and concepts of graph theory for solving problems.

Mapping of CO v/s PO:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	1	1	1	1	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	2	2	2	-	-	-	-	-	-	-	-
Average	2.00	2.00	2.00	2.00	-	-	-	-	-	-	-	-

Mapping of CO v/s PSO:

	PSO1	PSO2	PSO3
CO1	1	-	-

CO2	1	-	-
CO3	1	-	-
CO4	1	-	-
CO5	1	-	-
Average	1.00	-	-

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Topics to be covered beyond syllabus	Havel-Hakimi Algorithm

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING Allied (DS)

ACADEMIC YEAR 2025-26 (ODD Semester)

LESSON PLAN

Lecture	Module	Scheduled				Conducted			
		Topic	*RBT Levels	C O Mapping	Date	Topic	Date	No. Of Students	Faculty Sign
1	I	**Set Theory & Relations:** Introduction	L3	CO1					
2		Combination of sets	L3	CO1					
3		Relations: Definition, Operations on relations	L3	CO1					
4		Properties of relations,	L3	CO1					
5		Composite Relations, Equality of relations,	L3	CO1					
6		Recursive definition of relation	L3	CO1					
7		**Tutorial 1**	L3	CO1					
8		Order of relations.	L3	CO1					
9		POSET & Lattices: Hasse Diagram, POSET	L3	CO1					
10		Definition & Properties of lattices	L3	CO1					

11		Bounded, Complemented,	L3	CO1					
12		Distributed, Modular	L3	CO1					
13		Complete lattice	L3	CO1					
14		**Tutorial 2**	L3	CO1					
15	II	**Functions:** Definition, Classification of functions	L3	CO2					
16		Operations on functions.	L3	CO2					
17		Growth of Functions.	L3	CO2					
18		Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra	L3	CO2					
19		Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra **(Contd.)**	L3	CO2					
20		**Tutorial 3**	L3	CO2					
21		Algebraic manipulation of Boolean expressions	L3	CO2					
22		Algebraic manipulation of Boolean expressions **(Contd.)**	L3	CO2					
23		Algebraic manipulation of Boolean expressions **(Contd.)**	L3	CO2					

24		Simplification of Boolean Functions, Karnaugh maps	L3	CO2					
25		Simplification of Boolean Functions, Karnaugh maps **(Contd.)**	L3	CO2					
26		**Tutorial 4**	L3	CO2					
27	III	**Theory of Logics:** Proposition,	L3	CO3					
28		Truth tables, Tautology, Satisfiability, Contradiction,	L3	CO3					
29		Algebra of proposition, Theory of Inference.	L3	CO3					
30		Predicate Logic: First order predicate,	L3	CO3					
31		**Revision Class 1**	L3	CO3					
32		**Tutorial 5**	L3	CO3					
33		Well-formed formula of predicate	L3	CO3					
34		Quantifiers	L3	CO3					
35		Quantifiers	L3	CO3					
36		Inference theory of predicate logic	L3	CO3					
37		Inference theory of predicate logic **(Contd.)**	L3	CO3					

38		**Revision Class 2**	L3	CO3					
39		**Tutorial 6**	L3	CO3					
40	IV	**Algebraic Structures:** Definition, Groups	L3	CO4					
41		Subgroups and order	L3	CO4					
42		Subgroups and order **(Contd.)**	L3	CO4					
43		Cyclic Groups, Cosets,	L3	CO4					
44		Lagrange's theorem	L3	CO4					
45		**Tutorial 7**	L3	CO4					
46		**Revision Class 3**	L3	CO4					
47		Normal Subgroups	L3	CO4					
48		Permutation and Symmetric groups	L3	CO4					
49		Group Homomorphisms	L3	CO4					
50		Definition and elementary properties of Rings and Fields	L3	CO4					

51		Definition and elementary properties of Rings and Fields **(Contd.)**	L3	CO4					
52		**Revision Class 4**	L3	CO4					
53		**Tutorial 8**	L3	CO4					
54	V	Graphs: Definition and terminology	L2	CO5					
55		Graphs: Definition and terminology**(Contd.)**	L2	CO5					
56		Representation of graphs	L2	CO5					
57		Multigraphs, Bipartite graphs	L2	CO5					
58		Planar graphs,	L3	CO5					
59		Isomorphism and Homeomorphism of graphs	L3	CO5					
60		**Revision Class 5**	L3	CO5					
61		**Tutorial 9**	L3	CO5					
62		Euler and Hamiltonian paths	L3	CO5					
63		Euler and Hamiltonian paths,	L3	CO5					
64		Graph coloring.	L3	CO5					
65		Graph coloring **(Contd.)**	L3	CO5					

66		Combinatorics: Introduction, Counting Techniques,	L3	CO5					
67		Combinatorics: Introduction, Counting Techniques **(Contd.)**	L3	CO5					
68		Pigeonhole Pigeonhole Principle	L3	CO5					
69		**Havel-Hakimi Algorithm**	L3	CO5					
70		**Tutorial 10**	L3	CO5					
71		**Revision Class 6**							
72		**Revision Class 7**							
73		**Revision Class 8**							
74		**Revision Class 9**							
75		**Revision Class 10**							
76		**Revision Class 11**							
77		**Revision Class 12**							
78		**Revision Class 13**							
79		**Revision Class 14**							

80		**Revision Class 15**							
81		**Revision Class 16**							
82		**Revision Class 17**							
83		**Revision Class 18**							
84		**Revision Class 19**							
85		**Revision Class 20**							
86		**Revision Class 21**							
87		**Revision Class 22**							
88		**Revision Class 23**							
89		**Revision Class 24**							
90		**Revision Class 25**							
91		**Revision Class 26**							

BUDDHA INSTITUTE OF TECHNOLOGY

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ACADEMIC YEAR 2025-26 (ODD Semester)

Class Test	Syllabus
CT-01	Class 1-Class 28
CT-02	Class 29-Class 58
PRE-AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

Text Books:

T1. Swapan Kumar Sarkar, " A Text book of Discrete Mathematics", S. Chand.

Faculty Sign **HOD's Sign**

SKILL DEVELOPMENT CELL

Lesson Plan

Course- TechEdge (C++ Programming with DSA)
College- BIT
Department-CSE-AIML/CSE-DS
Class/Section-3rd Semester
Faculty- Mr. Vivek Mishra

Lecture#	Scheduled Topics	Conducted			
		Date	No Of Students	Faculty Sign	Topic
1	**Introduction to C++** • Overview of C++ and its importance in software development. • Setting up C++ environment (IDE / Compiler). • Structure of a C++ program. • Input/Output using cin and cout.				
2	• Variables, Data Types, and Constants. • Operators (Arithmetic, Relational, Logical, Assignment, Bitwise). • Type Casting. • Comments and Formatting.				
3	**Control Structures** • Conditional Statements (if, if-else, nested if, switch-case). • Loops (for, while, do-while).				

4	• break and continue statements. • Practice Questions **Functions in C++** • Defining and calling functions. • Function parameters (pass by value, pass by reference).				
5	• Default arguments. • Function overloading. • Inline functions. • Practice Questions				
6	**Arrays and Strings** • Single and multi-dimensional arrays. • String handling using character arrays. • String functions from <cstring>. • Introduction to strings.				
7	**Array and Strings Practice Questions**				
8	**Pointers and References** • Basics of pointers. • Pointer arithmetic. • Pointers and arrays.				
9	• References and their usage. • Dynamic memory allocation (new, delete). • Practice Questions				
10	**Structures and Enumerations** • Defining and using struct. • Nested structures.				

	• enum usage. • Difference between struct and class.				
11	**Object-Oriented Programming Basics** • Classes and Objects. • Access specifiers (public, private, protected). • Practice Questions				
12	• Constructors and Destructors. • Member functions • Practice Questions				
13	**OOP Advanced Concepts** • Inheritance (Single, Multiple, Multilevel). • Function overriding. • Polymorphism (Compile-time & Runtime). • Virtual functions and Abstract classes.				
14	**Operator Overloading & Friend Functions** • Overloading arithmetic and relational operators. • Friend functions and classes. • Practice concepts				
15	**Introduction to Data Structures in C++** • Overview of Data Structures. • Arrays and Linked Lists theory.				
16	Programs of Array (Searching, Sorting) Largest element, 2nd largest element etc. Other practice problems of Array				
17	**Linked List** • Basic concepts • Representation of Linked List • Types of Linked List				

18	Programming Implementation of Linked List Insertion and Deletion in various types of Linked List. Questions of Linked List				
19	**Stack** • Explanation and its Stack • Declaration and its initialization • Programming implementation				
20	• Inserting Elements • Accessing Elements • Deleting Elements • Traversal • Time complexity				
21	**Queue** • Explanation • Declaration and its initialization • Programming implementation				
22	• Inserting Elements • Accessing Elements • Deleting Elements • Traversal • Time complexity				
23	**Searching and Sorting Algorithms** • Linear Search and Binary Search. • Bubble Sort, Selection Sort, Insertion Sort. • Time complexity basics.				
24	**Recursion** • Concept and working of recursion. • Recursive vs Iterative approach. • Examples: Factorial, Fibonacci, Tower of Hanoi.				
25	**Standard Template Library (STL)** • Overview of STL. • Vectors, Lists, and Maps. • Iterators. • Common STL algorithms (sort, find, reverse).				

26	**HashMaps in C++** • Syntax • Declaration and Initialization • Program Demonstration • Use of HashMaps				
27	• Inserting Elements • Accessing Elements • Updating Elements • Finding and deleting Elements				
28	**Lab Work** • Applying C++ and DS concepts to a small project. • Example: Student Management System, Inventory System, or Simple Game.				
29	Practice Questions and Doubts				
30	Practice Questions and Doubts				

Faculty/ Trainer Sign: