Annexure. I

CSE Semester: II Sem	Code Subject CSA101 – Introduction to Computer Science and Programming	L T P C 3 0 2 4
Course Objectives: ● To introduce the Computer Science and Programming and Basic concepts of computers. ● To understand the components of computers and generation, organization of computers. ● To familiarize students with the programming and problem-solving concepts using C Programming language. ● The course will help students to solve the problem using computer programming.		
Prerequisite: Basics of C, Fundamental knowledge of Computer		
CO1	Familiarize the importance of computer science and Programming. Understand the concept of generation of computers and learn about components of computer systems.	
CO2	Understand the concept of Problem-solving using C and Implement the flowchart and program for solving Mathematical and Engineering problems.	
CO3	Articulate the Modular Programming Concept and Solve the Engineering Problem using Modular Programming.	
CO4	Articulate the Advance C Programming Concept to Solve the Engineering Problem using Structure, Union.	
CO5	Describe the basic concepts of pointers, file handling and their applications.	
Unit-I	**Introduction to Computer Science and Engineering**: Computer: Definition, Classification, Generation, Organization-Memory & Storage Systems. Introduction of Programming: characteristics, types, algorithm. Programming solving using computer concept, flowchart. Rules/conventions of coding, documentation, naming variables.	6 Hrs
Unit-II	**Problem Solving using C**: History of C, Structure of a C Program; Data types, Constant & Variable, Operators - arithmetic, logical, bitwise, relational, ternary, expressions, Control Constructs – if-else, for, while, do-while, conditional looping, Switch-case statements, Escape statements, Special constructs – Break, continue, exit(), goto labels, Type conversion & type casting, Priority & associativity of operators; Type modifiers.	10 Hrs
Unit-III	**Modular Programming:** Introduction to Arrays, Declaration and Initialization, Accessing Array Elements, Types of Arrays, Operations on Arrays, Arrays and Functions, Applications of Arrays. Functions; Arguments; Calling a function; Return statement; Parameter passing – call by value, call by reference; Scope, visibility and life-time rules for various types of variables; Storage classes.	9 Hrs
Unit-IV	**Advance C Programming:** Structure – basic, declaration, membership operator, pointer to structure, referential operator, self-referential structures, structure within structure, array in structure, array of structures, type def. Union – basic, declaration; Recursion – basics, comparison with iteration, types of recursions- direct, indirect, tree and tail recursion, when to avoid recursion.	8 Hrs

Unit -V	**Pointers:** Pointers, Pointers - & and * operators, pointer arithmetic, Arrays and Pointers, applications in memory management. **File Handling:** Basic file operations, including reading and writing data to files. Pre-processor Directives: C pre-processor – basics, #Include, #define, Enumerated data type.	7 Hrs

Text Books

- Let us C By Yashwant Kanetkar, BPBPublication.
- Programming in C, Schaum Outline,McGraw-Hill

Reference Books

- Programming in ANSI-C By E. Balagurusami, TMHPublication.
- C Programming language By Kernighan, Brian, W, Retchie, Dennis,PHI Publication
- Information Technology: Theory and Practice by PRADEEP K. SINHA, PRITI SINHA

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 1	PO_{11}	PO_{12}	PSO 1	PSO 2
CO-1	3	3										2	3	1
CO-2	3	2	3		1							2	3	1
CO-3	2	3			1							2	3	1
CO-4	2	3	2		1							2	2	1
CO-5		3	2									1	3	1

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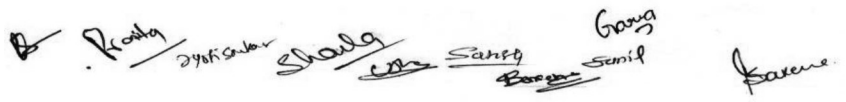


CSE Semester: II Sem	Code Subject CSA102 – Digital Electronics	L T P C 3 0 0 3

Course Objectives:

The objective of this course is to provide the fundamental concepts associated with the digital logic and circuit design. To familiarize students with the different number systems, logic gates, minimization of logic circuits and combinational and sequential circuits utilized in the different digital circuits and systems. The course will help student to design and analyze the digital circuits and systems.

Prerequisite: Basics knowledge of mathematics

CO1	Convert different number systems and codes used in digital circuits and systems.	
CO2	Simplify and analyze the digital logic circuits using Boolean algebra and other mapping techniques.	
CO3	Analyze and design different combinational logic circuits using different mapping techniques and mathematical tools.	
CO4	Compare different types of sequential circuits	
CO5	Study and compare different types of Counters.	
Unit-I	**Introduction to Digital Electronics**: Review of number system and conversions; Binary Arithmetic, Signed and Unsigned representation, Binary codes, Gray Code, Code Conversions, Error detection and correction codes - parity check codes and Hamming code.	8
Unit-II	**Boolean Algebra and Switching Functions -** Study of basic logic gates, Basic postulates and fundamental theorems of Boolean algebra; Standard representation of logic functions - SOP and POS forms; Simplification of switching functions - K-map and Quine-McCluskey tabular methods.	8
Unit-III	**Combinational Logic Modules and their applications**: Adders, Sub tractors, Code Converters, parity generators and comparators, Encoders & Decoders, BCD to seven-segment decoder, Multiplexers& De-multiplexers and their applications.	9
Unit-IV	**Sequential Circuits and Systems:** Set-Reset latches and flip flops, D-flip-flop, R-S flip-flop, J-K Flip-flop, Master slave Flip flop, edge triggered flip-flop, T flip-flops, Shift registers, classification of shift registers.	7
Unit -V	**Counters classification**: asynchronous counters, synchronous counters, counters design, BCD counter,	7 Hrs

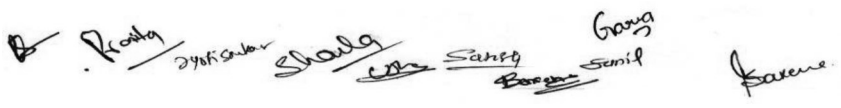
Text Books

- M. Mano, "Digital Logic and Computer Design", Pearson Education.
- T. L. Floyd, “Digital Fundamentals”, Pearson Education.
- A. Anand Kumar, “Fundamentals of Digital Circuits”, PHI.

Reference Books

List and Links of e-learning resources:

- https://nptel.ac.in/courses/108/105/108105132/ https://de-iitr.vlabs.ac.in/



27/05/2025 **Department of Computer Science and Engineering**

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 1	PO_{11}	PO_{12}	PSO 1	PSO 2
CO-1	3	2	3	2	3					2	2	1	2	2
CO-2	3	2	1	2	2	2				2	2	2	2	2
CO-3	2	2	2	1	2	1				1	2	2	2	1
CO-4	3	2	3	1	2	1				2	2	2	2	1
CO-5	3	2	3			1				2	1	2	1	2

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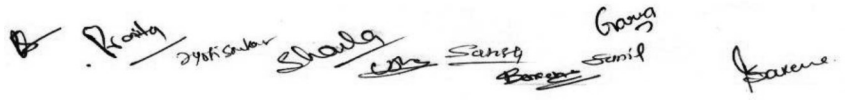

CSE Semester: II Sem	Code Subject CSA103 – Problem Solving and Data Structures	L T P C 3 0 2 4
Prerequisite: Basics of C, Fundamental knowledge of Computer		
Course Objective:		
Introduce the fundamentals of data structures and how these concepts are useful in problem solving.		
CO1	To teach efficient storage mechanisms of data for easy access.	
CO2	To design and implementation of various basic and advanced data structures.	
CO3	To introduce various techniques for representation of the data in the real world.	
CO4	To develop applications using data structures.	
CO5	To improve the logical ability.	
Unit-I	Problem solving concepts: top-down, bottom-up design, Concept of data type, variable, constant and pointers. Dynamic memory allocation. Introduction to data structure: Linear, Nonlinear, Primitive and Non primitive. Arrays-Concepts of Arrays, Single dimensional array, two-dimensional array- Representation and Address Calculation, Operations on arrays with algorithms (traversing, searching, inserting, deleting) and analysis.	8 Hrs.
Unit-II	List-Singly linked lists: Representation in memory, Operations on singly linked list with algorithms (traversing, searching, insertion, deletion) Doubly linked list-Operations with algorithms and analysis. Circular linked lists-Operations with algorithms and analysis. Representation & manipulations of polynomials/sets using linked lists.	6 Hrs.
Unit-III	Stack- Introduction to Stack and its operations, Implementation of stack using array and linked list with comparison. Application of stacks (Polish Notations, converting infix to postfix notation, evaluating postfix notation, Parenthesis balancing, Recursion). Queue- Introduction to Queue and its operations. Implementation of queue using array and linked list. De-queue, circular queue, priority queue. Applications of queue	9 Hrs.
Unit-IV	Tree- Definition and terminology, concept of binary tree and representation, Traversing binary tree (pre order, post order, in order) Operation with algorithm -insertion and deletion. Binary Search Trees and Concept of balance tree (AVL). Graph- Definition and terminology, Types of graphs, Representation of graph. Traversing of graph- Breadth First Traversing and Depth First Traversing.	9 Hrs.
Unit -V	Searching- Search methods- Linear search, Binary search and Hashing (collision, chaining and probing) with their algorithms and analysis. Sorting-Sorting Methods-Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Radix sort, Shell sort with their algorithms and analysis.	8 Hrs.
Text Books		
1. Data Structure- Schaum's Series- McGraw Hill Publication		
Reference Books		
1. Data Structure- Horwitz and Sartaj Sahni 2.Data Structure through C, Yashwant Kanekar, BPB Publication.		
List of Experiments		

1. Write program to implement pointers and structure in C to understand the concepts of Dynamic memory allocation.
2. Write a program to implement concept of linear array with following operations: i. Traverse an array. ii. Find minimum item, maximum item, and average of an array items. iii. Insert a new item at beginning, end and middle position within an array. iv. Delete an item from an array.
3. Write a program to implement singly linked list with following operations i. Insert a new item at beginning, end and middle position within a single linked list. ii. Delete an item from single linked list. iii. Traverse a single linked list.
4. Modify the singly linked list program to make it for doubly linked list.
5. Write a program to implement Stack with its operations (Push, Pop, Peek, IsEmpty) using: i. Using array ii. Using linked list
6. Write a program to evaluate postfix notation using stack.
7. Write program to implement queue with its operations (enqueue, dequeue) using: i. Using array ii. Using linked list
8. Modify the queue program to implement circular queue with its operations.
9. Write a program to implement binary search tree with insert and delete operations.
10. Write a program to implement depth first traverse and breadth first traverse on a graph.
11. Write program to implement linear search and binary search on a given array.
12. Write a program to sort a given list of 10000 random integers and compare their execution time using: i. Bubble sort ii. Insertion sort iii. Merge sort iv. Quick sort v. Radix sort

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CO-2	2	2		1								1	1	2
CO-3	2	3		1	2							2	2	3
CO-4	2	3		1	2							2	2	3
CO-5	1	1						2				1	2	

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