

**SHRI G. S. INSTITUTE OF TECHNOLOGY AND SCIENCE**  
**Department of Information Technology**  
**MCA I Year (Sem 1) (Sec - II)**

**Subject Code: CT10452**

**Subject Nomenclature: Programming Lab 1**

<b>Lecture No.</b>	<b>Topic Covered</b>
1	<b>Unit 1</b> : Block Schematic of Digital Computer and its working, Introduction to computer Hardware and Software
2	Different Number System
3	Flowchart and Algorithm
4	<b>Unit 2</b> : Structure to C Program, Keywords and Identifiers, constants, variables, Data types, enumerated data types, Strings
5	Declaration of Variable , scope and life of variables. Various type of operators and expressions.
6	Programming Errors and their Handling
7,8	<b>Unit 3</b> : Decision making and Branching: if-else, switch-case
9,10	Looping: While-do, for, do-while
11	Nesting of loops and practice Questions
12	<b>Unit 4</b> : Introduction to Arrays,
13	Structures, Pointers
14	Files, Reading from File and Writing into Files
15	Functions, Recursion.
16	<b>Unit 5</b> : File handling in C,
17	Introduction to Object oriented Programming paradigm,
18	Comparison of Procedural and Object Oriented Programming paradigm.

**SHRI.G.S. INSTITUTE OF TECHNOLOGY & SCIENCE**  
**Department Of Information Technology**  
**MCA I year I Sem (Section I)**

**Subject Code: CT10212**

**Subject Nomenclature: COA**

**Session: 2023-2024**

Lecture No	Topic Covered (Unit No)
1.	<b>UNIT-I:</b> Introduction of digital system: Number systems, Character codes
2.	Data and number representation, Binary arithmetic
3.	Logic gates, Latches
4.	Registers
5.	Boolean algebra, Combinational Circuit
6.	Sequential circuits, Arithmetic circuit.
7.	<b>UNIT -II:</b> Introduction of computer architecture: Evolution of digital computer
8.	Multilevel model of a computer.
9.	Von-Neumann model, ALU
10.	Control Unit, System bus, Memory, I/O Devices
11.	Concept of instruction execution
12.	Machine Level Instructions: Instruction formats
13.	Addressing modes, Instruction types
14.	Instruction cycle, Flow of control.
15.	<b>Unit III:</b> Memory & Control Unit: Secondary and main memory;
16.	Main memory organization properties and technologies;
17.	Associative memory, Cache memory
18.	Control Unit operation: Micro operations
19.	Control of the CPU
20.	Hardwired and Micro programmed control
21.	<b>Unit IV:</b> Input Output system: I/O devices, their characteristic
22.	Interfacing, I/O ports,
23.	Memory mapped and I/O mapped I/O
24.	Programmed I/O, Concept of interrupts
25.	Interrupt driven and DMA based I/O, I/O processors
26.	Device controllers
27.	I/O device interfaces
28.	Device Drivers, I/O and system buses
29.	Serial and Parallel Communication
30.	<b>Unit 5:</b> Introduction to Advanced Architectures: Basic concepts of Pipeline
31.	Types of pipelining
32.	Pipelining hazards
33.	Vector Processing
34.	RISC v/s CISC, Multiprocessors
35.	Fault Tolerant architectures



### Lecture Plan: CT10213

Session No	Topics to be cover	No. of Lectures
1	Introduction to Software Engineering	1
2,3	Software Process – Life Cycle Models	2
4	Perspective and Specialized Process Models	1
5	Software Project Management: Estimation	1
6	Project Scheduling	1
7	Risk Management	1
8,9	Modular Design Methodologies: Coupling and Cohesion	2
10,11	Software Measurement: Size metric LOC & FP Based, Cyclomatic Complexity	2
12	Complexity Measurement: Cyclomatic Complexity	1
13	Software Quality Control (SQA) activities	1
14,15	User requirements, System requirements, Software Requirements Document	2
16	Feasibility Studies	1
17	System Engineering	1
18,19	Activity Diagram and Data flow design – Level 0 DFD, Level 1 DFD	2
20	UML Diagrams	2
21	Software testing fundamentals, Internal and external views of Testing	1
22,23	White box testing - basis path testing, control structure testing.	2
14,25	Black box testing equivalence class, boundary value analysis.	2

26	Unit Testing, Integration Testing, system Testing	1
27	Configuration management- Identification, change control, status accounting, audits	1
26	Project planning and Scheduling	1
29,30	Software Quality assurance- Quality control, Cost, Issues, activities	2
31	Software Quality assurance activities	1
32	Basic fun	

**SHRI.G.S. INSTITUTE OF TECHNOLOGY & SCIENCE**  
**Department Of Information Technology**  
**MCA I year I Sem (Section I)**

**Subject Code: CT10212**

**Subject Nomenclature: COA**

**Session: 2023-2024**

Lecture No	Topic Covered (Unit No)
1.	<b>UNIT-I:</b> Introduction of digital system: Number systems, Character codes
2.	Data and number representation, Binary arithmetic
3.	Logic gates, Latches
4.	Registers
5.	Boolean algebra, Combinational Circuit
6.	Sequential circuits, Arithmetic circuit.
7.	<b>UNIT -II:</b> Introduction of computer architecture: Evolution of digital computer
8.	Multilevel model of a computer, Von-Neumann model, ALU
9.	Control Unit, System bus, Memory, I/O Devices
10.	Concept of instruction execution, Machine Level Instructions: Instruction formats
11.	Addressing modes, Instruction types
12.	Instruction cycle, Flow of control.
13.	<b>Unit III:</b> Memory & Control Unit: Secondary and main memory;
14.	Main memory organization properties and technologies;
15.	Associative memory, Cache memory
16.	Control Unit operation: Micro operations
17.	Control of the CPU
18.	Hardwired and Micro programmed control
19.	<b>Unit IV:</b> Input Output system: I/O devices, their characteristic
20.	Interfacing, I/O ports, Memory mapped and I/O mapped I/O
21.	Programmed I/O, Concept of interrupts
22.	Interrupt driven and DMA based I/O, I/O processors
23.	Device controllers, I/O device interfaces
24.	Device Drivers, I/O and system buses, Serial and Parallel Communication
25.	Unit 5: Introduction to Advanced Architectures: Basic concepts of Pipeline
26.	Types of pipelining, Pipelining hazards
27.	Vector Processing
28.	RISC v/s CISC
29.	Multiprocessors
30.	Fault Tolerant architectures

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**SHRI.G.S. INSTITUTE OF TECHNOLOGY & SCIENCE**  
**Department Of Information Technology**  
**MCA I year (1st Sem) (Section II)**

**Subject Code: CT10212**

**Subject Nomenclature: Data Structure**

**Session: 2023-2024**

Lecture No	Topic Covered (Unit No)
1.	<b>UNIT-I:</b> Review of Computer Programming, Definition of Data Structure, Types of Data Structures
2.	Concept of data and information, Abstract Data Types
3.	Design and Implementation issues of Data Structures
4.	Data structures memory representation
5.	<b>UNIT -II:</b> Stacks as ADT, Implementation of various operations on stack, Application of stack: Infix-Prefix expressions, their evaluation and conversions
6.	Recursion & their types using stack, applications of Stack
7.	Queues: Definition, Queues as an ADT, Types of Queues: Circular Queue, Deque, Priority Queue
8.	Implementation of various Operations on Queues, Applications of Queue
9.	Linked List: Representation of linked list in memory, Implementation of linked list
10.	Types of Linked List: Circular linked list, Doubly linked list, Header linked list,
11.	Linked Implementation of Stacks and Queues, Applications of linked list
12.	<b>Unit 3:</b> height, depth, order, degree, etc., Binary Tree
13.	Types of Binary Tree, Binary Search Tree : Introduction, Operations, Traversal, Search, Implementation
14.	Applications of Trees: Representation and Evaluation of an expression with binary operators
15.	Huffman's Algorithm, Heap; AVL Tree
16.	Threaded Binary Tree, Multiway Trees: B tree, B+ tree.
17.	<b>Unit 4:</b> Introduction, Directed and Undirected graphs
18.	Representation, Graph Traversal: Depth First search (DFS)
19.	Breadth First Search (BFS)
20.	Minimum Spanning Tree: Kruskal, Prim's algorithms
21.	Shortest Path Algorithm: Dijkstras and Warshalls algorithm
22.	Applications of Graphs
23.	<b>Unit 5:</b> Introduction, Different Sorting Techniques like: Bubble Sort,
24.	Quick Sort,
25.	Shell Sort
26.	Merge Sort
27.	Radix Sort
28.	Selection Sort
29.	Comparison of various Sorting Techniques
30.	Searching: Basic Search Techniques: Sequential Search

31.	Binary Search
32.	Indexed Sequential Search
33.	Hashing
34.	Types of hashing
35.	Comparison of various Searching techniques

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**SHRI.G.S. INSTITUTE OF TECHNOLOGY & SCIENCE**  
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**MCA I year (Ist Sem) (Section I)**

**Subject Code: CT10211**

**Subject Nomenclature: Mathematical Foundation of Computer Science**

**Session: 2023-2024**

Lecture No	Topic Covered (Unit No)
1.	<b>UNIT-I Set theory and counting techniques:</b> Set, Subsets, Operations on set
2.	Types of sets finite infinite set, Principle of Inclusion – Exclusion
3.	principle of Mathematical induction, Principle of strong mathematical induction
4.	Permutation and Combination
5.	Logic Theory - Propositional calculus
6.	Predicate calculus
7.	<b>Unit 2: Relations, Functions and Lattice:</b> Properties of relations, equivalence relation
8.	Partial order relation, poset
9.	Functions & types of functions: onto function, one-to-one functions,
10.	pigeon hole principle, Lattices,
11.	Distributive law in lattices,
12.	complemented lattice
13.	<b>Unit 3: Graphs and Trees:</b> Definitions, Algorithm
14.	Types of Graphs: Directed, Undirected, Subgraphs, regular Graph, etc.
15.	Euler path and circuit, Hamiltonian path and circui
16.	Planner and non-planner graphs,
17.	Characteristics of tree
18.	Degree, Indegree, Outdegree, total degree
19.	Tree based theorems
20.	minimum cost spanning tree
21.	Shortest path
22.	<b>Unit 4: Automata Theory:</b> Finite State Automata: Deterministic automata
23.	Non-deterministic M/c automata
24.	regular expressions, regular language
25.	regular grammar, Push down Automata: Deterministic Push down Automata
26.	Non deterministic push down automata
27.	Context free language and grammar.
28.	<b>Unit 5: Turing Machine:</b> Turing machine and compatibility
29.	Types of turing machine
30.	context sensitive language
31.	context sensitive grammer
32.	Decidability
33.	Computability,
34.	Computational Complexity
35.	Chomsky Hierarchy.

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