1. **Digital Logic and Circuits and Discrete Mathematical Structures:**

Number Systems

Boolean algebra and Logic Gates

Simplification of Boolean Functions

Combinational Circuits

Sequential Circuits

Memory circuits

Sets

Relations & Functions

Mathematical Logic

Boolean algebra

Combinatorics & Recurrence Relations

Graph theory

1. **Computer Organization and Architecture:**

Stored Program Concept

Components of a Computer System

Machine Instruction

Op codes and Operands

Instruction Cycle

Organization of Central Processing Unit, ALU, Hardwired & Micro programmed Control Unit; General Purpose and Special Purpose Registers

Memory Organization

I/O Organization

Functioning of CPU

Instruction Formats

Instruction Types

Addressing Modes

Common Microprocessor Instructions

Multi-core Architecture

Multiprocessor and Multicomputer

1. **Data Structures and Algorithm:**

Definition and type:Linear Structures, Non-Linear Data Structures

Hashing and Collision Resolution Techniques

Searching and Sorting, Algorithms, Analyzing.

Algorithms, Complexity of algorithms, Growth of functions, Performance measurements, Advanced Data Structures, Red-Black trees, B - trees, Binomial Heaps, Fibonacci Heaps. Introduction to Design Techniques: Divide and Conquer, Greedy algorithms, Optimal ReliabilityAllocation, Knapsack, Minimum Spanning trees Prim's and Kruskal's algorithms, Single source shortest paths - Dijkstra's and Bellman Ford algorithms

Dynamic Programming, Kanpsack, All pair shortest paths - Warshal's and Floyd's algorithms, Resource allocation problem

Backtracking, Branch and Bound with examples such as Travelling Salesman, Problem, Graph Coloring, nQueen Problem, Hamiltonian Cycles and Sum of subsets. Algebraic computation, fast Fourier Transform, String Matching, Theory of NP- completeness, Approximation algorithms and Randomized algorithms

1. **Object Oriented Techniques:**

Object orientation, Encapsulation, information hiding, polymorphism, generosity, Object Oriented modelling, UML, Structural Modelling, Behavioural.

Modelling and Architectural Modelling.

Object Oriented Analysis, Object oriented design, Object design.

Structured analysis and structured design (SA/SD), Jackson Structured Development (JSD). Object oriented programming style Introduction to Java, Java Beans, Enterprise Java beans (EJB), Java Swing; Java as internet programming language. The connectivity model, JDBC/ODBC, Bridge, Introduction to servlets.

1. **Operating System:**

Definition, Design Goals, Evolution, Structure and Functions of Operating System.

Process Management

Memory Management

Concurrent Processes

File and Secondary Storage Management

UNIX and Shell Programming

Windows Programming

1. **Database Management Systems:**

Database Systems, View of Data Models, Database Languages, DBMS Architecture, Database Users and Data Independence.

ER Modelling, Relational Model

Introduction to SQL Relational Database Design

Database Security, Transaction Management

Introduction to Query

Processing and Query Optimization

Concurrency Control and Recovery Techniques.

1. **Computer Networks:**

Network definition, network topologies, network classifications, network protocol, layered network architecture, overview of OSI reference.

Model, TCP/I P protocol suite.

Data Communication Fundamentals and Techniques, Networks Switching Techniques and Access mechanisms, Data Link Layer Functions and Protocol, Multiple Access Protocol and Networks, Networks Layer Functions and Protocols, Transport Layer Functions and Protocols, Overview of Application layer protocol.

1. **Software Engineering:**

Definition: Software development, and life-cycle models, CMM, Software Quality, role of metrics and measurement.

Requirements Analysis and Specification

Software Project Planning

Software Architecture

Software Design and implementation

Software Testing and Reliability

1. **Internet Technology, Web Design and Web Technology:**

Internet Technology and Protocol

Internet Connectivity

Internet Network

Services on Internet

Electronic Mail

Current Trends on Internet,

Web Publishing and Browsing

HTML Programming Basics

Interactivity Tools Internet

Security Management Concepts

Information Privacy and Copyright Issues

Web Technology: protocols, development strategies, applications, Web project and team. Web Page Designing, Scripting, Server Site Programming.

1. **System Analysis And Design:**

Analysis and Design of a System, documenting and evaluating the system, Data Modelling, Development of Information Management System, Implementation, Testing and Security Aspects.

1. **Information Security and Cyber Laws:**

Distributed Information Systems, Role of Internet and Web services

Threats and attacks, Assessing-Damages,

Security in Mobile and Wireless Computing, Security Threats to E-Commerce, E—Governance and EDI,

Concepts in Electronics payment systems, E-Cash, Credit/Debit Cards

Physical -Needs Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control

Model of Cryptographic Systems, Design and Implementation Issues, Policies, Network Security,Attacks, Need of Intrusion 'Monitoring and Detection, Intrusion Detection

Security metrics- Classification and their benefits

Information Security & Laws, Ethics- Ethical Issues, Issues in Data and Software Privacy. Overview and types of Cyber Crimes.

Security-Needs Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control. Model of Cryptographic Systems, Design and Implementation Issues, Policies, Network Security, Attacks, Need of Intrusion 'Monitoring and Detection, Intrusion Detection.

Security metrics- Classification and their benefits.

Information Security & Laws, Ethics- Ethical Issues, Issues in Data and Software Privacy. Overview and types of Cyber Crimes.

1. **Computer Graphics:**

Types of computer graphics,-Graphic Displays Random scan displays, Raster scan displays, Frame buffer and video controller, Line and Circle generating algorithms, Transformations, Windowing and Clipping, Three Dimensional graphics, Curves and Surfaces, Hidden Lines and Surfaces.