INTRODUCTION TO IT

Section I

Computer Fundamentals: Number Systems, History of Computers, Block diagram of computer & detailed significance of each part.

Study of I/O devices: Keyboard, Hard disk, CD-ROM, DVD, Plotters, Scanners, mouse, Printers, VDU. Primary & Secondary memories.

Introduction to Operating Systems & its functions

Definition of Simple batch processing, multiprogramming, multiprocessing, real-time, time-sharing systems, Concept of Spooling, Applications of IT , MSOffice: Word, excel, Power point, Access etc.

Section III

Application of Computers in various fields: Defense, Industry, Management, Sports, Commerce, Internet. Computer and communication: Single user, Multi-user, Workstations, and Overview of LAN, WAN: Overview of modem, E-Mail, Fax Internet facilities through WWW

MATH BRIDGE COURSE

Section I

Set relations and functions.

Section II

Principle of mathematics induction. Introduction to matrix, properties of matrix; evaluation of determinant.

BASIC ACCOUNTING

Section I

Basic Accounting: importance and scope, concepts and conventions-Generally accepted accounting principles-double entry framework,

Section II

Preparation of financial statements: Profit and loss account and balance sheet. Nature, scope, advantage and limitations of management accounting.

Section III

Application of computers in accounting.

PROGRAMMING IN C

Section I

Fundamentals: Character set, Identifiers & Keywords, Data Types, constants, set, constants, variables, expressions, statement, and symbolic constants.

Operations and expressions: Arithmetic operators, unary operators, relational and logical operators, assignment and conditional operators, and library functions.

Data input and output: Preliminaries, single character input, single character output,

Entering input data, more about the scanf function, writing output data, more about printf function, the gets and puts function, interactive programming.

Section II

Control statements: Preliminaries, while, do-while and for statements. Nested loops, if-else, switch, break continue statement.

Functions: Brief overview, defining accessing function, passing perimeters to function,

specifying argument data types, function prototype and recursion.
Program structure: Storage classes, automatic, external, and static variables, more about library functions.
Array: defining and processing an array, passing pointers to a function, pointer and one dimensional arrays, operations on pointers, passing functions multidimensional arrays of pointers, passing functions to the other functions, more about pointer declarations.
Section III
Structure and Unions: Defining and processing a structure, user defined data types, structure and Pointers, passing structure to function, self-referential structures, and unions.
Data files: Opening, closing, creating, and processing and unformatted data field.
C-programming applications: Sorting (Bubble sort, Selection sort), Searching (Binary search, Linear Search).

COMMUNICATION SKILLS

Section I
Introduction to Business Communication: Meaning and Definition, Process and Classification of communication, Elements & Characteristics of communication.
Section II
Principles of Effective Communications: 7 Cs Concepts
Types of Correspondence, Systems, Classification of Mail , Role & Function of Correspondence, MIS, Managing Computer

PRINCIPLES OF MANAGEMENT & SAD

Section I
Planning: nature and purpose, types, steps in planning, decision making: Strategic, tactical and operational decision, decision making process, rationality in decision making. Organizing: nature, importance, the organizing process, organizational objectives, formal and informal organization, organization chart, management by objectives. Decentralization v/s centralization. System Concepts: Definition, characteristics, elements & types of system. System development life cycle: Recognition of need: Feasibility study
Section II
System analysis-introduction, information collection, interviews, questionnaires, Observation, record searching and document analysis, analysis tools, data flow diagram, Data dictionary, decision tree, structured English and decision table.
Section III
System Design: The process and stages of systems design, input/output and file design; System Implementation: System implementation, system testing, implementation process and implementation methods; system maintenance.

DISCRETE MATH – II

Section I
Set theory. Relations and functions: Set notations and description, subsets, basic set operations. Laws of set theory, partition of sets, min sets, duality principle, basic definitions of relations and functions, graphics of relations, Recursion and recurrence:.

Section II

Graph theory: Various types of graphics, simple and multigraphs, directed and Undirected graphs, Eulerian and Hamiltonian graph, graph connectivity, traversals, graph Optimizations, Graph coloring, trees, spanning trees, rooted trees, binary trees.

DATA STRUCTURES

Section I

Introduction to Data Structure: Basic concept of data, Problem analysis , algorithm complexity, Big O notation and time space trade off.

Stacks & Queues: Basics of stacks and queues, Recursion, Polish notation, circular Queues, priority Queues.

Section II

Linked Lists: Single linked list, circular linked list, doubly linked list and dynamic storage management, generalized list, Garbage Collection.

Trees: Definition & Concepts, Basic trees, Binary tree representations, threaded storage representation, binary tree traversals, and application of trees.

Section III

Searching and sorting: use of various data structures for searching and sorting, linear and binary search, insertion sort, selection sort, merge sort, bubble sort, quick sort, Heap sort.

DIGITAL CKT. & LOGIC GATES

Section I

Introduction: Overview of number system and codes. Elements and functions of digital Logic gates, Gate propagation delay time, logic gates, and Gate propagation delay time, and logic gate applications. Boolean algebra: Boolean operations,

Section II

Combinational logical circuits: design of Binary Adder-Serial, Parallel, Carry look ahead type. Sequential logic circuits: Flip flop: Counters: Design of asynchronous and synchronous, up down and programmable counters. Registers: shift registers, various types and their applications. Detection and correction codes, detecting and correcting an error.

COMPUTER ORIENTED METHODS

Introduction of a matrix, its different kinds, matrix addition and scalar multiplication, Multiplication of matrices, Square matrix, Transpose, Adjoint and Inverse of a matrix

MANAGEMENT INFORMATION SYSTEM

Introduction to Systems and Basic Systems Concepts, Types of Systems, The Systems Approach, Information Systems: Definition & Characteristics, Types of Information, Role of Information in Decision - Making, Sub - Systems of an Information system: EDP and MIS.Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS.

SOFTWARE ENGINEERING

Section I

Software: Characteristics, Components, Applications, Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts of Project. Management, Role of Metrics & Measurements.

S/W Project Planning: Objectives, Decomposition techniques: S/W Sizing, Problem-based estimation, Process based estimation, Cost Estimation Models: COCOMO Model, The S/W Equation, System Analysis: Principles of Structured Analysis, Requirement analysis, DFD, Entity Relationship diagram, Data dictionary.
S/W Design: Objectives, Principles, Concepts, Design methodologies: Data design, Architectural design, procedural design, Object -oriented concepts

Section II

Testing fundamentals: Objectives, principles, testability, Test cases: White box & Black box testing, Testing strategies: verification & validation, unit test, integration testing, validation testing, system testing.

OBJECT ORIENTED PROGRAMMING USING C++

Section I

Introduction: Object oriented programming, characteristics of object orientated languages, classes, C++ basics: Program Statements, Variables and constants, Loops and Decisions. Functions: Defining a function, function arguments & passing by value, arrays & pointers, function & strings, functions & structures.

Section II

Classes & Objects: Defining class, class constructors and destructors, operator overloading. Class Inheritance: Derived class & base class; Virtual, Friends and Static functions; Multiple inheritance, Polymorphism.

Section III

Input/output files: Streams, buffers & io streams, header files, redirection, file input and output.

INTRODUCTION TO MICROPROCESSOR

Section I

Introduction, Microprocessor Architecture and its operations, 8085 MPU and its architecture,8085 instruction cycle ,8085 Instructions :Data Transfer instructions, Arithmetic instructions, logical instructions, Branch instructions,RISC v/s CISC processors.

Section II

INTEL 8086 ,Introduction, 8086 Architecture ,real and Protected mode memory Addressing, Memory, Paging Addressing Modes. Various types of instructions: Data movement, Arithmetic and logic; and program control. Type of instructions.

COMPUTER NETWORKS

Section I

Data communications concepts: Digital and analog parallel and serial synchronous and Asynchronous, simplex, half duplex, duplex, multiplexing.Communication channels: Wired transmissions: Telephone lines, leased lines, switch line, coaxial cables-base band, broadband, optical fiber transmission.

Section II

Wireless transmission: Microwave transmission, infrared transmission, laser Transmission, radio transmission, and satellite transmission. Communication switching techniques; Circuit switching, message switching, packet Switching .Network reference models; Network topologies, OSI references model, TCP/IP Reference model,

comparison of OSI and TCI reference model.

Section III

Data link layer design issue: Services provided to the network layer, framing, error control, flow control HDLC, SDLC, data link layer in the internet (SLIP, PPP).
MAC sub layer: CSMA/CD, IEEE standards, FDM, TDM, CDMA.

The Network Layer: Design Issues, Routing Algorithms: Optimality principled, shortest path routing, Concept of Internet Working.

DATA BASE MANAGEMENT SYSTEM

Section I

An overview of the DBMS: Concept of database system, Database Administrator and his responsibilities. Physical and Logical data independence. Three level Architecture of database system: the external level, conceptual level and the internal level.
Introduction to Data Models: Entity Relationship Model, Hierarchical, Network and Relational Model. Comparison of Network, Hierarchical and Relational Model.
Relational data model: Relational database, SQL ,SQL normalization.

Section II

Database protection: Recovery, concurrency, security, integrity and control.
Distribute database: Structure of distributed database, design of distributed databases

COMPUTER SYSTEM ARCHITECTURE

Section I

Computer Organization & Design: Instruction codes, op-codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory reference instructions, CPU: Stack Organization, Instruction format, Addressing Formats. Transfer of Information among I/O devices, CPU, Memory and I/O ports.

Section II

Memory System: Storage technologies, Memory hierarchy, Memory mapping, Main memory and Auxiliary memory, Associative and Cache memory introductory study of 8-bit Microprocessor.

OPERATING SYSTEMS

Section I

Introduction to Operating System, its need and Operating System services; Operating System classification -single user, multi-user, simple batch processing,
Multiprogramming, Multitasking, Parallel system, Distributed system, Real time system.
Process Management: Process Concept, Process scheduling, Overview of Inter-Process communication,

Section II

Deadlocks: Deadlock Characteristics, Prevention, Avoidance, Detection and Recovery, critical section, synchronization hardware, semaphores, combined approach to deadlock handling.

VISUAL BASIC & SCRIPTING

Mastering the IDE, working with forms, selecting and using controls, object programming with VB, adding Scripting & Scripting objects.

JAVA & JAVA SCRIPTING

Section I

Introduction: Internet Architecture board, understanding the internet.
Concept: Working, Surfing and security on the internet. Internet protocols Internet addressing, internet routing protocols internet message protocol, internet group management protocols, internet mail protocol.Internet applications: E-mail, multi cost backbone, net news. Web: World Wide Web advantages of web, web terminology, web access using web browser, locating information on the web.

Section II

Introduction to Java: Applets, different b/w Java & C++, working with Java objects: Encapsulation, inheritance & polymorphism, constructors. Garbage collection & finalizes, data types, modifies & expressions, array & flow control statements.

Section III

Exception handling threads, event handling, network programming & Java virtual machines, Java & databases.

INTRODUCATION TO SYSTEM SOFTWARE

Introduction to software processors; elements of assembly language programming; assembly scheme, single pass and two pass assembler; general design procedure of a two pass assembler.

COMPUTER GRAPHICS

Video Display Devices Refresh cathode -ray tube, raster scan displays, random scan displays, color CRT-monitors, direct view storage tube, flat-panel displays; 3-D viewing devices, raster scan systems, random scan systems, graphics monitors and workstations.

OPERATION RESEARCH

Origin & development of O.R., Nature & Characteristics features of O.R., Models & Modeling in Operation Research. Methodology of O.R., General methods for solving O.R. Models, O.R. & Decision making, Application, Use & Limitations of O.R.

ARTIFICIAL INTELLIGENCE

Introduction to AI: Definitions, AI problems, the underlying assumption, and AI Techniques, Level of Model. Problems, Problem Space and Search: defining the problem as a state space search, Production System, Problem Characteristics,