| A05-01 | **Fundamentals of Information Technology** | **Introduction:** What is Computer, Characteristics of Computers; The Evolution of Computers; The Computer Generations (First Generation (1942-1955), Second Generation (1955 – 1964), Third Generation (1964 – 1975), Fourth Generation (1975 – 1989), Fifth Generation (1989 – Present)),
Basic Computer System Organisation: Input Unit; Output Unit; Storage Unit; Arithmetic Logic Unit; Control Unit; Central Processing Unit; The System Concept,
Classification of Computers: Notebook Computers; Personal Computers (PCs); Workstations; Mainframe Systems; Supercomputers; Clients and Servers.
Data Representation (BCD, EBCDIC, ASCII) and **Number systems** (Binary, Hexadecimal and Octal), Computer Arithmetic, Non-Positional Number Systems; Positional Number Systems (Binary Number System, Octal Number System, Hexadecimal Number System); Converting One number System to Another (Converting to Decimal from Another Base, Converting from Decimal to Another Base (Division-Remainder Technique), Converting from a Base Other Than 10 to a Base Other Than 10, Shortcut Method for Binary to Octal Conversion, Shortcut Method for Octal to Binary Conversion, Shortcut Method for Binary to Hexadecimal Conversion, Shortcut Method for Hexadecimal to Binary Conversion); Fractional Numbers.
FILE SYSTEM MANAGEMENT: Files in Computers, Directories and Names (Partitions, Per-Process Root Directory, Directory Structure, Directory Entries); Types of File System Objects; File System Functions; Information Types; File System Architecture (Access Methods, Access Control, File Locking, Blocking, Allocation, Free Space).
Processor and Memory: The Central Processing Unit (CPU) (The Control Unit, The Arithmetic Logic Unit (ALU), Instruction Set, Registers, Processor Speed, Types of Processors); The Main Memory (Storage Evaluation Criteria, Main Memory Organization, Main Memory Capacity, RAM, ROM, PROM and EPROM, Cache Memory.
Secondary Storage Devices : Sequential and Direct-Access Devices; Magnetic Tape (Basic Principles of Operation, Types of Magnetic Tapes, Advantages and Limitations of Magnetic Tapes, Uses of Magnetic Disks); Optical Disk (Basic Principles of Operation, Types of Optical Disks, Advantages and Limitations of Optical Disks, Uses of Optical Disks); Mass Storage Devices (Disk Array, Automated Tape Library, CD-ROM Jukebox); Storage Hierarchy.
Input-Output Devices : Input Devices (Keyboard Devices, Point-and-Draw Devices, Data Scanning Devices, Digitizer, Electronic Card Reader, Voice Recognition Devices, Vision-Input System); Output Devices (Monitors, Printers, Plotters, Screen Image Projector, Voice Response Systems).
Computer Languages: Analogy with Natural Languages; Machine Language (Advantages and Limitations of Machine Language); Assembly Language (Assembler, Advantages of |

| **Operating System** | Assembly Language over Machine Language, Limitations of Assembly Language, Assembly Languages with Macro Instructions); High-Level Language (Compiler, Linker, Interpreter, Advantages and Limitations of High-Level Languages); Object-Oriented Programming Languages; Some High-Level Languages (FORTRAN, COBOL, BASIC, Pascal); Some More High-Level Languages (C and C++, Java, RPG, LISP, SNOBOL); Characteristics of a Good Programming Language; Selecting a Language for Coding an Application; Subprogram. Computer Software (System Software and Application Software)

Application Software Packages: Word-Processing Package (What it is?, Commonly Supported Features); Spreadsheet Package (What it is?, Commonly Supported Features); Graphics Package (What it is?, Commonly Supported Features); Personal Assistance Package (What it is?, Commonly Supported Features).,
Data and Information

Introduction: Machine Hardware (Traps and Interrupts, Multimode Execution); Operating System Structure (Operating System Types, Operating System Kernel, The Boot Process), What is Operating system, Main functions of Operating System

PROCESS MANAGEMENT: Process Scheduling; Process State; Scheduling Criteria; Scheduling Algorithms (First-Come First-Served, Shortest Job First, Shortest Remaining Time, Round Robin, Priority, Multilevel feedback Queues); Scheduling Algorithm Performance; Process Attributes (Run State and Scheduling, Memory Management, Hardware State, Signaling, Access Control, Input and Output, Other); Process Supervisor Calls.

INTERPROCESS COMMUNICATION AND SYNCHRONIZATION: Interprocess Communication; Process Synchronization (Critical Section, Interrupt Disabling, Test and Set Instruction, Swap Instruction, Wait and Signal, Semaphores, Dekker's Algorithm, Peterson's Algorithm, Bakery Algorithm, Monitors); Deadlock (Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Ostrich Algorithm).

MEMORY MANAGEMENT: Single Absolute Partition; Single Relocatable Partition, Multiprogramming; Multiple Partitions (Multiple Fixed Partitions, Multiple Variable Partitions (Partition Selection Algorithms); Buddy System; Simple Paging; Simple Segmentation; Segmentation with Paging; Page and Segment Tables (Associative Memory, Inverted Page Table (Swapping, Overlaying).

VIRTUAL MEMORY: Demand Paging (Locality of Reference, Page Locking, Page Size, Page Replacement Algorithms, Algorithm Performance, Allocation Policies, Working Set, Prepaging); Segmentation.

FILE SYSTEM MANAGEMENT: Directories and Names (Partitions, Per-Process Root Directory, Directory Structure, Directory Entries); Types of File System Objects; File System Functions; Information Types; File System Architecture (Access Methods, Access |

| | | Control, File Locking, Blocking, Allocation, Free Space). |

		DEVICE MANAGEMENT: Hardware I/O Organization (I/O Control, Port and Memory-Mapped I/O, Module Registers, Busy Wait I/O, Polled I/O, Interrupt I/O, Direct Memory Access (DMA)); Software Organization (Network I/O, Logical I/O, Buffering, Caching, Device Drivers); Devices (Graphics, Text-Based Displays, Storage Disks, Hard-Disk Performance, Hard-Disk Scheduling, Formatting, Raid, RAM Disks). **SECURITY:** Authentication (Passwords, Physical Authentication); Prevention; Detection; Correction; Identification; Threat Categories; Program Threats. **DOS**: MS-DOS (DOS as Operating System) Internal and External Commands, Naming of files, Primary and Secondary Names. Basic commands (Date, Time, Rename, Copy, Copy Con) Directory handling commands (RD, MD,CD, DIR, Type, Date, Time, Path), External Commands (Print, Format, Tree, Sort, Find), batch files **Windows:** MS Windows Introduction Getting started, Desktop Icons, Window elements and buttons, working with mouse, opening and closing documents, finding files and folders, starting programs using RUN command, Window Explorer, Setting Printer, Paint Brush, Note Pad, Word Pad. Organizing files on computer. Introduction to other multi user operating systems like UNIX, Linux, Window NT and 2000

A05-02	**Ms- Office** **MS-Word**	Creating, opening documents, saving documents and quitting applications, Cursor control and navigating the document, Editing Tools, editing document using cut copy and paste commands, printing the document, Formatting paragraph, Adding borders and shadings, Handling tables Mail – Merge, spell check, AutoCorrect (Add AutoCorrect Entries Without Formatting, Add New AutoCorrect Entries with Formatting); Auto Text (Creating an AutoText Entry, AutoComplete Option); AutoFormat (AutoFormat as You Type, AutoFormat on Command, Auto Formatting Text); Find and Replace; Find; Replace Text; Page Numbering; Header and Footer (Adding a Header or Footer in Your Document); Footnotes and Endnotes (Add a Footnote or Endnote).
	MS-Excel	Creating, opening, saving, closing worksheets, opening more than one workbooks Working inside worksheet (about cells), Cell: cell references, active cell toolbar. Activating worksheets, scrolling tabs, manipulation of multiple files. WB display in more than one windows, arranging windows, closing windows, Worksheet printing, Graphs and Charts and functions, Auditing a Workbook (To Trace the Precedents for a Formula); Comment Inserting (To Insert a Comment); Formulas That Make Decisions (How the If function works); Headers and Footers; Merging Workbooks (To merge workbooks); Outlines (Outline a Worksheet Automatically, Clear Entire Outline, Show or Hide Outline Symbols, Group Rows or Columns in an Outline, Ungroup Rows or Columns in an Outline, Remove Group from Outline, Set Outline Options); Printing Column and Row Labels on Every Page; a workbook, To share a workbook); Ranges, Naming (To name a range); References (Absolute references, Mixed references); Seeking Goals (To seek a goal); Sheets Naming (To Name a Sheet); Working with Workbooks (Copying Entries Between Workbooks, Moving Sheets Between Workbooks, Deleting Sheets)

	MS-Power Point	OLE Tips for Power Point, Terminology, different views, Working with text in slides, importing images, inserting photos in ppt presentation. Using clip art gallery. Inserting time, slide numbers, charts etc., Customization of slide shows: rehearing, slide transition, animation and build effects. Showing slides out of order. Hyperlinking No. of Hrs.	
	Introduction to Internet and MS Outlook	**Introduction of Internet:** Definition (What it is?); What is Internet, how does it works, Getting connected using modem, What is browser, understanding the web name, search engines, downloading files, browsing web, sending and receiving emails, Basic Services (Electronic Mail, File Transfer Protocol, Telnet, Usenet News, The World Wide Web); WWW Browsers; Uses of the Internet. **MS-OUTLOOK:** Starting Microsoft Outlook Express, Understanding Outlook screen, using menus and tool bars, electronic mail; Using Email--customizing and navigating; replying and reading messages; creating and sending messages; forwarding and customizing messages; working with e-mail attachments; Managing contacts enter and edit contact information; send and receive contact information; create a distribution list; flag, filter, sort, and delete contacts; merge a form letter with contacts. Planning tasks and schedules; taking notes; compiling a to-do list; organize and assign tasks; schedule the calendar and appointments; plan a meeting; save a calendar as a Web Page. Managing inbox; attach message flags; setting message options; create subfolders and files messages; find, sort, group, and filter messages; archiving messages; record and view activities in a journal; create office documents from Outlook; import and export files; send and receive faxes.	

| A05-03 | **DBMS using MS-ACCESS** | **Introduction to Databases, DBMS and RDBMS:** Introduction, Information, Quality of Information, Information Processing, What is a Database?, Why a Database?, Characteristics of Data in a Database, What is a Database Management System (DBMS)?, Need for DBMS, Types of DBMS, Relational Database Management Systems (RDBMS), RDBMS Terminology, Relational Data Structure, Relational Data Integrity, **Introduction to Access:** Introduction MS Access, Benefits of Ms-Access, What is New in Ms-Access, Overview of Ms-Access, Launching Ms-Access Applications, Switching between Ms-Access Applications, Ms-Access Help System, Detect & Repair Windows, Menus and Toolbars, Closing (Existing) Office Applications, Windows, Menus, Dialog Boxes and Toolbars, Application Windows, The Application's Workplace, Document Navigation, Working with Several Document Windows, Menus and Dialog Boxes, Dialog Box Options, Toolbars, Printing Documents, Exercises. Introduction to objects, tables, queries, forms, creating a database. Data types in MS Access, Creating Tables, Designing tables, working with tables in design view, working with fields properties, naming the fields, setting data types, primary key, **Ms-Access Basics:** Introduction, Starting Access, Access Startup Dialog Box, Menus and Toolbars, Using Toolbar Buttons, Arranging Buttons on the Toolbar, Viewing Data, Creating an Ms-Access Database and Tables, Database Properties, Modifying Tables, Creating Forms, Entering and Updating Data Using Forms, Navigating between Records in a Form, Finding, Editing and Deleting Data in a Form, Using Ms-Access Help, Using Answer Wizard, Using the Contents Tab to Get Help, Using the Index Tab to ger Help, Exercises. **Queries:** Creating queries, Introduction to queries. Writing simple queries. Working with queries, using query design grid, adding table to query design grid, sorting, handling null values, using simple query wizard. **Creating forms:** Understanding forms, working in design view, components of design view, sections of forms, assigning properties to forms, modifying form properties, Creating forms with Wizard, **Report:** Creating Reports, Introduction to Reports. Using Report Wizard, Auto reports, designing reports, setting report properties, viewing reports in report view, printing reports |

| A05-04 | **Introduction to Programming & Computer Language (C++)** | **Flow Charts:** What is flow chart, symbols used in flow charts Identifying problems, designing solutions, drawing flow charts, logic building

Languages: Procedural language, object oriented language, concept of oops, advantage of object oriented language over procedural language

Over view of C++: Character and string literals, Variables, Objects and their declarations, operators,

Statements: Simple Statements, conditional statements, compound conditions, Boolean expression, expression, nested expression, switch statements, type conversion. Loops and Iterations: While statements, do…while, for, break, continue.

Functions: Library function user defined functions, Declaration and definition, local variables and functions, function types, passing by reference, passing by constant reference, scope of functions, overloading.

Arrays: Defining arrays, array elements, initializing and processing arrays, passing arrays to a functions, sorting and searching arrays, type definitions, multidimensional arrays.

Pointers and References: Introduction to pointers and references, objects and values, returning a reference, arrays and pointers, new and delete operators, pointers and functions.

Strings: Strings, string input output, array of strings , string related library functions,

Classes: class declaration constructors, destructors, access functions, copy constructors,

Overloading: overloading the assignment operators, arithmetic operator, relational operators, increment and decrement operators, conversion operators string classes composition and inheritance. |

A05-05	**Web development using HTML**	What is web page, Web site **INTRODUCTION TO HTML:** Information Files Creation; Web Server; Web Client/Browser (Understanding how a Browser communicates with a Web Server); Hyper Text Markup Language (HTML) (HTML Tags, Paired Tags); Commonly used HTML Commands (The structure of an HTML program, Document Head, Document Body); Titles and Footers; Text Formatting (Paragraph Breaks, Line Breaks); Emphasizing Material in a Web Page (Heading Styles, Drawing Lines); Text Styles (Bold, Italics, Underline); Other Text Effects (Centering (Text, Images etc.); Spacing (Indenting Text). **Lists:** Types of Lists (Unordered List (Bullets), Ordered Lists (Numbering), Definition Lists). **Adding Graphics to HTML Documents:** Using the Border attribute; Using the Width and Height Attribute; Using the Align Attribute; Using the ALT Attribute. **Tables:** Introduction (Header, Data rows, The Caption Tag); Using the Width and Border Attribute; Using the Cell padding Attribute; Using the Cell spacing Attribute; Using the BGCOLOR Attribute; Using the COLSPAN and ROWSPAN Attributes. **Linking Documents:** Links (External Document References, Internal Document References); Images as Hyperlinks (Image Maps). **Frames:** Introduction to Frames (The <FRAMESET> tag, The <FRAME> tag, Targeting Named Frames. **DHTML:** Introduction to DHTML Defining Styles; Elements of Style; Linking a Style Sheet to an HTML Document; In-line Styles; External Style Sheets; Internal Style Sheets; Multiple Styles., overview of XML
	Web Development using JAVA Script	**JavaScript Grammar**: Variables, operators, expressions, statements, object , function and methods, **Variables and Data Types:** Local variables, global variables ,Data Types (number, Boolean string , null, undefined, objects), **Operators:** Arithmetical & computational, Boolean, comparison ,string, assignment and special **Statements:** If-else, do-while, while-do, for, loop, Break-Continue, switch Functions, Defining function, Calling Function, Examples of function, **Objects:** Document Object Model, Properties, Method Creating objects, Event **Handlers:** Click, Change ,Focus Blur, Mouse out, Mouse over, Select Submit, Resize, Unload, Load Events, Alerts, Password, confirmation, Browser Detection, Redirection, Opening a new window