Madhya Pradesh Bhoj (Open) University
M. Sc. IT (Previous)
Syllabus for the Session 2006-07 & onwards

MIT-01 : Foundation of IT and MS-Office 2000

Unit – I
Introduction to Computer Concepts : Elements of a Computer, History of Computers, Early Electronic Computers, Computer Generations, Classification of Computers.
Basic Computer Architecture : The Central Processing Unit, Basic Computer Architecture,
Input Output Devices : Keyed Input, Pointing Devices, touch-Sensitive Screens, Data Scanning devices, Voice Recognition Devices, Hard Copy Devices, Output Devices.
Storage Media : Traditional Storage-Magnetic Tape, Today's Preferred Storage- Magnetic disk.

Unit – II
Data Representation : Decimal system, Binary System, Conversions, Fraction, Binary System to Other Number Systems, Octal Number System to Other Systems, Hexadecimal System to Other Systems.
Software Concepts : Types of Software, software qualities, Programming Languages, Classification of Programming Languages, Classification of high level Languages, Object oriented languages.
Operating Systems : History and Evolution, Function of an Operating System, Types of Operating Systems, Operating System as Resource Manager, BIOS.

Unit – III
DOS : Directories, Files, Wild cards, DOS Commands, Redirection option in DOS.
Features of Unix Operating System : Multitasking Capability, Multi-user Capability, The Unix Connections, Components of The Unix Operating System, Unix Tools And Applications, the Unix Scheduler, The Unix File System, The Hierarchical File System of Unix, Basic Directory Commands, Basic File Commands, Shell Programming.
Windows 95/98 : Starting Windows 95/98, moving in Menus, working with documents or files, Understanding the start Menus.

Unit – IV
Database Management Systems : Data Processing, Database, Hierarchy of Database, why Database?, What is Database System?, DBMS Engine, Database Administrator, Database Users, Instances and Schemas, Data models.
Communication Systems : The Basic Communication System, Data Transmission, Data Transmission Technique, Methods of Transmission, Error Detection, Communication Parameters, Modes of Transmission, Communication channels.
Computer Virus, Spreading of Viruses, New Technology and Viruses, Methods to detect a Boot-sector Virus, Classification of Viruses, Effect of Viruses, Data Attacks, Session Hijacking, Viruses and Worms.
Internet : Uniform Resource Locater (URl), Web Browsers, Domain Name Service (DNS), Internet Service Provider (ISP), Internet Requirements, Net Surfing, Internet Services, Internet Talking, Intranet.

Unit – V
Windows 2000 : Introducing Windows 2000 Professional, New Ways to Communicate, File Systems.
Microsoft Word 2000 : Standard Toolbars, Page Setup, Editing of word Document, View menu, Insert Menu, Formatting a Document, Paragraphs Formatting.
Microsoft Excel 2000 : How to Start Microsoft Excel 2000, Working with Toolbars, File Menu, Page Setup, Editing in Excel-2000, Working with View Menu, Inserting Elements in Microsoft Excel, Insert chart, Formatting, Tools of Microsoft Excel, Data Management,
Microsoft access 2000 : Features of Access, Creating a Table, Creating a Relationship, Types of Functions, Introduction to Queries, Forms, Reports.
Microsoft PowerPoint 2000 : Starting PowerPoint 2000, Formatting, Inserting Text, Drawing Toolbar, Slide Show.
MS Outlook 2000 : Managing multiple mail and news accounts, Formatting message text, Secure Messages, Reading Messages, Organizing mail messages.

MIT-02 : Computer Organisation and Architecture

Unit – I
Information Representation : Number System, Floating Point Representation, Integer Representation, Character Codes.
Logic Gates : Boolean Algebra, Boolean Expression Simplification, Basic Building Blocks and Circuits, Combinational Circuits, Arithmetic Circuits, Combinational Circuits and Sequential Circuits, Registers, Counters.

Unit – II
Register Manipulations and Micro-Operations : Register Transfer, Bus System, Micro operations.
Computer Organization and Design Concepts : Instruction and Instruction Code, Computer Instructions, Timing and controls, instruction Cycle, Memory Reference Instructions, Input/Output and Interrupts, Complete Computer Description, Machine Language, Design Control Unit.

Unit – III
Basic Computer Programming : Assembly Language, The Assembler, Program Loops, Programming Arithmetic & Logic, Subroutines, Input/Output Programming
Micro-Programming : Micro Programmed Control, Address Sequencing, Micro program Example, Design of control Unit.

Unit – IV
CPU Organization : Central Processing Unit, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and manipulation, Micro Programmed Control, Reduced Instruction Set Computer
Input-Output Organization : Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Mode of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Serial Communication
Memory Organization : Memory unit, Types of Memory, Associative Memory, Building Large Memories, Cache Memory, Virtual Memory, Parallel Processing, Methods of Parallel Processing, Overcoming Pipelining Conflicts, Flynn's Classification, Array Processors

Unit – V
Pipeline and Vector Processing : Pipeline Processing, Vector Processing, Array Processing.
Multiprocessing : Multiprocessors, Interconnection Structures, Interprocess Arbitration, Interprocessor communication and Synchronization, Cache Coherence.

MIT-03 : Data Communication and Computer Networking

Unit – I
Fundamentals of Data Communication : Analog Versus Digital, Fundamentals of Data Transmission Communication Modes Transmission System, Synchronous System, **Communication Channnels-Modems** : Classification of Modems Modem Based on Range Modems Based on Line Modems Based on Operation Mode Modems Based on Synchronization Modems Based on Modulation.
Data Transmission Protocol : Protocols An Overview of Networking The Role of Computer Networks in Development, **Transmission Media** : Introduction Transmission Concepts and Terms Master Sites Interconnection to Telephone.

Unit – II
Local Area Network : Local Area Network Baseband Versus Broadband LAN Hardware LAN Operating Systems.
Implementing LAN : Implementation of LAN Using Fiber-Optic Cables Implementation of LAN Using Wireless Technology Fast LANs Non-standard LANs.
Extending LAN : Transmission Concepts and Terms, Master sites, Interconnection to Telephone.

Unit – III
Data Transmission Network : Telephone Networks, Wan Technologies.
TCP/IP and the Internet : History of Internet, Internet2 Internet Services Standards for TCP/IP and the Internet RFCS and the TCP/IP Standardization Process.
Network Architectures and OSI, Network Architectures Layering the Communications Process The Need for Layered Solutions Open Systems Interconnection (OSI) Model.
Routing and Congestion Control : Routing Concepts Routing in Wide Area Networks Hop-By-Hop versus Source Routing Congestion Control, Deadlocks. **Queueing Theory**: **Basic Design Techniques** : Basic Concepts, Queueing Model and Factors Traffic Theory Lost Call Rate.

Unit – IV
Wide Area Network : Introduction Network Using WAN and Network Services Communication Protocols Over WAN. **Transmission Control Protocol/Internet Protocol (TCP/IP)** : LAN Protocol and OSI TCP/IP Protocol Data Transmission by TCP and Ethernet Data Encapsulation Data Routing TCP/IP Services and Application Protocols. **Data Link Layer Address** : Physical Address. **Naming, Addressing, and Routing :** Network Layer Addresses Subnet Address Resolution Protocol (ARP) Domain Name System (DNS).

Unit – V
Broadband Network Local Loop Technologies Asymmetric Digital Subscriber Line (ADSL) High Bit-Rate Digital Subscriber Line (HDSL), Line Coding Techniques Wireless Local Loop (WLL). **Security** : Basic Requirements of Network Security, Security Levels Data Security Invalid Access/ Possibility of Eavesdropping Firewalls (Access Control) Encryption Security Against Remote Access. **Electronic Mail and other Internet Services :** Electronic Mail E-Mail Addresses Format of **A Mail Message** Some Important Features of E-Mail Services Available on The Internet, **Electronics Commerce and EDI**, Electronic Commerce Internet: A Tool for Electronic Commerce Electronic Data Interchange (EDI), Implementing EDI - Major Considerations User Characteristics and Electronic Commerce , Issues in Electronic Commerce.

MIT-04 : Programming in C and data Structures

Unit – I
Introduction to 'C' Language, Basic Constructs of Structured Programming, History of C Language, Advantage of C Language, Components of c Language, Structure of a C Program, A Sample C Language Program, **Data Types**, Primary Data Types, Composite Data Types, **Constants and Variables**, Character Constants, Integer Constants, Real or Floating point Constants, String Constants, Logical Constants, Variables, **Operators and Expressions**, Arithmetic Operators, Relational operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Operator Precedence, Type Modifiers, Expressions, Type Definitions using typedef, **Program Control, Conditional Statements**, The Break Statement, the Continue Statement, The exit () Function,

Unit – II
Arrays, One Dimensional Array, Strings, Two Dimensional Array, Multi-dimensional Array, **Functions**, Need of User Defined Functions, Function Declaration and Prototypes, Function Definition, Calling a Function, the Return Statement, Storage Classes, Scope and Lifetime of Declaration, Passing Parameters to Functions, Command line Arguments, Recursion in Function, **Structures**, Creating Structure Variables, Assigning Values to Members, Structure Initialization, Comparison of Structure Variables, Array within Structures, Structures within Structures, Passing Structures to Functions, structure Pointers, **Pointers**, Pointer Notation, Pointer Declaration and Initialization, Accessing Variable through pointer, Pointer Expressions, pointers and one Dimensional Arrays, Malloc Library Function, Calloc Library function, Pointers and Multi-dimensional Arrays, Arrays of Pointers, Pointer to Pointers, Pointers and Functions, Functions With a Variable Number of Arguments

Unit III
Data Structures, Primitive and Composite Data types, Abstract Data Type, Algorithm Design, Program Analysis, **Stacks**, Representation of Stacks, Application of Stacks, Simulating Recursive Function Using Stack, **Queues**, Circular Queue, Deques, Priority Queues. **Linked List**, Static and Dynamic Memory Allocation, Pointers, Static and Dynamic Variables, Linear Linked List, Representation of Linked List, Implementation of Linked List, Concatenation of Linked List, Merging of Linked List, Reversing of Linked List, Application of Linked List, Doubly Linked List, Circular Linked List, Generalized List.

Unit – IV
Trees, Basic Terminology, Binary Trees, Theorems Associated with Binary Trees, Binary tree Traversal, Implementation of Binary Trees, Deleting From a Binary Tree., **Graphs**, Definition and Terminology, Representation of Graphs, Path Matrix1, Traversal of Graph, Weighted Graphs, Spanning Trees

Unit - V
Hash Table, Hashing Function, Terms Associated with Hash Tables bucket Overflow, Handling bucket Overflows, ISAM, **Searching, Sorting**.

MIT-05 : Object Oriented Programming in C++

Unit – I
Object Oriented Paradigms and Metaphors : Basic Concepts of Object-oriented Programming Objects What is C++? A Simple C++ Program Initialization Input with C in Tokens Control Statements Decisions Nesting Type Conversion.
Data Types Operators and Expressions. Tokens Basic Data Types Constants User Defined Data Types Derived Data Types Declaration of Variables Operations and Expressions Operator and Function Overloading Manipulation of Strings Using Operators Polymorphism Streams.

Unit – II
Function in C++ : The Main Function Passing Arguments to Function Returning Values From Functions Overload Functions Inline Functions Default Arguments, **Class and Objects** The Concept of a Class, Classes Versus Objects.

Unit – III
Constructor and Destructor : Constructors, Destructors, Constructors of the String Class, String Class Assignment ,String Access Operators and Method.
Operator Overloading Type Casting

Unit – IV
Inheritance : Derived Class Relationships Superclass/Subclass Multiple Inheritence Constructors, Destructors, and Inheritance Hierarchical Inheritance Hybrid Inheritance Virtual Base Classes.
What Are Pointers? C++ Memory Map Free Store Pointers and Arrays Reserving Dynamic Memory Freeing Dynamic Memory Polymorphism Virtual Functions Pure Virtual Functions Early vs. Late Binding.

Unit – V
Input-Output in C++ : Old Vs. Modern C++I/O C++ Streams Creating Inserters Creating Extractors Creating Manipulator Functions.
File Handling in C++ Classes for File Stream Operations Opening and Closing A File Manipulations of File Pointers Random Access Command-Line Arguments. Standard Library Objects The Container Classes Theory of Operation Vectors Lists Maps Algorithms The String Class.

MIT-06 : Advanced DBMS

Unit - I

Query Processing: Query Execution Algorithms, Set Operations, Pipelining, **Query Optimization:** Using Heuristics in Query Optimization, Basic Algorithms for Executing Query Operations.

Unit - II

Database Tuning: Location of Bottlenecks, Tunable Parameters, **Extended Relational Model**: Relational Model Concepts, Referential Integrity Constraints, Structured Query Language (SQL), Querying Data with Multiple Conditions, Basic Relation algebra Operations.

Unit - III

Object Oriented Database Systems: Characteristics of an object-relation Database Management System (ORDBMS), Complex Objects, Inheritance, Function Overloading, Rules, **Distributed Database:** Distributed Database System, Distributed Database Design, Data Fragmentation, Data Replication, Data Allocation, Distributed Database Query Processing.

Unit - IV

Database Security: Security and Integrity Threats, International or Malicious Threats, Defense Mechanisms, Security Policies, Authorization, Objects, View as objects, Granularity, Subject, Access Types, **Database Operating Systems:** Features of a Database OS, Concurrency Control Model, Theory of Serializability, Concurrency Control Algorithms,

Unit - V

Multimedia Databases, Impact of IT on Libraries, Multimedia Data Formats, Continuous-Media Data, Similarity- Based Retrieval, Mobility and Personal Database, Database Technologies, Serving Database on the Web, Applying Databases to the Internet, **Deductive Databases**, Logic Concepts, Deductive Database Notations, Interpretation of Rules, Inference Mechanism, Deductive Database Systems, Deductive Object Oriented Databases

MIT-07 : ORACLE

Unit - I
Getting Started With Oracle : Overview of RDBMS, Getting Started, Module of Oracle, Invoking SQLPLUS, Data Types, Data Constraints.
Operators in SQL : Precedence of Operators, Types of Operators, SQL * Plus Functions, Types of Functions.
Database Objects : Introduction to Synonyms, Introduction to Sequences, Alternating of Sequence, Introduction to Indexes.
Data Integrity : Purpose, Prerequisites, Keywords and Parameters, references_clause, SCOPE REF Constraints, VALIDATE NOVALIDATE, Using Indexes to Enforce Constraints.

Unit - II
Formatting SQL * Plus Reports and Commands : Formatting Columns, Clarifying Your Report with Spacing and Summary Lines, Defining Page and Report Titles and Dimensions, Storing and Printing Query Results, SQL *PLUS Commands.
SQL * Loader : Introduction to SQL * Loader, Bad Files, Discard File, The Control File.
Accessing Remote Database : Introduction to Database Links, Using Database Links for Remote Queries, Dynamic Links: Using SQL PLUS Copy Command, Connecting to Remote Database.

Unit - III
Overview of PL/SQL : Understanding the Main Features of PL/SQL, The ORACLE Database Server, Advantages of PL/SQL. **Procedures, Functions and Packages :** Stored Procedures, How to Create and Execute Procedures? Where to Store Procedures? Stored Functions, How to Create & Execute Functions, Where to store Functions, Where do Procedures and Functions Reside?

Unit - IV
Triggers : Introduction to Database Triggers, Required System Privileges, Parts of A Trigger, Types of Trigger, Instead of Trigger, Enabling and disabling Trigger.
Object Relational Databases : Enhancements, Features of Object-Oriented Programming, Introduction to Object Views, Manipulating Data Through Object View, Introduction to Methods.
Collections (Nested Tables & Varying Arrays) : Introduction to Varying Arrays, Creating of Varying Arrays, Maintaining of Varying Arrays, Introduction to Nested Tables.

Unit - V
Using Large Objects : Available Data Types, Specifying Storage for LOB Data, Manipulating and Selecting LOB Values.
Introduction to Web Enabled Database : Role of SQL, Understand the Role of Java and WebDB, Introduction to web architecture.
A Brief Introduction About Database Administration : Creating a Database, Creating and Managing Rollback Segments, When Rollback Information is Required, Rollback Segment States, What is Backup and Recovery? How does Recovery works?

MIT-08 : Visual C++

Unit - I
Windows Application Basics : Windows and Window, Windows Programming.
Visual C++ Basics, Visual C++ and Windows Programming, Structure of a VC++ application, Starting VC++, A Sample VC++ (Win32) Application.
Dialogs and Controls, Dialog boxes, Command Button Control, Check-box Control, Radio Button Control, List Box, Combo Box, slider Control, Messages, Message Queue, Handling Messages with Class Wizard.
Documents and Views, The Documents Class, The View Class.

Unit - II
Drawing on the Screen : Device Contexts, Device Objects, Wizard Support for Device Context, Stock Objects, A DC Example, Using Color in Windows Applications.
Printing and Print Preview : Printing, MFC Printing Application, Adding Functionalities to MFC Print
Persistence and File I/O : File Basics, Files and Windows Applications, Serialization.

Unit - III
Status Bars and Tool Bars : Status Bar, Toolbars.
Common Controls : Command Button Control, check Box Control, Radio Button Control, List Box Control, Combo Box Control, Slider Control.
Help : Building Blocks of help,
Property Pages and Sheets : CpropertySheet, CpropertyPage
Unit - IV
Common Controls : ActiveX and OLE, ActiveX and COM, ActiveX and MFC, VC++ ActiveX Project, ActiveX Control Macros.
Building an ActiveX Container Application : ActiveX Control Containers.
Building an ActiveX Server Application : Component, Building and Using COM Server in VC++.
Building an ActiveX Control : A Simple ActiveX Control Application, ActiveX Control Methods, ActiveX Events.

Unit – V
Socket, Mapi and the Internet : Internet/Intranet Applications, Sockets, Ports and Addresses, Creating a Socket Program, Creating a Client Browser Program.
Internet Programming : Create The Project, Set_MERGE_PROXYSTUB, The Build Rule,
The Active Template Library : An ATL Project.
Database Application : ActiveX Data Objects, Creating a Database Application..