



**INSTITUTE OF DISTANCE AND OPEN LEARNING**  
**Gauhati University**  
**Guwahati - 14**

Syllabus for  
**Master in Computer Application**  
**( MCA )**

**Degree: Master of Computer Applications (MCA)**

**Duration: Six Semesters**

**Eligibility:**

1<sup>st</sup> semester: Any Graduate

3<sup>rd</sup> Semester(Lateral Entry): PGDCA from any Recognized University /  
DOEACC 'A' Level/BCA/B.Sc.(IT)/B.Sc.(CS)

### **Distribution of Courses for M.C.A.**

- (Each course may include laboratory work if prescribed)
- Total marks for each of the courses listed below will be 100 except for the course IT-26 (Major Project Work) which will carry a total of 500 marks.
- PGDCA/DOEACC 'A' Level Passed Candidate can enroll directly into the 3<sup>rd</sup> Semester of MCA but they have to clear addition two papers IT-05 & IT-10 within the course duration.

**Total Marks: 3000**

**Total Credits: 109**

Course No	Course Title	Evaluation Pattern	Credit
<b>SEMESTER - I</b>			
IT-01	Fundamentals of Computers	Objectives:40%, Descriptive: 60%	3
IT-02	Introduction to Programming	Objectives:40%, Descriptive: 60%	4
IT-03	Digital Logic	Objectives:40%, Descriptive: 60%	3
IT-04	Practical Lab-1 ( PC Software + Programming)	PC Software:70%, Programming: 30%	4
IT-05	Communication Skills & Technical Writing	Objectives:40%, Descriptive: 60%	2
<b>SEMESTER - II</b>			
IT-06	Programming in C++	Objectives:40%, Descriptive: 60%	4
IT-07	Database Management System	Objectives:40%, Descriptive: 60%	4
IT-08	Computer Network & Internet	Objectives:40%, Descriptive: 60%	4
IT-09	Practical Lab-2 (Programming+DBMS+Internet)	Programming: 40%, DBMS: 30%, Internet: 30%	4

IT-10	Management and Accounting	Objectives:40%, Descriptive: 60%	3
<b>SEMESTER - III</b>			
IT-11	Mathematical Foundation of Computer Science	Objectives:40%, Descriptive: 60%	3
IT-12	Data Structure and Algorithm	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-13	Computer Organization & Architecture	Objectives:40%, Descriptive: 60%	4
IT-14	Operating System	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-15	Web Technology and E Commerce	Objectives:30%, Descriptive: 40%, Practical:30%	4
<b>SEMESTER - IV</b>			
IT-16	Objected Oriented Programming using JAVA	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-17	Data Communication & Computer Network	Objectives:40%, Descriptive: 60%	4
IT-18	Advanced Database Management System	Objectives:40%, Descriptive: 60%	3
IT-19	Linux System Administration	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-20	Compilers	Objectives:40%, Descriptive: 60%	4
<b>SEMESTER - V</b>			
IT-21	Software Engineering	Objectives:40%, Descriptive: 60%	4
IT-22	Computer Graphics & Multimedia	Objectives:40%, Descriptive: 60%	4
IT-23	Application Software Development	Objectives:30%, Descriptive: 40%, Practical:30%	4
IT-24	Elective		4
IT-25	Seminar		2
<b>SEMESTER - VI</b>			
IT-26	Major Project		18

**List of electives:**

1. Artificial Intelligence
2. ERP

3. MIS
4. Data Mining and Warehousing

### **Detail Syllabus:**

## **SEMESTER – I**

### **IT-01: FUNDAMENTALS OF COMPUTERS**

#### **Introduction**

Brief history of development of computers, computer system concepts, capabilities and limitations, types of computers: Analog, Digital, Hybrid, general, special purpose, Micro, mini, mainframe super computers, generations of computers, personal computers, types of personal computers – Laptop, Palmtop etc.

#### **Computer software**

Need of software, types of software, System software – Operating system and its types, loader, linker etc.; Application software --word processing, spread sheet, presentation graphics, database management software; Programming languages - machine, assembly, high level, 4GL, their merits and demerits, Computer Viruses.

#### **Components of Computer System**

Basic components of computer system, Input devices, output devices, Control Unit, storage devices., maintaining the Computer System.

#### **PC Hardware and Maintenance**

Introduction and Identification of different hardware component of a PC , Installation of Operating System, Hard Disk Partitioning ,Troubleshooting.

#### **Introduction to Computer organization and architecture:**

### **IT-02: INTRODUCTION TO PROGRAMMING**

#### **Introduction to C:**

Steps for Problem Solving ,Algorithm, Analysis of Algorithm Efficiency, Flowchart , Pseudo code, Program , Programming Languages , Translators

History of C , Features of C, Structure of a C Program, Writing a C Program, Compiling and Run a C Program, Syntax and Semantic Errors, Linker Errors, Logical and Runtime Errors, Execution Process

#### **Variables and Constants:**

Character Set, Identifiers and Keywords, Rules for Forming Identifiers , Data Types and Storage Classes in C, Variables , Declaring Variables, Initializing Variables, Constants, Types of constants

### **Expressions and Operators:**

Assignment Statements, Unary and Binary Operators , Arithmetic Operators, Relational Operators , Logical Operators, Comma and Conditional Operators, Type Cast Operator, Size of Operator, Precedence of Operators

Control Statements, Decision Control Statements:: The if Statement , The switch Statement, Loop Control Statements:: The while Loop , The do-while Loop ,The for Loop, The Nested Loop, The Goto Statement, The Break Statement, The Continue Statement

### **Arrays:**

Definition , Syntax of Array Declaration and Initialization, Subscript, Processing the Arrays , Multi-Dimensional Arrays, Declaration and Initialization of Two-Dimensional Array, Processing of Two Dimensional Arrays, Representation of Matrix using Two Dimensional Array

### **Strings:**

Character Arrays, Declaration and Initialization of Strings, Array of Strings,Library String Functions: strlen , strcpy , strncpy , strcmp , strncmp , strcmpi , strncmp , strcat , strncat , strlen ,strupr , strrev , strdup , strchr , strset , strnset , strstr

### **Functions:**

Definition , Structure of a Function , Function Declaration , Function Definition , Formal parameter , Actual parameter ,The Return Statement , Function Prototypes , Recursive Function, Function Calling: Call by value and Call by address

### **Structures and Unions:**

Declaration and Initialization of Structures, Accessing the Members of a Structure , Structures as Function Arguments , Structures and Arrays , Unions , Initializing an Union, Accessing the Members of an Union

### **Pointers:**

What is Pointer , Address and Indirection Operators , Pointer Type Declaration and Assignment, Pointer to a Pointer , Null Pointer Assignment , Pointer Arithmetic, Passing Pointers to Functions , Arrays and Pointers , Array of Pointers , Pointers and Strings

### **The C Preprocessor and Command Line Arguments:**

Definition, Macros in C, #define, #include, #ifdef, Other Preprocessor Commands, Predefined Names Defined by Preprocessor

Command Line Arguments in C, Structure of Programs that use Command-Line Arguments, Accessing Command-Line Arguments

**Files:**

Definition, File Handling in C Using File Pointers, fopen( ), fclose( ), Input and Output using file pointers , Character Input and Output in Files, String Input / Output Functions , Formatted Input / Output Functions , Block Input / Output Functions, Sequential Files, Random Access Files , Positioning the File Pointer

**IT-03: DIGITAL LOGIC**

**Binary Systems**

Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Complements, Binary Codes, Binary Storage and Registers, Binary Logic, Integrated Circuits

**Boolean Algebra and Logic Gates**

Basic Definitions, Boolean Algebra: Theorems and Properties, Boolean Functions, Canonical and Standard Forms and Other Logic Operations. Digital Logic Gates and its different types.

**Simplification of Boolean Functions**

Map Method: Two, Three and Four variable maps. Product of Sums Simplification, NAND and NOR implementation, Don't Care Conditions, Tabulation Method.

**Combinational Logic and Sequential Logic**

Adders: Half Adder, Full Adder and Binary Parallel Adder. Decoder, Encoder, Multiplexer, Demultiplexer.

Flip-Flops and its different types, Registers, Shift Registers, Counters.

**IT-04: PRACTICAL LAB-1 (PC Software + Programming)**

MS Office Suit  
Exposure to Open Office  
Programming in C

## **SEMESTER – II**

### **IT-06: PROGRAMMING IN C++**

#### **Principles of OOP**

What is OOP, Difference between OOP and Structured Programming, Basic Concepts of Class, Object, Data abstraction and Encapsulation, Inheritance , Polymorphism, Dynamic binding, Message passing, Benefits of OOP, OOP languages, Applications

#### **Introduction to C++**

Features of C++ , Structure of a C++ Program, The iostream file, cin and cout object, Saving a C++ program, Compiling and Running a C++ Program.

Variables, Constants, Operators and Expressions and Control Statements (if, switch, for, while, do-while) in C++.

#### **Functions in C++**

Return types in main(), function prototyping, Call by reference, Call by value, Call by address.

Inline functions, Default arguments, Constant argument, Function overloading.

#### **Classes and Object:**

Specifying a class, Member of a class, Access specifier , Use of scope resolution operator(::) , Creating object, Accessing class members, Defining member functions, Friend function, Friend class, Object as function arguments, Constructor , Constructor overloading, Default argument constructor, Copy constructor, Parameterized constructor, Default constructor, Destructors.

#### **Inheritance:**

Concept of Base class and Derive class, Types of Inheritance

### **IT-07: DATABASE MANAGEMENT SYSTEM**

#### **The Basic Concepts**

The file based system, limitations of file based system, the Database Approach, Advantages of DBMS.

#### **DBMS Architecture**

Three level architecture of Database System, Mappings, Data Independence.

Components and Functions of DBMS, Database Administrator and its roles.

### **Entity, Attributes and Associations**

Definition of Entity, attribute, association among entity and attributes, Generalizations and Aggregation.

### **Data Models**

Relational Model, Hierarchical Model, Network Model

### **The Relational Model**

The Relational Model, Domains, Attributes, Tuples, Relations and Views. Primary Key, Foreign Key, Candidate Key, Alternate Key, Super Key, Relational Constraints.

The E-R Model, Weak Entity and Strong Entity.

### **Relational Algebra**

Basic operations – Union, Intersection, Difference and Product. Additional operations – Select, Project, Join and Divide.

### **Database Integrity and Normalisation**

Referential Integrity, Entity Integrity. Functional Dependencies, Concept of Normalization, First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form.

### **Structured Query Language**

What is SQL? Data Definition Languages, Data Manipulation Languages, Data Control Languages.

### **Database Recovery and Security**

What is Recovery? Kinds of failures, Failure controlling methods, Database errors, Recovery Techniques, Security & Integrity, Relationship between Security and Integrity.

## **IT-08: COMPUTER NETWORK & INTERNET**

### **Computer Network**

Uses of computer networks, Types of computer networks: LAN, MAN, WAN etc., Networks topologies, Layered architecture. Interface and services, Connection-oriented and connectionless service, The relationship of services to protocol,

The OSI reference model, The TCP/IP reference model, Different inter-connecting devices: repeaters, hubs, bridges, switches, routers and gateways.

Physical layer: Guided and wireless transmission media, Satellite communication and their relative merits and demerits

Data link Layer: Functions of data link layer, framing error control flow control

Network Layer: Functions of network layer, Virtual circuit vs. datagram subnet, Routing, Internet protocol (IP)

Transport Layer: Basic functionality of transport layer, TCP and UDP protocol

Application Layer: Domain Name Service (DNS), electronic mail, ftp, telnet, www, http, URL

## **Internet**

### **Overview**

History of Internet, Internet services: telnet, e-mail – Definition, use, Equipments required for an Internet Connection, Opening an e-mail account, Reading and Writing e-mail.

Web browser, Components of a Web Browser, Web page, home page, web site, URL, introduction to e-commerce, Surfing the Internet., Search Engine, uploading and downloading.

### **Introduction to HTML**

Hypertext Markup Language (HTML), Writing a web page in HTML, Tags, hyperlinks, URLs, tables, text formatting in web pages, Using graphics and multimedia in web pages; image maps., Use of frames and forms.

### **Introduction to JavaScript:**

Constants, variables, operators, expressions, statements. Use of user-defined and built-in functions, Client-side Form validation using JavaScript, Using properties and methods of built-in objects.

## **IT-09: PRACTICAL LAB-2 (Programming + DBMS + Internet)**

## **IT-10: MANAGEMENT & ACCOUNTING**

Accounting: Principles, concepts and conventions, double entry system of accounting, introduction to basis books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading, Profit and Loss accounts and Balance sheet of sole proprietary concern (without adjustment)

Financial Management: Meaning, scope and role, a brief study of functional areas of financial management. Introduction to various FM tools: Ration Analysis, Fund Flow statement and cash flow statement (without adjustments)

Costing: nature, importance and basic principles. Marginal costing: Nature scope and importance, Break even analysis, its uses and limitations, construction of break even chart, Standard costing: Nature, scope and variances (only introduction)

Computerized accounting: Meaning and advantages, Computer Programs for accounting, Balancing accounts, Trial balance and final accounts in computerized, Accounting, control, and Audit, Sub- Modules of computerized accounting systems.

### **SEMESTER – III**

#### **IT-11: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE**

Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations

Algebra of logic, Propositions, Connectives, Tautologies and contradiction, Equivalence and implication, Principle of Mathematical induction, quantifiers.

Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse and rank of a square matrix, solving simultaneous equations using Gauss elimination, Gauss Jordan Methods, Matrix Inversion method.

A general introduction, simple and multiprgraphs, directed and undirected graphs, Eulerian and Hamiltonian Graphs, Shortest path algorithms, Chromatic number, Bipartite graph, graph coloring.

#### **IT-14: OPERATING SYSTEM**

##### **Introduction to Operating System**

What is an operating system, history of operating systems. Operating system concepts – processes, files and shells.

Operating system classification – Single user, multi user, simple batch processing, multiprogramming, multitasking, parallel systems, distributed system, real time system.

##### **Process Management**

Process - Process Model, Process Hierarchies, Process States, Threads - What is thread and its use, design issues of thread.

Process Scheduling:- Basic Concepts. Preemptive and non-preemptive scheduling. Types of scheduling:- batch, interactive and real-time. Scheduling Algorithms:- First Come First Server, Shortest Job First & Round Robin Scheduling.

What is Interprocess Communication, Race conditions, Critical-Sections, Mutual exclusion. Solution to race condition: - Disabling Interrupt, Peterson's solution, Sleep & Wake Up(The Producer Consumer Problem) and Semaphores.

### **Input/Output Management & Deadlocks**

Basic principles I/O Hardware, I/O Devices, Device controllers, DMA. Principles of I/O Software, its goals, Interrupt Handlers, Device Drivers, Device Independent I/O Software(its functions)

What is Deadlock. Principles of Deadlock (Deadlock conditions & Modelling). Deadlock Detection, Recovery & Prevention. Deadlock Avoidance(Banker's algorithm).

### **Memory Management**

Monoprogramming and Multiprogramming. Swapping and its basic concepts. Virtual Memory – Basic Concepts, Paging, Page Tables. Page replacement algorithms: - Optimal, Not Recently Used, First In First Out, Least Recently Used.

### **File System**

What is file, file naming, file types(directory, regular, device), sequential access and random access files, file attributes, operations on file, hierarchical directory structure, path name(relative and absolute), operation on directories. File System Implementation Techniques.

### **System Calls**

What is System Calls. System Calls:- Process Management(fork, getpid, getppid, wait, waitpid, exit, execve), Signaling(kill, sigaction, sigreturn, pause), File & Files System Management(creat, open, close, read, write, lseek, stat, fstat, dup, rename).

## **SEMESTER – IV**

### **IT-16: OBJECT ORIENTED PROGRAMMING USING JAVA**

#### **Object Oriented Methodology**

Paradigms of Programming Languages, Evolution of OO Methodology, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure Oriented Approaches, Benefits of OOPs, Introduction to Common OO Language, Applications of OOPs

Classes and Objects, Abstraction and Encapsulation, Inheritance, Method Overriding and Polymorphism.

#### **Java Language Basics**

Basic Features, Java Virtual Machine Concepts, Primitive Data Type And Variables, Java Keywords, Java Operators.

Expressions, Statements, Control Statements, Selection Statements, Iterative Statements, Jump Statements, Arrays.

#### **Class and Objects**

Class Fundamentals, Creating objects, Assigning object reference variables, Introducing Methods, Static methods, Constructors, Overloading constructors, This Keyword, Using Objects as Parameters, Argument passing, Returning objects, Method Overloading, Garbage Collection, The Finalize ( ) Method

#### **Inheritance and Polymorphism**

Inheritance Basics, Access Control, Multilevel Inheritance, Method Overriding, Abstract Classes, Polymorphism, Final Keyword

#### **Packages and Interfaces**

Package, Defining Package, CLASSPATH, Package naming, Accessibility of Packages, Using Package Members, Interfaces, Implementing Interfaces, Interface and Abstract Classes, Extends and Implements Together

#### **I/O in Java**

I/O Basics, Streams and Stream Classes, Byte Stream Class, Character Stream Classes, Predefined Streams, Reading from, and Writing to, Console, Reading and Writing Files, The Transient and Volatile Modifiers, Using Instance of Native Methods

#### **Strings and Characters**

Fundamentals of Characters and Strings, The String Class, String Operations, Data Conversion using Value Of ( ) Methods, String Buffer Class and Methods

#### **Exploring Java I/O**

Java I/O Classes and Interfaces, I/O Stream Class, Input and Output Stream, Input Stream and Output Stream, Hierarchy, Text Streams, Stream Tokenizer, Serialization, Buffered Stream, Print Stream, Random Access File

## **IT-18: ADVANCED DATABASE MANAGEMENT SYSTEM**

### **Relational model, relational algebra, and relational calculus (review):**

Relational model concepts, relational databases and schemas; Relational algebra operations, queries in relational algebra; Tuple relational calculus, domain relational calculus, overview of QBE; Commercial query language SQL- data definition, constraints, SQL queries, insertion, deletion, updation.

### **Semantic modeling (review):**

Introduction, The E-R model, E-R diagrams, design of database with E-R model.

### **Normalization and functional dependencies (review):**

design guidelines, functional dependencies, normal forms- 1NF, 2NF, 3NF, BCNF.

### **System implementation techniques:**

Query processing and optimization- translation between SQL queries and relational algebra, introduction to basic algorithms for executing query operations; Transaction processing- transaction and system concepts, desirable properties, schedules and recoverability; Concurrency control- locking techniques, concurrency control based on timestamp ordering, multiversion concurrency control techniques; Database recovery- concepts and techniques, recovery in multidatabase systems; Security and authentication- issues, access control techniques, introduction to multilevel security.

### **Object oriented database systems:**

Concepts of object-oriented databases; Standards, languages and design; Object relational database systems.

### **Distributed databases:**

Concepts; Data fragmentation, replication, and allocation techniques; Types of distributed database systems; Query processing in distributed databases; Overview of concurrency control and recovery in distributed databases.

### **Image, multimedia, and spatial databases:**

Concepts of Image, multimedia, and spatial databases; Content-based indexing and retrieval, Indexing techniques- R trees, R+ trees, KD trees.

## **IT-20: COMPILERS**

The Structure Of A Compiler, Phase Of A Compiler, Compiler Tools, Finite Automata, Regular Expressions, Conversion From Regular Expression To Finite Automata.

Syntax Analysis, Context Free Grammars, Top Down & Bottom Up Parsing Techniques. Construction of LR, SLR&LALR Parsers.

Syntax Directed Translation & Their Implementation. Intermediate Code, Postfix Translation, Phase Trees, Syntax Trees.

Run Time Environment: Storage Organization, Storage Allocation Strategies, Parameter Passing, Symbol Tables, Code Generation, Problem In Code Generation, A Simple Code Generation & Code Optimization: Principle Sources, Loop Optimization, DAG Representation

## **IT-15: WEB TECHNOLOGY AND E-COMMERCE**

### **Review of HTML & JavaScript:**

Various HTML Tags, properties & use; Cascading Style Sheet (CSS). Creating interactive and dynamic web pages with JavaScript.

### **Markup language basics:**

Standard Generalized Markup Language (SGML)- structures, elements, Content models, DTD, attributes, entities. Extensible Markup Language (XML)- Introduction: using user-defined tags in web pages; displaying XML contents using HTML and JavaScript; XML Document Type Definitions;

Extensible Stylesheet Language (XSL) and its use to display XML contents; XSL and basic database queries; brief introduction to other markup languages: VML, MathML, VRML, RELML, HRMML, VoxML, etc.

### **Web Browsers:**

functions and working principle of web browsers; plug-ins & helper applications; conceptual architecture of typical web browsers (like Mozilla).

### **Introduction to Client/Server Computing:**

client-server computing basics; types of Client/Server systems; middleware; N-tired systems: 2-tier/3-tier/4-tier systems; Fat Clients versus Fat Servers.

### **Web Servers:**

Web services and web server functionality; web server composition; registration; HTTP, IP address, DNS & ports; conceptual architecture of a typical web server (like Apache).

### **Server-side scripting:**

overview of CGI, ASP, and JSP. Server side scripting using PHP- constants, variables, operators, expressions & statements; user-defined & built-in functions; form processing scripts; using properties and methods of built-in objects. Web database connectivity- introduction to ODBC; PHP with database connectivity.

### **Advanced web technologies:**

brief introduction to COM, DCOM, CORBA, ISAPI, SOAP, UDDI, WSDL, .NET, etc. Introduction to AJAX and its implementations.

### **Web Security:**

Firewalls- definition and uses, network layer firewalls and application layer firewalls; Proxy servers.

## **E – Commerce**

### **Electronic commerce fundamentals:**

History and basic idea of EDI and electronic messaging, definition of e-commerce; administration, business, and consumer models of e-commerce; e-commerce enablers- cost reduction, trust issues, products, processes, and markets.

**E-commerce Internet applications:** overview of e-commerce standardization activities and standards

**Electronic payment systems:** digital cash- Ecash, ECheque, Credit card based payment systems, Micropayments and Macropayments.

**Social impacts of e-commerce:** changes in administration & business; electronic shopping; electronic forms; global e-commerce and future trends.

## **SEMESTER – V**

### **IT-22: COMPUTER GRAPHICS & MULTIMEDIA**

Graphics Hardware: The Functional Characteristics Of The Systems Are Emphasized. Input Device: Keyboard Touch Panel, Light Pens, Graphic Tablets, Joysticks, Trackball, Data Glove, Digitizer, Image Scanner, Mouse, Voice Systems.

Hard Copy Devices: Impact And Non Impact Printers, Such As Line Printers, Dot Matrix Printers, Laser, Ink- Jet, Electrostatic, Flatbed And Drum Plotters. Video Display Devices: Refresh Cathode-Ray Tube, Raster Scan Display, Random Scan Displays, Color CRT-Monitors, Direct View Storage Tube, Flat Panel Displays, 3-D Viewing Devices, Raster Scan Systems, Random Scan Systems, Graphic Monitors And Workstation.

Scan Conversion Algorithm Line, Circle And Ellipse, Bresenham's Algorithm, Area Filling Techniques, Character Generation. 2-Dimensional Graphics: Cartesian And Homogenous Co-

Ordinate Systems, Geometrical Transformation (Translation, Scaling, Rotation, Reflection, Shearing), Two Dimensional Viewing Transformation And Clipping (Line, Polygon And Text)

3-Dimensional Graphics: Geometrical Transformation (Translation, Scaling, Rotation, Reflection, Shearing), Mathematics And Projections (Parallel And Perspective). 3-D Viewing transformation And Clipping.

Hidden Line Surface Removal Algorithms, Z-Buffer, Scan Line, Sub Division Shading: Modeling Light Intensities: Diffuse Reflection, Refracted Light, Half toning. Surface Shading Methods: Constant Intensity Method, Gouraud Shading, Phong Shading.

Introduction to Multi-media Technology, Audio System, Image Compression, Data Compression, Digital Motion Video, Authoring tools, Multimedia Applications, Multimedia DBMS

### **IT-23: APPLICATION SOFTWARE DEVELOPMENT**

#### **Introduction to .NET**

.NET: Introduction, Advantages, DNA Architecture, Study of .NET Framework, Languages under .NET.

#### **Introduction to VB.NET**

Basic Programming Rules, Creating a Project, Exploring & Coding a Project, Building a Project, Debugging.

Variables, Constants, Operators and Expressions and Control Statements, Arrays, Structures, Enumerators, Functions.

Class, Object, Inheritance, Events, String Handling, Exception Handling, File Handling, Multi-Threading, Memory Management Issues.

#### **GUI Programming with VB.NET**

Introduction to GUI Application and Their Components. Elements of GUI Programming: Controls, Properties, Methods, Events.

Form Control: Interacting with Controls, Dialog Controls, Creating and Using MDI Applications, Creating Custom Controls.

#### **Database Programming**

Connecting to Databases, Retrieving Data, Inserting Data, Updating Data etc.

### **IT-25: SEMINAR**

## **SEMESTER – VI**

**IT-26:MAJOR PROJECT**