

**BACHELOR OF COMPUTER APPLICATIONS  
SCHEME OF EXAMINATION – THIRD YEAR**

<b>Paper No.</b>	<b>Title of Paper</b>	<b>External Marks</b>	<b>Internal Assessment</b>	<b>Maximum Marks</b>	<b>Pass Marks</b>	<b>Exam Duration</b>
<b>Semester - V</b>						
BCA-351	Introduction to Object oriented Programming	90	10	100	35	3hrs
BCA-352	Operating Systems	90	10	100	35	3hrs
BCA-353	Software Engineering	90	10	100	35	3hrs
BCA-354	Computer Networks	90	10	100	35	3hrs
BCA-355	Computer Graphics	90	10	100	35	3hrs
BCA-356	Web Designing – II	90	10	100	35	3hrs
BCA-357	Lab – I Programming in ‘C++’			100	35	3hrs
BCA-358	Lab – II Web designing			100	35	3hrs
<b>Semester - VI</b>						
BCA-361	Programming in ‘C++’	90	10	100	35	3hrs
BCA-362	Introduction to Linux	90	10	100	35	3hrs
BCA-363	Internet Technology	90	10	100	35	3hrs
BCA-364	Visual Basic	90	10	100	35	3hrs
BCA-365	Multimedia Technology	90	10	100	35	3hrs
BCA-366	Introduction to .NET	90	10	100	35	3hrs
BCA-367	Lab – I Linux and C++			100	35	3hrs
BCA-368	Lab – II Programming in VB			100	35	3hrs

## **BCA – 351 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING**

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### **UNIT – I**

Object oriented Programming: Object-Oriented programming features and benefits. Object-Oriented features of C++, Class and Objects, Data Hiding & Encapsulation, Structures, Data members and Member functions, Static Data Members and Member Functions, Nested and Local Class, Accessing Members of Class and Structure, Preprocessor Directives, Namespace.

### **UNIT – II**

Initialization & Cleanup: Constructors – Default, Parameterized & Copy Constructors, and Default Values to Parameters, Destructors.  
Console I/O: Hierarchy of Console Stream Classes, Unformatted And Formatted I/O Operations, Manipulators.

### **UNIT – III**

Friend Function, Friend Class, Arrays, array of Objects, Passing and Returning Objects to Functions, String Handling in C++.  
Dynamic Memory Management: Pointers, new and delete Operator, Array of Pointers to Objects, this Pointer, Passing Parameters to Functions by Reference & pointers.

### **UNIT – IV**

Static Polymorphism: Operators in C++, Precedence and Associativity Rules, Operator Overloading, Unary & Binary Operators Overloading, Function Overloading, Inline and External Linkage Functions, Merits/Demerits of Static Polymorphism.

#### **TEXT BOOKS:**

1. Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++

#### **REFERENCE BOOKS:**

1. Bjarne Stroustrup, The C++ Programming Language, Pearson
2. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill

## BCA – 352 OPERATING SYSTEMS

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Introductory Concepts: Operating system functions and characteristics, historical evolution of operating systems, Real time systems, Distributed systems, Methodologies for implementation of O/S service system calls, system programs.

### UNIT – II

Process management: Process concepts, Process states and Process Control Block.  
CPU Scheduling: Scheduling criteria, Levels of Scheduling, Scheduling algorithms, Multiple processor scheduling.  
Deadlocks: Deadlock characterization, Deadlock prevention and avoidance, Deadlock detection and recovery, practical considerations.

### UNIT – III

Concurrent Processes: Critical section problem, Semaphores, Classical process co-ordination problems and their solutions, Inter-process Communications.  
Storage Management: memory management of single-user and multiuser operating system, partitioning, swapping, paging and segmentation, virtual memory, Page replacement Algorithms, Thrashing.

### UNIT – IV

Device and file management: Disk scheduling, Disk structure, Disk management, File Systems: Functions of the system, File access and allocation methods, Directory Systems: Structured Organizations, directory and file protection mechanisms.

### TEXT BOOKS:

1. Silberschatz A., Galvin P.B., and Gagne G., “Operating System Concepts”, John Wiley & Sons, Inc., New York.
2. Godbole, A.S., “Operating Systems”, Tata McGraw-Hill Publishing Company, New Delhi.

### REFERENCE BOOKS:

1. Deitel, H.M., “Operating Systems”, Addison- Wesley Publishing Company, New York.
2. Tanenbaum, A.S., “Operating System- Design and Implementation”, Prentice Hall of India, New Delhi.

## BCA – 353 SOFTWARE ENGINEERING

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Software Crisis – problem and causes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models.

Software Project Planning: Cost estimation: COCOMO model, Putnam Resource Allocation Model, Risk management, project scheduling, personnel planning, team structure, Software configuration management, quality assurance, project monitoring.

### UNIT – II

Software Requirement Analysis and Specifications: Structured Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship diagrams, Software Requirement and Specifications, Behavioral and non-behavioral requirements.

Software Design: Design fundamentals, problem partitioning and abstraction, design methodology, Cohesion & Coupling, Classification of Cohesiveness & Coupling.

### UNIT – III

Coding: Programming style, structured programming.

Software Testing: Testing fundamentals, Functional testing: Boundary Value Analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Control flow based and data flow based testing, loop testing;

### UNIT – IV

Software testing strategies: unit testing, integration testing, Validation testing, System testing, Alpha and Beta testing.

Software Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.

### TEXT BOOKS:

1. Pressman R. S., “Software Engineering – A Practitioner’s Approach”, Tata McGraw Hill.
2. Jalote P., “An Integrated approach to Software Engineering”, Narosa.

### REFERENCE BOOKS:

1. Sommerville, “Software Engineering”, Addison Wesley.
2. Fairley R., “Software Engineering Concepts”, Tata McGraw Hill.
3. James Peter, W Pedrycz, “Software Engineering”, John Wiley & Sons.

## BCA – 354 COMPUTER NETWORKS

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Introduction to Computer Communications and Networking Technologies; Uses of Computer Networks; Network Devices, Nodes, and Hosts; Types of Computer Networks and their Topologies; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; Network Applications and Application Protocols; Computer Communications and Networking Models: Decentralized and Centralized Systems, Distributed Systems, Client/Server Model, Peer-to-Peer Model, Web-Based Model, Network Architecture and the OSI Reference Model; Example Networks: The Internet, X.25, Frame Relay, ATM;

### UNIT – II

Analog and Digital Communications Concepts: Representing Data as Analog Signals, Representing Data as Digital Signals, Data Rate and Bandwidth, Capacity, Baud Rate; Digital Carrier Systems; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Dialup Networking; Analog Modem Concepts; DSL Service;

### UNIT - III

Data Link Layer: Framing, Flow Control, Error Control; Error Detection and Correction; Sliding Window Protocols; Media Access Control: Random Access Protocols, Token Passing Protocols; Token Ring; Introduction to LAN technologies: Ethernet, switched Ethernet, VLAN, fast Ethernet, gigabit Ethernet, token ring, FDDI, Wireless LANs; Bluetooth;

Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways;

### UNIT – IV

Network Layer and Routing Concepts: Virtual Circuits and Datagrams; Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control Algorithms; Internetworking;  
Network Security Issues: Security threats; Encryption Methods; Authentication; Symmetric – Key Algorithms; Public-Key Algorithms;

### TEXT BOOKS:

1. Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, CENGAGE Learning.
2. Andrew S. Tanenbaum, “Computer Networks”, Pearson Education.

**REFERENCE BOOKS:**

1. James F. Kurose, Keith W. Ross, "Computer Networking", Pearson Education.
2. Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.

## BCA – 355 COMPUTER GRAPHICS

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Overview of Computer Graphics: Historical background of Computer Graphics; Applications of Computer Graphics; Popular Graphics Softwares; Display devices: Pixel, Resolution, Aspect Ratio; Raster-Scan Systems and Display : CRT, Refresh Rate and Interlacing; Bit Planes, Color Depth and Color Palette, Frame Buffer, Video Controller, Raster-Scan Display Processor, Lookup Table, RGB Color Model, Color CRT monitors; Random-Scan Displays; Flat Panel Display : LCD, Plasma Panel; Graphics Monitors and Workstations; Popular Graphics Input Devices; Hard-Copy Devices;

### UNIT – II

Coordinate Representations; Graphics Primitives: Line Drawing Algorithms- DDA Algorithm, Bresenham's Algorithm; Different Line Styles; Circle-Generating Algorithms- Properties of Circles, Circle Drawing using Polar Coordinates, Bresenham's Circle Drawing Algorithm; Ellipse-Generating Algorithms; Anti-aliasing;

### UNIT – III

Geometric Transformations: Scaling, Translation, Rotation; Matrix Representations and Homogeneous Coordinates; Rotation Relative to an Arbitrary Point; Reflection; Shearing; Coordinate Transformation; Inverse Transformation; Affine Transformation; Raster Transformation; Composite Transformations; Fixed-point Scaling; Input Techniques: Pointing, Positioning, Rubber-band method, Dragging;

### UNIT – IV

Two-Dimensional Viewing: Window-to-Viewport Coordinate Transformation; Zooming; Panning; Clipping: Point Clipping, Line Clipping- Cohen-Sutherland line clipping, Mid-point Subdivision Line Clipping; Polygon Clipping – Sutherland-Hodgeman Polygon Clipping; Text Clipping; Graphics in Three Dimensions: Displays in Three Dimensions, 3-D Transformations; 3-D Viewing : Viewing Parameters, Projections, Parallel and Perspective projection; Hidden Surfaces: Z-Buffer Method, Painter's Algorithm;

#### TEXT BOOKS:

1. "Computer Graphics", Donald Hearn, M. Pauline Baker, PHI.
2. "Computer Graphics", Apurva A. Desai, PHI, 2010

#### REFERENCE BOOKS:

1. "Principles of Interactive Computer Graphics", Newmann & Sproull, McGraw Hill.

2. "Computer Graphics Principles & Practice", Foley etc. Addison Wesley.
3. "Procedural Elements of Computer Graphics", Rogers, McGraw Hill.
4. "Introduction to Computer Graphics and Multimedia", Anirban Mukhopadhyay, Arup Chattopadhyay, Vikas.
5. "Computer Graphics", Zhigang Xiang, Roy Plastock, Tata McGraw Hill.
6. "Fundamentals of Computer Graphics and Multimedia", D.P. Mukherjee, PHI.



## BCA-356 Web DESIGNING – II

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Brief Introduction to Interactivity tools: CGI; Features of Java; Java Script; Features of ASP; VBScript; Macromedia Flash; Macromedia Dreamweaver; PHP;

### UNIT – II

Introduction and Features of Adobe Photoshop; Microsoft FrontPage Introduction; Features; Title Bar; Menu bar; FrontPage Tool Bar; Style, FontFace andFormatting Bar; Scroll Bars;

### UNIT – III

Introduction to DHTML and its features; Events; Cascading Style Sheets: Creating Style Sheets; Common Tasks with CSS: Text, Fonts, Margins, Links, Tables, Colors; Marquee; Mouseovers; Filters and Transitions; Adding Links; Adding Tables; Adding Forms; Adding Image and Sound;

### UNIT – IV

Extensible Mark-up Language(XML): Introduction; Features; XML Support and Usage; Structure of XML Documents; Structures in XML;Creating Document Type Declarations; Flow Objects; Working with Text andFont; Color and Background properties;

### TEXT BOOKS:

1. Internet and Web Technologies, Raj Kamal, Tata McGraw-Hill.
2. Multimedia and Web Technology, Ramesh Bangia, Firewall Media.
3. Internet and Web Design, ITLESL Research and Development Wing, Macmillan India .

### REFERENCE BOOKS:

1. Web Design: The Complete Reference , 4/e, Thomas A. Powell, Tata McGraw-Hill
2. Internet and World Wide Web, How to Program, Deitel and Goldberg, PHI.

## BCA – 361 PROGRAMMING IN ‘C++’

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Inheritance: Rules of Derivations – Private, Protected and Public Derivations, Different Forms of Inheritance – Single, Multiple, Multilevel, Hierarchical and Multipath Inheritance, Roles of Constructors and Destructors in Inheritance.

### UNIT – II

Dynamic Polymorphism: Function Overriding, Virtual Function and its Need, Pure Virtual Function, Abstract Class, Virtual Derivation, Virtual Destructor.

Type Conversion: Basic Type Conversion, Conversion Between Objects And Basic Types, Conversion Between Objects Of Different Classes.

### UNIT – III

Genericity in C++: Template Function, Template Class, Inheritance and Templates.

Exception Handling: try, throw and catch constructs, rethrowing an exception, catch all Handlers.

### UNIT – IV

Files I/O in C++: Class Hierarchy for Files I/O, Text versus Binary Files, Opening and Closing Files, File Pointers, Manipulators and Error Handling.

### TEXT BOOKS:

1. Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++

### REFERENCE BOOKS:

1. Bjarne Stroustrup, The C++ Programming Language, Pearson.
2. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill

## BCA – 362 INTRODUCTION TO LINUX

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Introduction to Linux: Linux distributions, Overview of Linux operating system, Linux architecture, Features of Linux, Accessing Linux system, Starting and shutting down system, Logging in and Logging out. Comparison of Linux with other operating systems.

### UNIT – II

Commands in Linux: General-Purpose commands, File oriented commands, directory oriented commands, Communication-oriented commands, process oriented commands, etc. Regular expressions & Filters in Linux: Simple filters viz. more, wc, diff, sort, uniq, grep. Introducing regular expressions.

### UNIT – III

Linux file system: Linux files, inodes and structure and file system, file system components, standard file system, file system types.  
Processes in Linux: starting and stopping processes, initialization Processes, mechanism of process creation, Job control in linux using at, batch, cron & time.

### UNIT – IV

Shell Programming: VI editor, shell variables, I/O in shell, control structures, loops, subprograms, creating & executing shell scripts in linux.

### TEXT BOOKS:

1. Yashwant Kanetkar, UNIX & Shell programming – BPB.
2. M.G.Venkateshmurthy, Introduction to UNIX & Shell Programming, Pearson Education.
3. Richard Petersen, The Complete Reference – Linux, McGraw-Hill.

### REFERENCE BOOKS:

1. Stephen Prata, Advanced UNIX – A programmer's Guide, SAMS.
2. Sumitabha Das, Your UNIX - The Ultimate Guide, Tata McGraw-Hill.

## BCA – 363 INTERNET TECHNOLOGY

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Internet and TCP/IP: Introduction to the Internet; Internet History, Internet Administration; Internet and Intranet; Internet Services; TCP/IP model and its protocols; IP addresses: IPv4; Subnetting IPv4 addresses; Supernetting; Next generation Internet Protocol (IPv6); The need for IPv6; Packet Format; IPv6 Addresses; Extension Headers;

### UNIT – II

TCP/IPs Transport and Network Layer Protocols: Role of TCP, UDP, IP, and Port numbers; Format of TCP, UDP and IP; TCP services; TCP connection management; Remote Procedure Call; SCTP; IP address resolution- DNS; Domain Name Space; DNS mapping; Recursive and Iterative resolution; Resource records; Mapping Internet Addresses to Physical Addresses; ARP, RARP, BOOTP, DHCP; ICMP; IGMP;

### UNIT – III

TCP/IP Application Level Protocols: Electronic Mail : Architecture; SMTP, MIME, POP, IMAP; Web Based Mail; File Access and Transfer: FTP, Anonymous FTP, TFTP, NFS; Remote Login using TELNET; Voice and Video over IP: RTP, RTCP, IP Telephony and Signaling, Resource Reservation and Quality of Service, RSVP;

### UNIT – IV

Routing in Internet: RIP, OSPF, BGP; Internet Multicasting; Mobile IP; Private Network Interconnection: Network Address Translation (NAT), Virtual Private Network (VPN); Internet Management: SNMP; Internet Security: IPSec, E-Mail Security; Web Security; Firewalls; Digital Signatures; Certificates;

### TEXT BOOKS

1. Douglas E. Comer, "Internetworking with TCP/IP Volume – I, Principles, Protocols, and Architectures", Fourth Edition, Pearson Education.
2. Andrew S. Tanenbaum, "Computer Networks", Pearson Education.

### REFERENCE BOOKS:

1. Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.
2. Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", CENGAGE Learning.
3. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Pearson Education.

4. "Introduction to Data Communications and Networking", Wayne Tomasi, Pearson Education.

## BCA – 364 VISUAL BASIC

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Introduction to VB: Visual & non-visual programming, Procedural, Object-oriented and event-driven programming languages, The VB environment: Menu bar, Toolbar, Project explorer, Toolbox, Properties window, Form designer, Form layout, Immediate window. Visual Development and Event Driven programming.

### UNIT – II

Basics of Programming: Variables: Declaring variables, Types of variables, Converting variables types, User-defined data types, Forcing variable declaration, Scope & lifetime of variables. Constants: Named & intrinsic. Operators: Arithmetic, Relational & Logical operators. I/O in VB: Various controls for I/O in VB, Message box, Input Box, Print statement.

### UNIT – III

Programming with VB: Decisions and conditions: If statement, If-then-else, Select-case. Looping statements: Do-loops, For-next, While-wend, Exit statement. Nested control structures. Arrays: Declaring and using arrays, one-dimensional and multi-dimensional arrays, Static & dynamic arrays, Arrays of array. Collections: Adding, Removing, Counting, Returning items in a collection, Processing a collection.

### UNIT – IV

Programming with VB: Procedures: General & event procedures, Subroutines, Functions, Calling procedures, Arguments- passing mechanisms, Optional arguments, Named arguments, Functions returning custom data types, Functions returning arrays. Working with forms: Adding multiple forms in VB, Hiding & showing forms, Load & unload statements, Activate & deactivate events, Form-load event, menu designing in VB. Simple programs in VB.

### TEXT BOOKS:

1. Steven Holzner, “Visual Basic 6 Programming: Black Book”, Dreamtech Press.
2. Evangelos Petroustos. “Mastering Visual Basic 6”, BPB Publications.
3. Julia Case Bradley & Anita C. Millsbaugh, “Programming in Visual Basic 6.0”, Tata McGraw-Hill Edition

### REFERENCE BOOKS:

1. Michael Halvorson, “Step by Step Microsoft Visual Basic 6.0 Professional”, PHI

2. "Visual basic 6 Complete", BPB Publications.
3. Scott Warner, "Teach Yourself Visual basic 6", Tata McGraw-Hill Edition
4. Brian Siler and Jeff Spotts, "Using Visual Basic 6", Special Edition, PHI.

## BCA – 365 MULTIMEDIA TECHNOLOGY

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

Introduction to Multimedia: Components of Multimedia; Hypermedia and Multimedia; Overview of Multimedia Software Tools; Multimedia Hardware and Software; Basic Software Tools; Making Instant Multimedia; Presentation Tools; Multimedia Authoring; Types of Authoring Tools; Card- and Page-Based Authoring Tools; Icon-Based Authoring Tools; Time-Based Authoring Tools; Object-Oriented Authoring Tools; VRML;

### UNIT – II

Graphics and Image Data Representation: Graphics/Image Data Types, Popular File Formats; Color Models in Images and Video; Types of Video Signals; Analog and Digital Video: Broadcast Video Standards: NTSC, PAL, SECAM, HDTV; Chroma Subsampling; CCIR Standards for Digital Video;

### UNIT – III

Digital Audio: Digitization of Sound; MIDI Versus Digital Audio; Quantization and Transmission of Audio: Coding of Audio; Pulse Code Modulation; Differential Coding of Audio; Lossless Predictive Coding; DPCM; DM; ADPCM;

### UNIT – IV

Multimedia Data Compression: Run-Length Coding; Variable-Length Coding; Dictionary-Based Coding; Transform Coding; Image Compression Standards – JPEG standard; Video Compression Techniques: H.261, H.263, MPEG;

### TEXT BOOKS:

1. Ze-Nian Li, Mark S. Drew, “Fundamentals of Multimedia”, Pearson Education.
2. Tay Vaughan, “Multimedia Making It Work”, Tata McGraw- Hill.

### REFERENCE BOOKS:

1. Ramesh Bangia, “Multimedia and Web Technology”, Firewall Media.
2. John F. Koegel Buford, “Multimedia Systems”, Addison Wesley, Pearson Education.
3. Ana Weston Solomon, “Introduction to Multimedia”, Tata McGraw-Hill.



## BCA – 366 INTRODUCTION TO .NET

**Maximum Marks: 100**  
**Minimum Pass Marks: 35**  
**Time: 3 hours**

**External: 90**  
**Internal: 10**

**Note:** Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

### UNIT – I

The Framework of .Net: Building blocks of .Net Platform (the CLR, CTS and CLS), Features of .Net, Deploying the .Net Runtime, Architecture of .Net platform, Introduction to namespaces & type distinction. Types & Object in .Net, the evolution of Web development.

### UNIT – II

Class Libraries in .Net, Introduction to Assemblies & Manifest in .Net, Metadata & attributes.

Introduction to C#: Characteristics of C#, Data types: Value types, reference types, default value, constants, variables, scope of variables, boxing and unboxing.

### UNIT – III

Operators and expressions: Arithmetic, relational, logical, bitwise, special operators, evolution of expressions, operator precedence & associativity.

Control constructs in C#: Decision making, loops.

Classes & methods: Class, methods, constructors, destructors, overloading of operators & functions.

### UNIT – IV

Inheritance & polymorphism: visibility control, overriding, abstract class & methods, sealed classes & methods, interfaces.

Advanced features of C#: Exception handling & error handling, automatic memory management, Input and output (Directories, Files, and streams).

### TEXT BOOKS:

1. Introduction to C# using .NET By Robert J. Oberg, PHI, 2002.
2. Programming in C# By E. Balaguruswamy, Tata McGraw Hill

### REFERENCES BOOKS:

1. The Complete Guide to C# Programming by V. P. Jain
2. C# : A Beginner's Guide, Herbert Schildt, Tata McGraw Hill
3. C# and .NET Platform by Andrew Troelsen, Apress, 1<sup>st</sup> edition, 2001