



# **JODHPUR NATIONAL UNIVERSITY**

## **JODHPUR**

**Faculty of Computer Application**

**B. C. A. (3 Years)**

**Teaching & Examination Scheme, and,  
Syllabus**

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## Teaching & Examination Scheme

BCA I Semester									
S No.	Code	Subject	Teaching Scheme			Max. Marks			
			L	T	P	Internal	External	Total	
1	BCA101	C Programming	3	1		30	70	100	
2	BCA102	Digital Electronics	3	2		30	70	100	
3	BCA103	Art of Communications	3	2		30	70	100	
4	BCA104	Computer Fundamentals	3	2		30	70	100	
5	BCA105	P C Software	3	1		30	70	100	
6	BCA106	C Programming Lab			6	30	70	100	
7	BCA107	P C Software Lab			6	30	70	100	700

BCA II Semester									
S No.	Code	Subject	Teaching Scheme			Max. Marks			
			L	T	P	Internal	External	Total	
1	BCA201	Advance C Programming	3	1		30	70	100	
2	BCA202	Information Technology Trends	3	2		30	70	100	
3	BCA203	Data Structure	3	2		30	70	100	
4	BCA 204	Web Designing	3	1		30	70	100	
5	BCA 205	Mathematics	3	2		30	70	100	
6	BCA206	Advance C Programming Lab			6	30	70	100	
7	BCA207	Web Designing Lab			6	30	70	100	700

BCA III Semester									
S No.	Code	Subject	Teaching Scheme			Max. Marks			
			L	T	P	Internal	External	Total	
1	BCA301	Object Oriented Programming - C++	3	1		30	70	100	
2	BCA302	Computer Organization and Architecture	3	2		30	70	100	
3	BCA303	Database Management System	3	2		30	70	100	
4	<u>BCA304</u>	<u>E-commerce</u>	3	2		30	70	100	
5	BCA305	Computer Graphics	3	1		30	70	100	
6	BCA306	Object Oriented Programming - C++ Lab			6	30	70	100	
7	BCA307	Computer Graphics Lab			6	30	70	100	700

BCA IV Semester									
S No.	Code	Subject	Teaching Scheme			Max. Marks			
			L	T	P	Internal	External	Total	
1	BCA401	Java Core Programming	3	1		30	70	100	
2	BCA402	Relational Database Management System	3	1		30	70	100	
3	BCA403	System Analysis and Design	3	2		30	70	100	
4	<u>BCA404</u>	<u>Internet and Cyber Law</u>	3	2		30	70	100	
5	BCA405	Data Communication & Networking	3	2		30	70	100	
6	BCA406	Java Programming lab			6	30	70	100	
7	BCA407	RDBMS Lab			6	30	70	100	700

BCA V Semester									
S No.	Code	Subject	Teaching Scheme			Max. Marks			
			L	T	P	Internal	External	Total	
1	BCA501	Programming with VB.Net	3	1		30	70	100	
2	BCA502	Accounting and Economics	3	2		30	70	100	
3	BCA503	Statistical Methods	3	2		30	70	100	
4	BCA504	Operating System	3	2		30	70	100	
5	BCA505	Multimedia Applications	3	1		30	70	100	
6	BCA506	Programming with VB.Net Lab			6	30	70	100	
7	BCA507	Multimedia Applications Lab			6	30	70	100	700

BCA VI Semester							
S No.	Code	Subject			Max. Marks		
					Internal	External	Total
1	BCA610	Seminar			50	100	150
2	BCA611	Project/Training			100	250	350
							500

**Total Marks: 700+700+700+700+700+500= 4000**

BCA I Semester									
S No.	Code	Subject	Teaching Scheme			Max. Marks			
			L	T	P	Internal	External	Total	
1	BCA101	C Programming	3	1		30	70	100	
2	BCA102	Digital Electronics	3	2		30	70	100	
3	BCA103	Art of Communications	3	2		30	70	100	
4	BCA104	Computer Fundamentals	3	2		30	70	100	
5	BCA105	P C Software	3	1		30	70	100	
6	BCA106	C Programming Lab			6	30	70	100	
7	BCA107	P C Software Lab			6	30	70	100	700

### BCA101

### C Programming

#### UNIT I

About C, Evolution of C, Programming languages, Structure of a C program, Compiling a C program, Character set in C, Keywords in C, Hierarchy of operators, Basic data types, Qualifiers used with basic data types, Variables in C, Type declaration, Output function, Input function and format specifiers, arithmetic operators, Unary operators, Relational and logical operators.

#### UNIT II

Control statements, if statement, if else statement, for statement, while loop, do while statements, break statements, continue statements, switch statement, goto statement, ternary operators.

#### UNIT III

Arrays, advantages of arrays, types of arrays, array declaration, array initialization, accessing data from array, array inside the memory, multidimensional arrays.

#### UNIT IV

Character arrays, Array overflow, String Variables, Reading & writing strings, string handling functions.

#### UNIT V

Functions, advantages of functions, declaring a function, calling a function, variables, passing arguments to a function, nested functions, passing array to functions, recursion in functions, Call by value and Call by reference.

**UNIT I**

Data types and Number systems, Binary number system, Octal & Hexa-decimal number system, 1's & 2's complement, Binary Fixed- Point Representation, Arithmetic operation on Binary numbers, Overflow & underflow, Floating Point Representation, Codes, ASCII, EBCDIC codes, Gray code, Excess-3 & BCD, Error detection & correcting codes

**UNIT II**

Logic Gates, AND, OR, NOT GATES and their Truth tables, NOR, NAND & XOR gates, Boolean Algebra, Basic Boolean Law's, De Morgan's theorem, MAP Simplification, Minimization techniques, K -Map, Sum of Product & Product of Sum

**UNIT III**

Combinational & Sequential circuits, Half Adder & Full Adder, Full Subtractor, Flip-flops - RS, D, JK & T Flip-flops, Shift Registers, RAM and ROM, Multiplexer, Demultiplexer, Encoder, Decoder, Idea about Arithmetic Circuits, Program Control, Instruction Sequencing

**UNIT IV**

I/O Interface, Properties of simple I/O devices and their controller, Isolated versus memory-mapped I/O, Modes of Data transfer, Synchronous & Asynchronous Data transfer, Handshaking, Asynchronous serial transfer, I/O Processor

**UNIT V**

Auxiliary memory, Magnetic Drum, Disk & Tape, Semi-conductor memories, Memory Hierarchy, Associative Memory, Virtual Memory, Address space & Memory Space, Address Mapping, Page table, Page Replacement, Cache Memory, Hit Ratio, Mapping Techniques, Writing into Cache.

**UNIT I**

Words and Sentences, Parts of speech, Articles, Verbs/ Tenses, Reported Speech, The passive,

**UNIT II**

Introduction to Communication: -Meaning and Definition, Objectives, Principles of Communication, Scope, Limitations. Barriers to Communication.

**UNIT III**

Communication process: - Meaning & Concept, Elements of Communication, and Media of Communication: Written, Oral, face-face, visual, audiovisual, computer based communication

**UNIT IV**

Transactional Analysis: What makes us say what we say, the four life positions and analysis of transactions, perception and reality, the art of listening.

**UNIT V**

Composition, Paragraph writing. Business Letters: Need and functions of business letters - Planning & layout of business letter - Types of business letters and letter writing, Application for employment and resume - Notices, Agenda and Minutes of the Meetings.

**UNIT I**

Introduction to Computer:-Definition, Characteristics. Generation of Computers, Capabilities and Limitations. Introduction to Operating System. Concept of Bios, Booting Files. Basic Components of a Computer System-Control Unit, ALU, Input/output functions and characteristics. Memory Introduction, Classifications- Volatile Memory and Non- Volatile , Flash Memory, ROM, RAM, EPROM, PROM, EEPROM other types of memory.

**UNIT II**

Input, Output and storage units, Computer Keyboard, Pointing Devices: Mouse, Trackball, Touch Panel, and Joystick, Light Pen, Scanners, Various types of Monitors, Touch-sensitive screens, Optical Recognition System, Pen based systems, Digitizers, MICR, OCR, OMR, Bar-code Reader, digital camera.

Hard Copy Devices:- Impact and Non- Impact Printers- Daisy Wheel, Dot Matrix, Line Printer, Chain Printer, Comb Printers, Non Impact Printers- DeskJet, Laser Printer, Thermal Transfer Printer, Barcode Printers, Electro static printers and plotters.

**UNIT III**

High Level Language and Low Level Language, Software and its different types- System Software, Application software. Hardware , Firmware, , Compiler, Interpreter and Assembler. File Allocation Table (FAT, FAT32 & NTFS). Introduction to algorithm and Flow chart: - Representation of an algorithm, flowchart symbols and levels of flow chart, rules, advantage and limitations of flowchart and pseudo code.

**UNIT IV**

Testing and Debugging Definition of testing and debugging, types of program errors, testing of programs, debugging a program for syntax and logical errors, difference between testing and debugging.

**UNIT V**

Booting process details of Dos and Windows DOS system files, Internal and External Commands, Difference between External and Internal Commands. Internal Commands MD, CD, RD, COPY CON, TYPE, DATE & TIME, VOLUME VERSION, REN, PROMPT, CLS, DIR/P/W, COPY , DEL Etc. External commands - FORMAT, DISKCOPY, DISKCOMP, XCOPY, CHKDISK, SCANDISK, HELP, DEBUG, PRINT etc.

**UNIT I**

Introduction and history of Operating system, file and directory structures and naming rules, booting process, system files, internal and external files.

Windows XP/2000. Windows concepts, Features, Windows structure, Desktop, Taskbar, Start menu, My Computer, Recycle Bin, Windows Accessories- Calculator, Notepad, Paint, WordPad, Character Map, Windows Explorer, Entertainment, Managing Hardware & Software- installation of Hardware and Software, Using Scanner , System Tools, Communication, Sharing information between programs.

## **UNIT II**

Word processors, working with formatted text, Shortcut keys, Formatting documents: Selecting text, Copying & moving data, Formatting characters, changing cases, Paragraph formatting, Indents, Drop Caps, Using format painter, Page formatting, Header & footer, Bullets & numbering, Tabs, Forming tables. Finding & replacing text, go to (F5) command, proofing text (Spell check, Auto correct), Reversing actions, Macros, Inserting pictures, Hyperlinks, Mail merging, Printing documents.

## **UNIT III**

Spreadsheets, workbooks, creating, saving & editing a workbook, Renaming sheet, cell entries (numbers, labels, and formulas), spell check, find and replace, Adding and deleting rows and columns Filling series, fill with drag, data sort, Formatting worksheet, Functions and its parts, Some useful Functions in excel (SUM, AVERAGE, COUNT, MAX, MIN, IF), Cell referencing (Relative, Absolute, Mixed), What-if analysis Introduction to charts: types of charts, creation of chart from adjacent data/ nonadjacent data, printing a chart, printing worksheet.

## **UNIT IV**

Presentation Software, Uses, Presentation tips, components of slide, templates and wizards, using template, choosing an auto layout, using outlines, adding subheadings, editing text, formatting text, using master slide, adding slides, changing color scheme, changing background and shading, adding header and footer, adding clip arts and auto shapes. Various presentation, Working in slide sorter view (deleting, duplicating, rearranging slides), adding transition and animations to slide show, inserting music or sound on a slide, Inserting action buttons or hyperlinks for a presentation, set and rehearse slide timings, viewing slide show, Printing slides.

## **UNIT V**

Database management system, An Overview of Access, Access Tables, Data Types, Access Query, Access Reports, Creating Relationships, OLE (importing & exporting data)





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2	BCA202	Information Technology Trends	3	2		30	70	100	
3	BCA203	Data Structure	3	2		30	70	100	
4	BCA 204	Web Designing	3	1		30	70	100	
5	BCA 205	Mathematics	3	2		30	70	100	
6	BCA206	Advance C Programming Lab			6	30	70	100	
7	BCA207	Web Designing Lab			6	30	70	100	700

### BCA201

### Advance C Programming

#### UNIT I

Structure, declaration of structure, Union, difference between structure and union, Pointers, pointers operators, pointer arithmetic, Pointers and function, Array of pointers, Pointer and Strings, Pointer to structure, Pointers within structure, Introduction of Static and Dynamic memory allocation, The process of Dynamic memory allocation, DMA functions malloc() function, Sizeof() operator, Function free(), Function realloc()

#### UNIT II

Introduction File handling, :-File structure, File handling function, File types, Streams, Text, Binary, File system basics, The file pointer, Opening a file, Closing a file, Writing a character, Reading a character, Using fopen(), getc(), putc(), and fclose(), Using feof().

#### UNIT III

Working with string, fputs() and fgets(), Standard streams in C, Flushing a stream, Using fread() and fwrite(), Direct access file, fseek() and random access I/O, fprintf() and fscanf(), getting file name as Command line arguments.

#### UNIT IV

Preprocessor, # define, defining functions like macros, # error, #include, creating header files, include user defined header files. Conditional compilation directives i.e. # if, # else, # elif and #ifdef &#undef, using defined, #line, #pragma, the ## preprocessor Error handling in C: types of errors, handling errors, debugging tools.

## **UNIT V**

Graphics on your PC: Graphics and Text mode, Video Adapter, Initialize Graphics Mode and resolution, header file graphics.h. Functions used In Graphics - Drawing a Point on Screen, Drawing – lines, rectangle, circles, arcs, polygon. Functions to fill colors. Display Text in Graphics mode, outtext(), outtextxy(), justifying text.

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### **BCA202**

### **Information Technology Trends**

## **UNIT I**

Characteristics of hypermedia, the components of hypermedia, Hypermedia applications, a system less suited for hypermedia, Application area well suited for hypermedia Virtual Reality– Introduction, Brief History of virtual reality, Present uses of virtual reality.

## **UNIT II**

Introduction to E-Supply Chain Management, components, E-Supply chain architecture, some examples of using ESCM

Introduction and concept of E-Customer Relationship Management (ECRM), How technology can help in this .ECRM solutions, advantages, ECRM capabilities

## **UNIT III**

Introduction to Data Warehouse and Data Marts- advantages, components, Metadata, Summarized data, Structure of a data warehouse, use of data warehouse, Introduction to data mining.

Distributed Systems- Introduction, Distributing the processing and storage function, Advantage and Disadvantage of Distributed System.

## **UNIT IV**

Computer Viruses, Types of Viruses, Ways to catch Computer Virus, virus detections and preventions, Worms. Security in IT- Attacks, hackers, crackers, cryptology, encryption and decryption, firewall etc.

## **UNIT V**

Introduction to AI and Experts system, Decision Support System and Executive information system.

Introduction and basic concepts of modern communication and telephony technology: CDMA, WLL, GSM, VOIP, Blue-tooth, Wi-Fi, infrared.

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### **BCA203**

### **Data Structure**

## **UNIT I**

Structural programming, top-down design, abstract data type, implementation of arrays, triangular arrays, structures, character strings, Pointers dynamic memory management.

## **UNIT II**

Singly linked list, implementation linked list using arrays, implementation of linked list using dynamic memory allocation circular link list, doubly linked list, polynomial manipulation using linked list, representation of sparse matrices. Stacks - their concepts and implementation, multiple stacks. Conversion of infix to postfix notation using stack, evaluation of postfix expression, recursion, how recursion- works, queues their concepts and implementation, deque, primary queues, simulation.

### **UNIT III**

Trees, Binary tree - their representation and operations, tree traversals, threaded binary trees, conversion of general trees to binary trees, binary expression tree, and applications of trees. sequential searching, binary search, height balanced tree and weight balanced trees, multiway search trees, digital search, trees, hashing and collision - resolution techniques.

### **UNIT IV**

Sorting algorithms, bubble sort, selection sort, inserted sort, quick sort, merge sort, address calculation sort and heap sort, complexity of the algorithm.

### **UNIT V**

Graphs, terminology, representation of graphs, reachability, minimum path problem, critical events, Graph traversals, spanning trees, application of graph.

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## **BCA 204      Web Designing**

### **UNIT I**

HTML, Browsers and their types, URL's, web sites, Domain Names, static and dynamic sites and active web pages, Files Creation, Web Server, Web Client/Browser Hyper Text Markup Language, HTML Tags, Paired Tags, Commonly used HTML Commands Titles and Footers, Paragraph Breaks, Line Breaks, Heading Styles, Drawing Lines, Text Styles, Other Text Effects, Indenting Text, Lists, Types of Lists.

### **UNIT II**

Using the Border attribute, Using the Width and Height Attribute, Using the Align Attribute, Using the ALT Attribute, Tables - Header, Data rows, The Caption Tag, Attributes - Width and Border, cellpadding, BGCOLOR, COLSPAN, ROWSPAN, External Document References, Internal Document References, Images as Hyperlinks, Introduction to Frames, tag, <FRAME> tag, Targeting Named Frame.  
DHTML Introduction, use and its elements, Cascading Style Sheets, working with classes , using span tag external style sheet and use of DIV tags.

### **UNIT III**

JavaScript, Advantages, JavaScript Syntax, Data Types and Literal, Type Casting, Variables, Incorporating variables in a Script, Array, Operators and Expressions, Arithmetic Operators, Logical Operators, Comparison Operators, String Operators, Assignment Operators, Conditional Expression, Ternary and Special Operators, JavaScript Programming Constructs, If - then - else, Immediate If, For Loop, Built-in Functions, User Defined functions, Declaring functions, Place of Declaration, Passing Parameters, Variable Scope, Return Values, Recursive Functions, Placing text in a Browser, Dialog Boxes - Alert dialog box, Prompt dialog box, Confirm dialog box.

### **UNIT IV**

JavaScript Assisted Style Sheets DOM (JSSS DOM), Understanding Objects in HTML- Properties, Methods, Browser Objects - The Web Page HTML Object Hierarchy, Access to Elements of a Web Page, How a Web Page Element is Manipulated, Handling, WEB PAGE, Events Using JavaScript, Named JavaScript Event handlers.

### **UNIT V**

The Form Object, The Form Object's Methods, Text Element, Password Element, Button Element, Submit Button Element, Reset Button Element, Checkbox Element, Radio Element, Text Area Element, Select and Option Element, Multi Choice Select Lists Element, Other Built-In Objects in JavaScript - String, Math, Date Object, Creating a User Defined Object, Instances, Objects within Objects.

**UNIT I**

Set, Relations and Functions: Set, Cartesian Products of Sets, Relations, Functions, Binary Operations, Basic Trigonometric Functions and Problems.

Quadratic Equation: Solution of Quadratic Equations, Symmetric Functions of Roots

**UNIT II**

Determinants and Matrices: Properties and Applications, Definition and Types of Matrices, Elementary Transformation of a Matrix, Inverse of a Matrix, Normal Form of a Matrix, Orthogonal Matrices.

**UNIT III**

Differential Calculus: Derivative of a Function, Various Formulae-Product and Quotient Rule of Differentiation, Logarithmic Differentiation, Limits and Continuity, Successive Differentiation, Partial Differentiation, Rolle's Theorem, Mean Value Theorem, Taylor's Theorem, Maclaurin's Series.

**UNIT IV**

Cartesian System of Rectangular Coordinates: The Number Plane, Distance Formula, Area of a Triangle, Section Formulae, Slope of a Line, Locus and Equation.

**UNIT V**

Straight Line: To find Equation of a Straight Line Parallel to an Axis: The Point Slope Form, Two Point Form, Intercept Form, Normal, Condition of Concurrency for three Straight Lines, Analytic Proof of Geometric Theorems.

Circle: Standard form of a Circle, Its General Form, Condition of Tangency.



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1	BCA301	Object Oriented Programming - C++	3	1		30	70	100	
2	BCA302	Computer Organization and Architecture	3	2		30	70	100	
3	BCA303	Database Management System	3	2		30	70	100	
4	<u>BCA304</u>	<u>E-commerce</u>	3	2		30	70	100	
5	BCA305	Computer Graphics	3	1		30	70	100	
6	BCA306	Object Oriented Programming - C++ Lab			6	30	70	100	
7	BCA307	Computer Graphics Lab			6	30	70	100	700

### BCA301

### Object Oriented Programming - C++

#### UNIT I

Identifiers and Keywords, Constants, C++ Operators, Type Conversion, Declaration of Variables, Statements, Simple C++ Programs, iostream.h, Keyboard and screen I/O, Manipulator Functions, Predefined manipulators, Input and Output (I/O) Stream Flags, if statement, if - else statement, switch Statement, for loop, while loop, do-while loop, break statement, continue statement, goto statement.

#### UNIT II

Defining a Function, return Statement, Types of Functions, Actual and Formal Arguments, Local and Global Variables, Default Arguments, Multifunction Program, Storage Class Specifiers, Recursive Function, Preprocessors Header Files, Standard Functions. Array, Arrays and Functions, Multidimensional Arrays, Character Array. Pointer operator, Address operator, Pointer expressions, Pointer Arithmetic, Pointers and Functions, Pointers and Arrays, Pointer and one dimensional array, Pointer and multidimensional array, Pointers and Strings, Array of Pointers, Pointers to Pointers.

#### UNIT III

Classes, Declaration of Class, Member Functions, Defining the Object of a Class, Accessing a Member of Class, Array of Class Objects, Pointers and Classes, Unions and Classes, Nested Class, Constructors, Destructors, Inline Member Functions, Static Class Members, Friend Functions, Dynamic Memory Allocations, this Pointer. Single Inheritance, Types of Base Classes, Types of Derivation, Ambiguity in Single Inheritance, Array of Class Objects and Single Inheritance, Multiple Inheritance.

#### **UNIT IV**

Container Classes, Member Access Control, Function Overloading, Special features of function Overloading, Operator Overloading, Overloading assignment operator, Overloading of Binary Operators, Overloading arithmetic operators, Overloading of comparison Operators, Overloading of Unary Operators. Polymorphism, Early Binding, Polymorphism with Pointers, Virtual Functions, Late Binding, Pure Virtual Functions, Abstract Base Classes, Constructors under Inheritance, Destructors under Inheritance, Virtual Destructors, Virtual Base class.

#### **UNIT V**

Data file operations : Opening & closing of files, Stream State Member functions, reading/Writing a character from a file, Binary file operations, Classes & file operations, Array of class objects & file operations, Nested classes & file operations, Random Access File processing.

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### **BCA302**

### **Computer Organization and Architecture**

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#### **UNIT I**

Computer System Technology: Components to Applications, Computer Systems and their Parts, Generations, Processor and Memory Technologies, Peripherals I/O and Communications, Software Systems and Applications.

#### **UNIT II**

Instruction and addressing, instruction formats, types, addressing modes. Assembly Language Programs, Assembler Directives, Pseudo Instructions, Macroinstructions, Linking and Loading.

#### **UNIT III**

Memory System Design: Main Memory Concepts, Cache Memory Organization, Mass Memory Concepts, Virtual Memory and Paging.

#### **UNIT IV**

Input/Output and Interfacing, Input/Output Devices, Input/Output Programming, Interrupts.

#### **UNIT V**

Vector And Array Processing, Shared-Memory, Multiprocessing, Distributed Multi Computing.

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### **BCA 303**

### **Database Management System**

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#### **UNIT I**

Overview of database management system, Database system Vs File System, Database system concepts and architecture, data models schema and instance , data independence and data base language and interfaces, Data Definitions language, DDL, Overall Database structure. ER model concept, notation for ER diagram, mapping constrains, Keys, concepts of super key, candidate key, Primary Key, Generalization, aggregation, reduction of an ER diagram to tables, extended ER model, relationships of higher degree.

## **UNIT II**

Relational data model concepts, integrity constraints: entity integrity, referential integrity, keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus, basic operations.

## **UNIT III**

Functional dependencies, normal forms, first, second, third, normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

## **UNIT IV**

Transaction system, Testing of serializability, Serializability of schedules, conflict and view serializable schedule, recoverability, recovery from transaction failures, log based recovery, checkpoints, deadlock handling

## **UNIT V**

Introduction to distributed systems, types of distributed databases, Transaction processing in distributed system, data fragmentation, Replication and allocation techniques for distributed system.

### **References:**

Abraham Silberschatz, Henry F. Korth, S.Sudarshan “Database System Concepts”, McGraw-Hill Fifth Edition.

## **Unit I**

Introduction to Electronic Commerce : Introduction, Definition, Objectives, Advantages and disadvantages, impact of E-commerce, architectural framework. , Forces driving E-Commerce, Traditional commerce Vs. E-Commerce, E-Commerce opportunities for industries, Growth of E-Commerce. , Goals of E-Commerce , Technical Components of E-commerce , Functions of E-commerce , Scope of E-commerce , Electronic commerce Applications .

## **Unit II**

E-Commerce Models: Electronic commerce and Electronic Business , Business to consumer, Business to Business, Consumer to Consumer, other models – Brokerage Model, Aggregator Model, Info-mediary Model, Community Model and value chain Model.

## **Unit III**

Electronic Data Interchange : Introduction ,Concepts of EDI and Limitation ,Application of EDI , Disadvantages of EDI , EDI model .

Electronic payment System : Introduction , Types of Electronic payment system ,Payment types ,Traditional payment ,Value exchange system ,Credit card system ,Electronic funds transfer ,Paperless bill ,Modern payment cash ,Electronic cash

## **Unit IV**

Planning for Electronic Commerce : Planning electronic commerce initiatives , Linking objectives to business strategies ,Measuring cost objectives , Comparing benefits to costs , Strategies for developing electronic commerce web sites.

E Marketing, E-Customer Relationship Management (E-CRM), Customer Relationship management concepts, E-CRM solutions advantages E-CRM capabilities and examples of E-CRM, E-Supply Chain Management, Introduction, components, architecture, Major trends in E-SCM and examples of ESCM

### **Unit V**

Internet Marketing : The PROS and CONS of online shopping , The PROS and CONS of online Shopping , The cons of online shopping , Justify an Internet business , Internet marketing techniques ,

The E-cycle of Internet marketing , Personalisation e – Commerce .

E- Governance of India : Indian customer EDI system , Service centre ,Imports , Exports

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## **BCA 305      Computer Graphics**

### **UNIT I**

Raster scan displays, Storage tube displays, refreshing, flickering, interlacing, color monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball , tablets and joysticks, graphical input techniques, positioning techniques, rubber band techniques, dragging etc.

### **UNIT II**

Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Bezier Method, B-spline Method.

### **UNIT III**

2D & 3D Co-ordinate system, Translation, Rotation, Scaling, Reflection Inverse transformation, Composite transformation, world coordinate system, screen coordinate system, parallel and perspective projection, Representation of 3D object on 2D screen.

### **UNIT IV**

Point Clipping. Line Clipping Algorithms, Polygon Clipping algorithms, Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, Specular reflection, Phong shading, Gourand shading ray tracing, color models like RGB, YIQ, CMY, HSV etc.

### **UNIT V**

Multimedia components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation tools, Authoring tools, presentation.





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1	BCA401	Java Core Programming	3	1		30	70	100	
2	BCA402	Relational Database Management System	3	1		30	70	100	
3	BCA403	System Analysis and Design	3	2		30	70	100	
4	<u>BCA404</u>	<u>Internet and Cyber Law</u>	3	2		30	70	100	
5	BCA405	Data Communication & Networking	3	2		30	70	100	
6	BCA406	Java Programming lab			6	30	70	100	
7	BCA407	RDBMS Lab			6	30	70	100	700

### BCA401

### Java Core Programming

#### UNIT I

Java History, Java Features, Simple Java Program, Java Tokens - Java character set, Keywords, Identifiers, Literals, Operators, Separators, Java Statements, Creating the program, Compiling the program, Running the program, Machine neutral, Java Virtual Machine, Command Line Arguments, Programming Style.

#### UNIT II

Constants, Variables, Data Types, Declaration of Variables, Scope of Variable, Symbolic Constants, Modifiability, Understandability, Type Casting, Getting Values of Variables, Standard Default Values, Operators, Dot operator, Arithmetic Expressions, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions.

#### UNIT III

Simple if Statement, The if....else Statement, Nesting if....else Statements, else if Ladder, switch statement, ternary Operator. while, do, for Statement, Jumps in Loops, Labeled Loops. Arrays, One-Dimensional Arrays, Variable size arrays, Strings, String arrays, String methods, StringBuffer class, Vectors, Wrapper Classes.

#### UNIT IV

Defining a Class, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class, Defining a subclass, Subclass constructor, Multilevel inheritance, Hierarchical inheritance, Overriding Methods, Final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control.

## **UNIT V**

Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables. System Packages, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes. Exceptions, Exception Handling , Using finally Statement, Throwing Our Own Exceptions.

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### **BCA402**

### **Relational Database Management System**

## **UNIT I**

SQL commands, Data Definition Language Commands, Data Manipulation Language Commands, The Data types a cell can hold, insertion of data into the tables, Viewing of data into the tables, Deletion operations, updating the contents of the table, modifying the structure of the table, renaming table, destroying tables, Data Constraints, Type of Data Constraint, Column Level Constraint, Table Level Constraint, Null value Concepts, UNIQUE Constraint, The PRIMARY constraint, The FOREIGN key constraint, The CHECK Constraint, Viewing the User Constraints

## **UNIT II**

Computations on Table Data, Arithmetic Operators, Logical Operators, Comparison Operators, Range Searching, Pattern Searching, ORACLE FUNCTIONS, Number Functions, Group Functions, Scalar Functions, Data Conversion Functions, Manipulating Dates in SQL , Character Functions, Joins, Equi Joins, Non Equi Joins, Self Joins, Outer Joins, SubQueries, Correlated Queries, Using Set Operators:- Union , Intersect, Minus, Views, Creating and Altering Views, Using Views, Indexed Views, Partitioned views, Definition and Advantages of Indexes, Composite Index and Unique Indexes, Accessing Data With and without Indexes, Creating Indexes and Statistics.

## **UNIT III**

PL/SQL, The Generic PL/SQL Block, The Declaration Section, The Begin Section, The End Section, The Character set, Literals, PL/SQL Data types, Variables, Constants, Logical Comparison, Conditional Control in PL/SQL, Iterative Control, Types of Cursors, Implicit Cursor, Explicit Cursor, Explicit Cursor attributes, Cursor For Loop, Parameterized Cursor.

## **UNIT IV**

Error Handling in PL/SQL, Internal Exceptions, User Defined Exceptions. Stored Procedures and Functions:- Advantages of using a Procedure or Function, Procedure Versus Functions, Creating stored Procedures and Functions, Parameters to Procedures and Functions, Deleting a Stored Procedure or a Functions.

## **UNIT V**

Packages, Components of a Package, Package Objects, Private and Public , Package state, Package Dependency, Triggers, Use of Database Triggers, Database Triggers V/s Procedures, Types of Triggers, Row Triggers, statement Triggers, Before V/S After Triggers, Deleting a Trigger.

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### **BCA403**

### **System Analysis and Design**

## **UNIT I**

The System Concept: Definition, Characteristics of Systems, Elements of a System, Open and Closed System, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

## **UNIT II**

SDLC, Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation & Maintenance. The Role of the Systems Analyst: Historical Perspective, The War Effort, What Does it take to do System Analysis, Academic & Personal Qualifications, The Multifaceted role of the Analyst, The Analyst/User Interface, Behavioral issues.

## **UNIT III**

Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

## **UNIT IV**

Information, Information gathering tools, The art of Interviewing, Arranging the Interview, Guides to a Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives. Structured Analysis, The Dataflow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

## **UNIT V**

Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis. Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, Requirements of form Design. H/W / S/W Selection and Maintenance: The Computer Industry, S/W Industry, a Procedure for H/W / S/W Selection, Major Phases in Selection, Criteria for S/W Selection, The Used Computer, The Computer Contract.

## **BCA-404                      Internet and Cyber law**

### **Unit I**

Internet : History and evolution of internet, capabilities, benefits, problems of internet, its applications and future of internet, Adv and Dis adv of the Internet , Component of a Intranet Information technology structure , Development of a Intranet , ,FTP, TELNET, TCP/IP protocol, characteristics of protocols. FTP, E mail, WWW server, HTTP,

### **Unit II**

Basic Concepts of Technology and Law :

Cyber laws, Scope of Cyber Laws , Business Ethics., Cyber jurisprudence

Law of Digital Contracts:

The essence of Digital Contracts , The system of Digital signatures , The role and function of certifying authorities

### **Unit III**

Access Control :

Operating system Access Controls , Group and Roles , Access Control lists , Unix Operating system security , Windows NT , Capabilities , Added features in Windows 2000 ,Granularity , Sandboxing and Proof-carrying code , Hardware protection , Other technical attacks

## **Unit IV**

Security Issues in E-Commerce: Security risk of E-Commerce, Types of threats, Security tools and risk management approach. Data message security and Electronic Mail, Encryption : The science of cryptography , Symmetric and asymmetric cryptography , RSA Algorithm , Public key encryption , Hash Functions .

## **Unit V**

Electronic Banking :Banking and Bookkeeping ,Legal recognition of digital signature .  
The Cyber Crime :Tampering with computer source document ,Hacking with computer system .

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### **BCA405**

### **Data Communication & Networking**

#### **UNIT I**

Principles of Data communications, features of communications, modes and ways of communications. Evolution of networking, LAN, WAN, MAN and their elements, internet, modulation, multiplexing, signaling and their types, encoding and decoding.

#### **UNIT II**

Network Architecture: ISO-OSI Reference model for networking, their functions, Ethernet technologies, Ethernet versions, token ring technologies.  
Network devices: Routers, Bridges, Hub, Switches, Gateway.

#### **UNIT III**

Base technology (FDMA, CDMA, TDMA, SDMA, centralized Access, circuit mode access), Satellite (ALOHA, pure/ Slotted ALOHA), broadcasting, multicasting, unicasting, network protocols, bandwidth.  
Network Security: Message confidentiality, Message Integrity, Message Authentication, Digital Signatures and Firewalls.

#### **UNIT IV**

Circuit switching, packet switching, error detection and correction codes: hamming codes, parity generator and detection. Transmission media: Twisted pair, coaxial cable, optical fiber.  
LAN topologies: Star, Bus, Ring.

#### **UNIT V**

Asynchronous transfer mode, Name Resolution, Address Resolution Protocol (ARP), RARP.  
Introduction to Wireless technology: Cordless telephony, cellular telephony, digital enhanced cordless telecommunication, handoff, Adhoc network, Bluetooth, infrared, IP Address.

#### **Reference:**

Behrouz A Forouzan,"Data Communications and Networking",Tata McGrawHill. Fourth Edition.

BCA V Semester									
S No.	Code	Subject	Teaching Scheme			Max. Marks			
			L	T	P	Internal	External	Total	
1	BCA501	Programming with VB.Net	3	1		30	70	100	
2	<u>BCA502</u>	<u>Accounting and Economics</u>	3	2		30	70	100	
3	BCA503	Statistical Methods	3	2		30	70	100	
4	BCA504	Operating System	3	2		30	70	100	
5	BCA505	Multimedia Applications	3	1		30	70	100	
6	BCA506	Programming with VB.Net Lab			6	30	70	100	
7	BCA507	Multimedia Applications Lab			6	30	70	100	700

### BCA501

### Programming with VB.Net

#### UNIT I

Introduction to .NET Framework overview of CLR, .NET class Frame, An overview of .NET Components.

IDE of VB.NET - Menu bar, toolbars, project explorer, toolbox, Properties window, Form designer, Form layout, immediate window. Visual Development And Event-Driven Programming -Event Driven Programming Methods and events, Concept of VB.NET project, types of VB.NET project, Opening and saving the projects, Elements of the user interface, Designing the user interface, Creating forms and code modules, Running the application, Grouping controls, Customizing The Environment -Editor tab, format tab, general tab, docking tab, environment tab, Working with Forms, Loading, Showing and hiding forms, Controlling one form within another

#### UNIT II

Variables -Declaring variables, Type of variables Converting variables types, User-defined data types, Special values, Forcing variables declarations, Scope and lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Procedures, subroutines, functions, Control flow statements and conditional statements, Loop statements, Designing menus and popup menus, Programming menu commands, Using access and shortcut keys, Using message box and input box, Using standard modules.

#### UNIT III

The Text Box Control -Text selection, Search and replace operations, The List box and Combo box controls, Indexing with the List box controls, Searching a Sorted list, The scroll bar and slider controls, Using the common dialog controls, Color common dialog box, Font common dialog box, The file open and save common dialog boxes, Print dialog box, Help common dialog box, The file controls.

#### **UNIT IV**

Classes, instances, objects, Encapsulation and abstraction, Derived classes and base classes, class in. Object linking and embedding (OLE), OLE at runtime, OLE control, Graphics With Visual Basic.NET, Form, picture box and image box controls Sizing images, loading and saving images, Coordinate systems, scale properties and methods, The drawing methods: drawing text, drawing, drawing boxes, filling, Drawing curves, manipulating pixels, specifying colors, Using timer controls, Multiple Document Interface(MDI), MDI-built-in capabilities, Parent-child menus, Objects and instances, Loading and unloading of child forms, New and open commands.

#### **UNIT V**

Dynamic-link-libraries (DLL), Declaring a DLL procedure, Calling a DLL procedure.

ADO.NET: Basics of ADO.NET, Data Adaptors, Data Sets, Data Tables, Working with ADO.NET, Database Connections, Creating Data Sets, Populating Data Sets and Displaying Data in Data Grid.

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### **BCA502**

### **Accounting and Economics**

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#### **Unit I**

Accounting- Introduction, Definition, Scope, Objectives & Limitations .Accounting Concepts and Conventions.

Basic Accounting Terms – Asset, Liability, Capital, Expense, Income, Expenditure, Debtors, Creditors, Cost, Stock, Purchases, Sales Profit, Loss, Gain, Discount, Drawings.

#### **UNIT II**

Recording of Transactions: Purchases Book, Sales Book, Purchase Returns Book, Sales Returns Book; Ledger, Cash Book , Trial Balance.

#### **UNIT III**

Preparation of Final Accounts: Preparation of Trading Account, Profit & Loss Account & Balance Sheet .

#### **UNIT IV**

Definition, nature and scope of Managerial Economics - Managerial Economics and Micro-economics Demand Analysis - Determinants of Market Demand - Law of Demand -Elasticity of Demand - Measurement and its use.

#### **UNIT V**

Cost Benefit Analysis - Private vs. Public Goods, Steps in cost benefit analysis - Justification for the use of cost benefit analysis

**UNIT I**

Introduction, Definition, Scope, Functions, Importance, Limitations and Distrust of statistics; Types of Statistical Methods; Data collection and Analysis; Types of data: Primary and Secondary, Methods of collection, Classification of data; Characteristics of a Graph: Types of Graph and their merits and demerits.

**UNIT II**

Measures of Central Tendency: Meaning and Definition; Types of Average, Median, Mode, Arithmetic mean, Geometric mean, Harmonic mean; Comparative Study of different Averages.

**UNIT III**

Measures of Dispersion and Skewness: Absolute and relative measures of dispersion range, Quartile deviation, mean and standard deviation and Coefficient: Difference between Skewness and Dispersion.

**UNIT IV**

Correlation theory: Linear correlation, measures of correlation, the least square regression lines, expected and unexpected variation, coefficient of correlation, rank correlation, Types of regression analysis Difference between Correlation and Regression.

**UNIT V**

Elements of Probability Theory: Random experiment , sample space, events, Classical and Statistical definition of probability , Additive law of probability , condition probability , statistical Independence of events, multiplication law of probability.

Introduction to: Theoretical Frequency Distribution, Binomial and Normal distribution, analysis of time series.

**Suggested Readings:-**

Gupta, S. C.: Fundamentals of Statistics

Sancheti, D. C. & Kapoor, V.K.: Statistics [Theory, Methods and Applications]; Sultan Chand & Sons

Enhance, D. N.: Fundamentals of Statistics; Kitab Mahal.

Goyal, Gupta Bhatnagar, Shah and Lodha: Business Statistics; Ajmera Book Company.

**UNIT I**

Introduction to Operating Systems, Operating system services, multiprogramming, time-sharing system, storage structures, system calls, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/O devices organization, I/O devices organization, I/O devices organization, I/O buffering.

**UNIT II**

Process concept, process scheduling, operations on processes, threads, interposes communication, precedence graphs, critical section problem, Semaphores, classical problems of synchronization. Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.

### **UNIT III**

Concepts of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation.

### **UNIT IV**

Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation. Security threads protection intruders-Viruses-trusted system.

### **UNIT V**

Disk scheduling, file concepts, file access methods, allocation methods, directory systems, file protection, introduction to distributed systems and parallel processing case study.

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## **BCA505**

## **Multimedia Applications**

### **UNIT I**

Introduction to Multimedia technology –Computer Communication and Entertainment: Framework for multimedia systems: Advantage of MM .System components and the user interface. MM platform. Hardware, Software, Overview of multimedia software tools and standard. Application of MM: Intelligent M/M system. Training and education .Kiosks, Multimedia in office and home.

### **UNIT II**

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, Graphics and image data representation Graphics/image data types, file formats, Color in image and video: color science, color Models in images, color models in video.

### **UNIT III**

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

### **UNIT IV**

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

### **UNIT V**

Build HTML documents from scratch .View HTML document using a variety of Web Browsers .Organize information using Lists, Use HTML frames and tables for page layout .Connect to a variety of resources by using hypertext links Create style sheets to format the look and feel of the pages .Understand key image theory concepts. Create new images from scans or from scratch. Optimize image sizes. Create animated gifs and transparent images. Be able to create graphical elements for use on WebPages : Buttons banners navigation bars. Background files embed images and other multimedia



**BCA VI Semester**

S No.	Code	Subject	Max. Marks			
			Internal	External	Total	
1	BCA610	Seminar	50	100	150	
2	BCA611	Project/Training	100	250	350	500