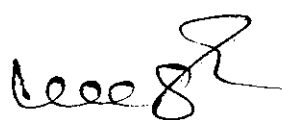


**Vikram University, Ujjain**  
**Bachelor of Computer Application (BCA)**

**BCA (Annual System)**

**Scheme & Syllabus**

w.e.f. Session 2017-18



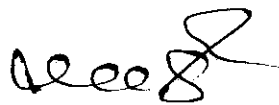




**Vikram University, Ujjain**  
**Bachelor of Computer Application (BCA)**  
**BCA – I/ First Year (Annual System)**  
**(Examination Scheme)**

Group	Paper Code	Paper Name	Internal	External (Theory)	Total	Practical	Grand Total
Group-I	BCA-11	Fundamental of computer & PC-Packages	10	40	50	--	100
	BCA-12	Digital Electronics	10	40	50	--	
Group-II	BCA-13	Programming and Problem Solving in C	10	40	50	--	100
	BCA-14	Operating System and System Software	10	40	50	--	
Group-III	BCA-15	Mathematical Foundation of computer Science	10	40	50	--	100
	BCA-16	Financial Accounting and Principle of Management	10	40	50	--	
Group-IV	BCA-17.1	Hindi Language and Moral Values	5	30	100	--	100
	BCA-17.2	English Language	5	30			
	BCA-17.3	Entrepreneurship Development	5	25			
Group-V	BCA-P18	Practical based on BCA11	--	--	--	50	100
	BCA-P19	Practical based on BCA13	--	--	--	50	
TOTAL					400	100	500

**NOTE: General BCA Examinations rules are same as B. Sc. (Computer Sc.)/(IT).**




**Vikram University, Ujjain**  
**Bachelor of Computer Application (BCA)**  
w.e.f. July 2018 Onwards

**BCA – II/ Second Year (Annual System)**  
**(Examination Scheme)**

Group	Paper Code	Paper Name	Internal	External (Theory)	Total	Practical	Grand Total
Group-I	BCA-21	Data Structure using C++	10	40	50	--	100
	BCA-22	DBMS & RDBMS	10	40	50	--	
Group-II	BCA-23	Internet & E-Commerce	10	40	50	--	100
	BCA-24	Data Communication & Computer network	10	40	50	--	
Group-III	BCA-25	System analysis Design & Software Engineering	10	40	50	--	100
	BCA-26	Managerial Economics & Management Information System	10	40	50	--	
Group-IV	BCA-27.1	Hindi Language and Moral Values	5	30	100	--	100
	BCA-27.2	English Language	5	30			
	BCA-27.3	Environmental Studies	5	25			
Group-V	BCA-P28	Practical based on BCA-21& BCA-22	--	--	--	50	100
	BCA-P28	Minor Project	--	--	--	50	
TOTAL					400	100	500

NOTE: General BCA Examinations rules are same as B. Sc. (Computer Sc.)/(IT).

# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

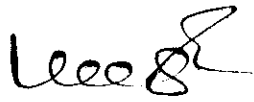
w.e.f. July 2019 Onwards

BCA – III/ Third Year (Annual System)

(Examination Scheme)

Group	Paper Code	Paper Name	Internal	External (Theory)	Total	Practical	Grand Total
Group-I	BCA-31	Programming With JAVA	10	40	50	--	100
	BCA-32	Artificial Intellegance & Expert System	10	40	50	--	
Group-II	BCA-33	Internet Technology with ASP.NET and C#	10	40	50	--	100
	BCA-34	Computer graphics and Multimedia	10	40	50	--	
Group-III	BCA-35	Microprocessor and Interfacing	10	40	50	--	100
	BCA-36	Enterprise Resource Planning & organizational Behaviour	10	40	50	--	
Group-IV	BCA-37.1	Hindi Language and Moral Values	5	30	100	--	100
	BCA-37.2	English Language	5	30			
	BCA-37.3	Basic of Computer & Information Technology	5	25			
Group-V	BCA-P38	Practical based on BCA-31 & BCA-33	--	--	--	50	100
	BCA-P38	Major Project	--	--	--	50	
TOTAL					400	100	500

NOTE: General BCA Examinations rules are same as B. Sc. (Computer Sc.)/(IT).


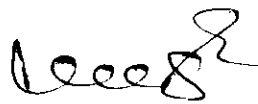



**Vikram University, Ujjain**  
**Bachelor of Computer Application (BCA)**

# **Detailed Syllabus**

## **BCA**

**(2017-18 Onwards)**



# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

### BCA - 11 Fundamental of Computers and PC-Packages

#### UNIT I

**Computer Fundamental:** Characteristics of Computers, History of Computer, Evolution of Computers, Computer Generations, Types of Computer, Components of a Computer: Registers, Instruction Set, Bus Architecture, Computer Hardware: Input Devices, Output Devices, Storage Devices: Primary Storage capacity, Memory Types, Memory Measuring Units, Secondary Storage Device

**Software and Computer Applications:** Software & Software Types, Computer Languages, Compiler, Interpreter, Editor, Computer Ethics, Computer applications, Introduction of Programming: Procedure Oriented Programming, Object oriented programming, Concepts used in OOP, Benefits of OOP, Main advantages and disadvantage of OOP, Applications of OOP, OOP vs. POP.

#### UNIT II

**Operating System Overview:** Computer System Startup, Computer System Structure, Computer System Components, Operating System Classifications, Operating System Services, Major Functions of Operating system, Process Management, CPU Scheduling, Scheduling Criteria. Memory and File Management: Memory Management Requirements, Swapping, Memory Management Techniques, Virtual Memory, File Management, File Access Methods, Protection.

**Introduction to DBMS:** File System, Traditional File Oriented Approach, DBMS-Advantages and Disadvantages, Role of DBMS, Three views of data, DBMS Architecture, Data Models, Data Independence, Major components of DBMS, Data Dictionary, Types of Users, DBMS applications, Keys in Databases, Database Languages.

#### UNIT III

**Introduction to Computer Networks:** Computer Network Definition, Importance of Networking, Types of Networks, Network Topology, Advantages and Disadvantage of Computer Networks, Applications of computer networks, Reference Model, Internet, Introduction to Internet Technology, Electronic Mail, World Wide Web.

**MS Windows:** Introduction to MS Windows; Features of windows; Working with Windows; My computer & Recycle bin; Desktop, Icons and Windows Explorer; Screen description & working styles of Windows; Dialog Boxes & Toolbar; Working with files & Folders; Simple operations like copy, delete, moving of files and folders from one drive to another; Accessories and Windows Settings using Control Panel-setting common devices using control panel, modem, printers, audio, network, fonts, creating users, internet settings, Start button & Program lists ;Installing and Uninstalling new Hardware & Software program on your computer.

#### Unit-IV

**MS Word Basics** – Introduction to MS Office; Introduction to MS- Word; Features & area of use, working with MS- word; Menus & Commands; Toolbars & Buttons; Shortcut Menus, Wizards & Templates, creating a New Document; Different Page Views and Layouts; Applying various Text Enhancements; Working with – Styles, Text Attributes; Paragraph and Page Formatting; Text Editing using various features; Bullets, Numbering, Auto formatting, Printing & various print options.




# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

**Advanced Features of MS- word-** Spell check, Thesaurus, Find & Replace; Headers & Footers: Inserting- Page Number, Pictures, Files, Autotexts, Symbols etc.; working with columns, Tab& Indents; Creation and working with Tables including conversion to and from text; Margins and Space management in Documents; Adding references and Graphics; Mail Merge, Envelops & mailing Labels. Importing and Exporting to and from various formats.

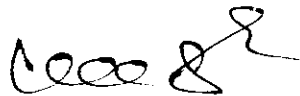
### Unit- V

**MS Excel:** Introduction and area of use; working with MS Excel: concept of workbook and worksheet; Using Wizards; Various Data Types; Using different features with Data, Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; Working with Data & Ranges; Different views of Worksheet; Column Freezing, Labels, Hiding, Splitting etc.; Using different features of Data and Text; Use of Formulas, Calculation & Functions; Cell formatting including Borders and Shading; Working with Different Chart Types; Printing of Workbook & Worksheets with Various options.

**MS PowerPoint:** Introduction and area of use; Working with MS PowerPoint; Creating a New Presentation; Working with Presentation; Using Wizards; Slides & its Different Views; Inserting, Deleting and Copying of Slides; Working with Notes, Handouts; Columns and Lists; Adding Graphics, Sounds and Movies to a slide; Working with PowerPoint Objects; Designing and Presentation of a Slide Show; Printing Presentations; Notes, Handouts with print options.

### Reference Books:

1. Operating Systems Concepts, A. Silberschatz, P. Galvin, G. Gagne, John Wiley & Sons
2. Object Oriented Programming in C++, Robert Lafore, Galgotia Publication.
3. Data base management systems vol. 1., Date C.J.
4. Fundamental of Computer Science & IT, Singh Umesh Kumar, Jain S., Maheshwari A., SSDN Publications New Delhi,
5. Data Communications and Networks, Godbole A, Tata McGraw-Hill Publications.
6. Windows XP Complete Reference. BPB Publications
7. MS Office XP complete BPB Publication




# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

### BCA - 12 Digital Electronics

#### 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, DeMorgan'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

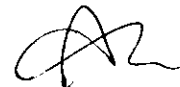
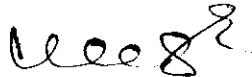
I/O Interface, Properties of simple I/O devices and their controller, isolated versus memory-mapped I/O, Modes of Data transfer, Synchronous & Asynchronous Data transfer, Handshaking, Asynchronous serial transfer, I/O Processor.

#### 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.

#### Reference Books:

1. BARTEE, "Digital Computer Fundamentals " TMH Publication
2. MALVINO, " Digital Computer Electronics " TMH Publication
3. MORRIS MANO, "Computer System Architecture PHI Publication





# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

### BCA-13 Programming and Problem Solving in C

#### Unit – I

Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance, algorithms & flowcharts, Characteristics of a good program – accuracy, simplicity, robustness, portability, minimum resource & time requirement, modularization; Rules/conventions of coding, documentation, naming variables; Top down design; Bottom-up design.

#### Unit II

History of C, Structure of a C program, Data types, Constant & Variable, Operators & expressions, Control Constructs – if-else, for, while, do-while, Case statement, Arrays, Formatted & unformatted I/O, Type modifiers & Storage classes, Ternary operator, Type conversion & type casting, Priority & associativity of operators.

#### Unit –III

Functions, Arguments, return value, Parameter passing – call by value, call by reference, return statement, Scope, visibility and life time rules for various types of variable, static variable, calling a function, Recursion – basics, comparison with iteration, tail recursion, when to avoid recursion examples.

#### Unit IV

Special constructs – break, continue, exit(), goto & labels; Pointers - & and \* operators, pointer expression, pointer arithmetic, dynamic memory management functions like malloc(), calloc(), free(), String, Pointer to function, Function to parameter, Structure – basic, declaration, membership operator, pointer to structure, referential operator, self-referential structures, structure within structure, array in structure, array of structures, Union – basic, declaration; Enumerated data type, Typedef, Command line arguments.

#### Unit V

**File handling and related functions:** printf & scanf family, C preprocessor – basics, # Include, # define, # undef, conditional compilation directive like #if, #else, #endif, #ifdef and #ifndef, Variable argument list functions.

**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(), Working with string fputs() and fgets(), Standard streams in C, Flushing a stream, Using fread() and fwrite(), Direct access file, fseek() and random access fprintf() and fscanf().

#### Reference Books:

1. Kerninghan & Richie: The C Programming language, PHI
2. Cooper Mullish: The Spirit of C, Jaico Publishing House, Delhi
3. Kanetkar Y: Let us C
4. Kanetkar Y: Pointers in C.

**Vikram University, Ujjain**  
**Bachelor of Computer Application (BCA)**  
**BCA-14 Operating Systems and System Software**

**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, inter-process communication, precedence graphs, critical section problem, semaphores, 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**

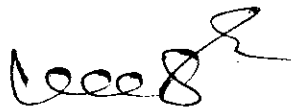
Concepts of virtual memory, demand paging, page replacement algorithms. allocation of frames, thrashing, demand segmentation, Security threads protection, Intruders- Viruses-trusted system,

**Unit V**

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

**Reference Books:**

1. Operating System by Silberschatz
2. Operating System by Deitel
3. Modern operating system by anneubacem.



# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

### BCA-15 Mathematical Foundation of Computer Science

#### UNIT-I

Types of errors, Error approximation, truncation error, rounding error. Solution of transcendental equation by: Bisection, false position, Newton-Raphson Methods.

#### UNIT-II

**Introduction and Approximation:** Polynomial interpolation, Newton and Lagrange interpolation. Approximation of function by Taylor series, Numerical integration: Simpson's one third rule, Gauss quadrature formula.

#### UNIT -III

**Sets and Relation:** Combinations of sets, finite and infinite sets, countable and uncountable infinite sets, Order sets. Properties of Binary Relations. Partial Ordering relations and Lattice.

#### UNIT-IV

**Formal Languages and Finite Automata:** Regular expressions, finite Automata from Regular Expression to finite Automata, Minimizing the number of States of DFA. Phrase structure Grammars, Types of Grammar and Languages.

#### UNIT-V

**Graphs, Trees and Cut-Sets:** Basic Terminology, Multigraphs and weighted graphs, Paths and Circuits, Shortest Paths, Eulerian Paths and circuits, Hamiltonian paths and circuits. Rooted trees, Path length in rooted trees, Binary search trees, Spanning trees, Minimum spanning trees.

#### Reference Books:

1. Hogg, R.V. Craig, A.L.: Introduction to mathematical statistics, American Publishing co. pvt. Ltd.
2. Seymour Lipschutz: Linear Algebra.
3. Computer oriented numerical analysis by S.S. Shastri

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# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

### BCA -16 – Financial Accounting and Principle of Management

#### Unit –I

The basic Financial Accounts, types of accounts, Rules of Entries of transactions, Journals. Cash Book – Types, Format of Cash Book, Balancing of Cash Book, Subsidiary books – Purchase, Sales. Purchase return and sales return. Ledger, posting of entries.

#### Unit II

Trial Balance, Rectification of errors, adjustment entries. Depreciation and Inflation. Principles of Cost Accounting, Valuation of Stocks, Allocation of Overheads, Methods of material issues.

#### Unit III

Pay roll department, preparation of pay roll, Preparation of wage record, Methods of payments of wages, overview of computerized method for payroll preparation. Inventory account and store record, inventory or stock control and cost accounting, Department demand and supply method of stock control. Classification and condition of material Report on material handling. Overview of computerized accounting process – Introduction to accounting system software, their features and some basic operations.

#### Unit IV

**Management Concept:** Managements, Administration, Organization Management and Administration, Difference and Relationship between Organizations, importance of Management, characteristics of Management.

Scientific Management, Principles of Management, Process of Management, Functions of Management, Levels of Management, Project Management

#### Unit V

**Decision Making:** Introduction and Definition, Types of Decision, Techniques of Decision Making, Decision making under uncertainty, Decision Making under risk.

#### Reference Books:

1. Mazda, Engineering Management, Addisen Wesley
2. S P Gupta, Management Accounting
3. I.M.Pandey, Financial Management, Vikas Publication.
4. The Practice of Management : Peter Drucker, Harper and Row
5. Essentials of Management :Koontz Prentice Hall of India
6. Management : Staner Prentice Hall of India
7. Principle & Practice of Management :T.N. Chhabra ; Dhanpat Rai New Delhi



**Vikram University, Ujjain**  
**Bachelor of Computer Application (BCA)**  
**BCA-P18**

**Practical based on BCA11**

**BCA 11. Fundamentals of Computers and PC-Packages**

**Windows:**

1. Creating folder, cut, copy, paste, managing file and folder in windows.
2. Arrange icons, set display properties.
3. Adding and removing software and hardware.
4. Setting date and time, screen saver and appearance.
5. Using windows accessories.
6. Settings of all control panel items.
7. Search file.
8. Desktop setting – new folder, rename, recycle bin operation, briefcase, control panel utility, Display properties, screen saver, background setting.

**MS-Word**

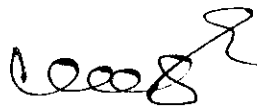
1. Creating & Editing Document .
2. Formatting Document.
3. Use of Auto-text, Autocorrect, Spelling and Grammar Tool.
4. Page Formatting, Page Border, Background.
5. Creation of MS-Word-Mail Merge, Macros, Tables.
6. Practice of Printing, page setup etc.

**MS- Powerpoint**

1. Creating, Manipulating & Enhancing Slides.
2. Inserting Organizational Charts, Excel Charts.
3. Using Word Art.
4. Putting Animations and Sounds.
5. Inserting Animated Pictures.
6. Inserting Recorded Sound Effect.

**MS-Excel**

1. Creating & Editing Worksheet.
2. Use Formulas and Functions.
3. Chart creation.



**Vikram University, Ujjain**  
**Bachelor of Computer Application (BCA)**  
**BCA-P19**

**Practical based on BCA13**


**BCA 13. Programming and problem solving through C**

1. Write a program for swapping two variables without using third variable.
2. Write a program to calculate simple interest and compound interest.
3. Write a program to convert temperature entered into centigrade to Fahrenheit.
4. Write a program to find maximum of three numbers.
5. Write a program to read in a three digit number produce following output (assuming that the input is 539), 5 hundreds , 3 tens, 9 units.
6. Write a program to find sum of digits of accepted number.
7. Write a program to student grace using IF-ELSE ladder.
8. Write a program that prints given three integers in ascending order using IF-ELSE.
9. Write a program for simple calculator using switch/case loop.
10. Write a program for print Fibonacci series up to N number.
11. Write a program to find sum of first 50 odd numbers and even number.
12. Write a program to find reverse of given number.
13. Write a program to find factorial of accepted number.
14. Write a program to find all prime number between two given numbers.
15. Write a program to find minimum, maximum, sum and average of given one dimensional array.
16. Write a program for sparse matrix.
17. Write a program to find addition, subtraction, multiplication of matrix.
18. Write a program that print terms of each of the following series. (i)  $\sin(x)$  (ii)  $\cos(x)$
19. Write a program to crown pyramid stoners.
 

*	1	1
**	1 2	2 2
***	1 2 3	3 3 3
****	1 2 3 4	4 4 4 4
*****	1 2 3 4 5	5 5 5 5 5
20. Write a program to read and write a structure.
21. Write a program for factorial function.
22. Write a program to read a string and print its reverse.
23. Write a program to find abusing call by reference.
24. Write a program for create, open and append a file.

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# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

### BCA-21 Data Structure using C++

#### Unit- I

**Overview of C++:** Object oriented programming, Concepts, Advantages, Usage.

**Classes & Objects:** Classes, Structure & classes, Union & Classes, Friend function, Friend classes, Inline function, Scope resolution operator, Static class members: Static data member, Static member function, passing objects to function, Returning objects, Object assignment.

**Array, Pointers References & The Dynamic Allocation operators:** Array of objects, Pointers to object, Type checking C++ pointers, The This pointer, Pointer to derived types, Pointer to class members, C++'s dynamic allocation operators, Initializing allocated memory, Allocating Array, Allocating objects.

#### Unit-II

**Constructor & Destructor:** Introduction, Constructor, Parameterized constructor, Multiple constructor in a class, Constructor with default argument, Copy constructor, Default Argument, Destructor.

**Function & Operator Overloading:** Function Overloading, Overloading constructor, Operator Overloading, Creating a member operator function, Operator overloading using friend function.

#### Unit-III

**Inheritance:** Base class Access control, protected members, protected base class inheritance, inheriting multiple base classes, Constructors, destructors & Inheritance, when constructor & destructor function are executed, passing parameters to base class constructors, Granting access, Virtual base classes.

**Virtual functions & Polymorphism:** Virtual function, Pure Virtual functions, Early Vs. late binding.

**The C++ I/O system basics:** C++ streams, The basic stream classes: C++ predefined streams, **Formatted I/O:** Formatting using the IOS members, Setting the format flags, Clearing format flags, An overloaded form of setf(), Examining the formatted flags, Setting all flags, using width(), precision() and fill(), Using manipulators to format I/O, Creating your own manipulators.

#### Unit-IV

The concept of data structure, Abstract data type, Concept of list & array Introduction to stack, Stack as an abstract data type, primitive operation on stack, Stacks application: Infix, Post fix, Prefix and Recursion, Multiple Stack. Introduction to queues, Primitive Operations on the Queues, Queue as an abstract data type, Circular queue, Dequeue, Priority queue, Applications of queue.

Introduction to the Linked List, Basic operations on linked list, Stacks and queues linked list, Header nodes, Doubly Linked List, Circular Linked List, Application of Linked List.

#### Unit- V

Analysis of algorithm, complexity using big 'O' notation. Searching; linear search, Binary search, their comparison, Sorting: insertion sort, Selection sort. Quick sort, Bubble sort, Heap sort, Comparison of sorting methods, Hash Table, Collision resolution Techniques.




# Vikram University, Ujjain

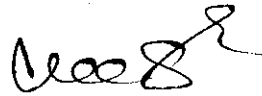
## Bachelor of Computer Application (BCA)

TREES Basic Terminology, Binary Trees, Tree Representations using Array & Linked List, Basic operation on **Binary Trees Traversal of binary trees**: - In order, Preorder & Post order, Application of Binary tree, Binary tree representation of trees.

Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversal-Depth first & Breadth first search. Spanning Trees, minimum spanning Tree, Shortest path algorithm.

### Reference Books:

1. Object oriented programming in C++ by Robert Lafore.
2. Object oriented programming with C++ by David Parsons.
3. Object oriented design with C++ by Ken Barclay.
4. Programming with C++ Made simple by K. Kumar, TMH 2002
5. Fundamentals of Data Structure, By S, Sawhney & E, Horowitz
6. Data Structure: By Trembley & Sorenson
7. Data Structure: By lipschuists (Schaum's Outline Series Mcgraw Hill Publication)
8. Fundamentals of Computer Algorithm: By Ellis Horowitz and SartajSawhney





# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

### BCA- 22 DBMS & RDBMS

#### Unit I

DBMS Concepts and architecture Introduction, Review of file organization techniques, Database approach v/s Traditional file accessing approach, Advantages of database systems, Data models, Schemas and instances, Data independence, Functions of DBA and designer. Entities and attributes, Entity types, Value, Sets, Key attributes, Relationships, Defining the E-R diagram of database, **Various data models:** Basic concepts of Hierarchical data model. Network data model, and Relational data model, Comparison between the three types of models.

#### Unit II

**Relational Data models:** Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints, Intension and Extension, **Relational Query languages:** Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union etc.

#### Unit III

**SQL:** Data definition in SQL, Brief History and overview of Sql, **Sql Basic:** Creating a Database, Adding Tables, Adding Records, Removing and Modifying records, executing queries, Data types: Numeric, String, Date & Time, Operators: Arithmetic, Comparison, Logical, Functions: Math Function, Aggregate, String, Date & Time.

#### Unit IV

**Data Base Design:** Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and losslessjoin, problems with null valued and dangling tuples, multivalued dependencies. Distributed databases, protection, security and integrity constraints, concurrent operation on databases, recovery, transaction processing, basic concepts of object oriented data base system and design, CODD's rule.

#### Unit-V

**Relational Database Design:** pitfalls in relational database design, subqueries, overview of subqueries, types of sub-query: Where/Having Clause, subqueries and from clause, Subqueries and Joins. Security, **Access Control and Privilege:** Granting, Revoking & Viewing user privileges, commit and roll back. Transaction, Acid Properties of Transaction.

#### Reference Books:

1. Data Base Management System by C.J. Date
2. Data Base Management System by Ullman
3. Fundamental of database system byElmasri/Navathe the Benjamin / Cunnings Publishing company inc.
4. Data base design by GioWiederhold, McGraw Hill
5. Fundamental of Data Base Management System by Leon & Leon, Vikas Publishing House Pvt. Ltd.
6. Complete Reference using MySql by VikramVaswani.
7. An Introduction to DataBase System by Bipin.C. Desai.




# Vikram University, Ujjain

## Bachelor of Computer Application (BCA)

### BCA-23 Internet and E-Commerce

#### Unit-I

Internet: Evolution, Concepts, Internet Vs Intranet, Growth of Internet, ISP, ISP in India, Types of connectivity - Dial-up, Leased line, DSL, Broadband, RF, VSAT etc., Methods of sharing of Internet connection, Use of Proxy server. Internet Services USENET, GOPHER, WAIS, ARCHIE and VERONICA, IRC. WORLD WIDE WEB (WWW) - History, Working, Web Browsers, Its functions, URLs, web sites, Domain names, Portals. Concept of Search Engines, Search engines types, searching the Web, Web Servers, TCP/IP and others main protocols used on the Web. E-Mail: Concepts, POP and WEB Based E-mail, merits, address, Basics of Sending & Receiving, E-mail Protocols, Mailing List, Free E-mail services, e-mail servers and e-mail clients programs.

#### Unit-II

Concepts of Hypertext, HTML introduction, features, uses & versions Using various HTML tags, Elements of HTML syntax, Head & Body Sections, inserting texts, Text alignment, using images in pages, Hyperlinks text and images, bookmarks, Backgrounds and Color controls, creating and using Tables in HTML, and presentation, use of font size & Attributes, List types and its tags. Cascading Style sheets defining and using simple CSS.

#### Unit-III

Introduction to WYSIWYG Design tools for HTML, Overview of MS FrontPage, Macromedia Dream weaver, and other popular HTML editors, designing Web sites using MS FrontPage (using at least FrontPage 2000). Use of Frames and Forms in web pages, Image editors, Issues in Web site creations & Maintenance, Web Hosting and publishing Concepts, Hosting considerations, Choosing Web servers Linux Vs Windows Web servers, Choosing Domain names, Domain name Registration, Obtaining space on Server for Web site, FTP software for upload web site. Add your website on search engines.

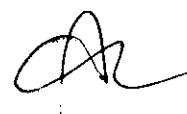
#### Unit-IV

JavaScript Overview, JavaScript and the WWW, JavaScript vs. VB Script, JavaScript vs. Java, JavaScript versions, Script element, Functions: Functions introduction, Calling functions. JavaScript Comments, Variables: Variables overview, declaring variables, Types of variables, Casting variables, Alert box, Prompt & confirm. Expressions: Arithmetic operators, Assignment operators, Logical operators, Expressions and precedence, Statements: If statement, for statement, while statement, Break/Continue Creating arrays/event handlers, JavaScript Object model, Object and Events in JavaScript – OnClick, On Mouse Over, On Focus, OnChange, On Load etc. Getting data with forms.

#### Unit—V

E - Commerce an introduction, Concepts, Advantages and disadvantages, Technology in E-Commerce, Internet & E-business, Applications, Feasibility & various constraints. E-transition challenges for Indian corporate, the Information Technology Act 2000 and its highlights related to e-commerce.

Electronic Payment Systems: Introduction, Types of Electronic Payment Systems, Digital Token-Based Electronic Payment Systems, Smart Cards and Electronic Payment Systems, Credit Card-Based Electronic Payment Systems, Risk and Electronic Payment Systems.


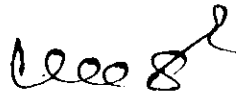
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E-security — Security on the internet, network and web site risks for e-business, use of firewalls, secure physical infrastructure

**Reference Books:**

1. Frontiers of Electronic Commerce, By- Kalakota, Ravi; Stone, Tom; Whinston, Andrew B, Addison Wesley Publishing Co.
2. E-Commerce an Indian Perspective (Second Edition) — by P. T, Joseph, S.J. PrenticeHall of India
3. Learn HTML in a weekend by Steven E. Callihan, PHI
4. Using HTML By Lee Anne Phillips, PHI
5. SAMS Teach Yourself JavaScript in 24 Hrs., By Michael Moncur. TechMedia



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## Bachelor of Computer Application (BCA)

### BCA-24 Data Communication and Computer Networks

#### Unit I

Introduction Theoretical Model for Communication, analog and digital signals Bandwidth, Noise, Channel Capacity, Data-rate, Concepts of Circuit Switching, Message switching and Packet switching with their timing diagrams, comparison of switching techniques, ISDN.

#### Unit II

**Evolution of Computer Networks Layered:** Network architecture, OSI Layers Model, transmission media topology, error detection & Correction techniques, Parity checks, CRC, Asynchronous and synchronous transmission, TDM, FDM.

#### Unit III

**Data Link Layer:** Different Types of line discipline, simplex, half duplex and full duplex. **Flow control:** stop and wait protocol, sliding Window Protocol with their efficiency, ARQ techniques & their performances HDLC.

#### Unit IV


**LAN:** Static & Dynamic channel allocation, Media access control for LAN & WAN; **ALOHA:** pure, slotted ALOHA, CSMA, CSMA/CD, **IEEE 802 standards for LAN & MAN:** 802.3, 802.4, 802.5, 802.6 and 802.2 & their comparison **Fast LANs:** fast Ethernet, FDDI.

#### Unit V

**Routing:** Definition, Elements of routing techniques, Least Cost Routing algorithm, Dijkstra's algorithm, Bellman-ford algorithm, Routing Strategies, Congestion Control encryption & description techniques, Internet working, Internet and Intranet.

#### Reference Books:

1. Computer Networks Tanenbaum A. S. PHI.
2. LANs- Keizer
3. Computer Networks - Stalling w., PHI.



**Vikram University, Ujjain**  
**Bachelor of Computer Application (BCA)**  
**BCA-25 Systems Analysis Design & Software Engineering**

**Unit-I**

**System Concept:** Definition, Characteristics, Elements of system, Physical and abstract system open and closed system, man-made information systems, **System Development Life Cycle:** Various phases of system development, Considerations for system planning and control for system success. **System Planning:** Base for planning a system, Dimensions of Planning. **Initial Investigation:** Determining users requirements and analysis, fact finding process and techniques. **Feasibility study:** Determination of feasibility study, Technical, Operational & Economic Feasibilities, System performance constraints, and identification of system objectives, feasibility report. **Cost/Benefit Analysis:** Data analysis cost and benefit analysis of a new system. Categories determination and system proposal.

**Unit-II**

**Tools of structured Analysis:** Logical and Physical models context, diagram, data dictionary, data diagram, form driven methodology, IPO and HIPO charts, Gantt charts, system model, pseudo codes, Flow charts, system flow chart, run flow charts etc., decision tree, decision tables, data validation. **Input/ Output and Form Design:** Input and output form design methodologies, menu, screen design, layout consideration. Management standards Systems analysis standards, Programming standards, Operating standards. Documentation standards User Manual, system development manual, programming manual, programming specifications, operator manual.

**Unit-III**

**System testing & quality:** System testing and quality assurance, steps in system implementation and software maintenance. System security: Data Security, Disaster/ recovery and ethics in system development, threat and risk analysis, System audit. **Organisation of EDP:** Introduction, Job Responsibilities & duties of EDP, Personnel- EDP manager, System Analyst, Programmers, Operators etc. Essential features in EDP Organization. **Selection of Data Processing Resources:** purchase, lease, rent-advantages and disadvantages. Hardware and software procurement – In-house purchase v/s hiring and lease.

**Unit-IV**

**The Software Product and Software Process:** Software Engineering - A Layered Technology, **Software Process Models:** Linear Sequential Model. Prototyping Model, RAD Model Evolutionary Software Process Models: Incremental Model, Spiral Model Component Assembly Model, Formal Methods, Fourth-Generation Techniques. **Systems Engineering:** The Systems Engineering Hierarchy, Information Engineering, Information Strategy Planning, Business Area Analysis, **Product Engineering Requirement Analysis Modeling:** Analysis Concepts and Principles, The Elements of the Analysis Model Data Modifying, Functional Modeling and Information Flow and Behavior Modeling, Mechanics of Structured Analysis, Data Dictionary.

**Unit-V**

**Principles, and Methods:** The Software Design Process: Design Principles, Design Concepts, Effective Modular Design, Design Heuristics, Design Documentation, Design Methods: Data Design, Architectural Design, Interface Design, Human Computer Interface Design, Procedural Design.




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**Software Testing Methods:** Software Testing Fundamentals, Test Case Design, Black-Box Testing, White-Box Testing, Software Testing Strategies: Verification and Validation, Strategic Issues, Unit Testing, Integration Testing, Validation Testing, System Testing.

**Software Process and Project Metrics:** Measures, Metrics and indicators, Metrics in the Process and Project Domains, Software Measurement, Metrics of Software Quality.

**Reference Books:**

1. System Analysis & Design by V K Jain, Dreamtech Press
2. Modern System Analysis & Design by A Hoffer. F George- S Valaciahlow Priced Edn. Pearson Education.
3. Information Technology & Computer Applications. by V.K.Kapoor, Sultan Chand & Sons, New Delhi.
4. Software Engineering: A Practitioner's Approach by P, S. Pressman Fourth edition 1997, McGraw- HW pub.
5. An integrated Approach to Software Engineering Pankaj Jalote, 1991, Narosa Pub.
6. Software Engineering University Press — by Sonunerville Oxford university press 1996
7. Fundamentals of Software Engineering Leon and Leon Vikas Publishing House Pvt. Ltd.

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**Bachelor of Computer Application (BCA)**

**BCA-26 Managerial Economics and Management Information System**

**Unit I**

**Managerial Economics:** Introduction of Managerial Economics- Factors Influencing Manger, Micro and Macroeconomics, Theory of the Cost Theory of the Firm Theory of Production Function, Production System

**Unit II**

Input-Output Analysis, Micro Economics Applied to plants and industrial undertakings, Productivity, Factors affecting Productivity, Increasing Productivity of Resources.

**Unit -III**

Meaning, Nature, Need, Role, Importance, Evolution of Management Through Information system. Structure of Management Information System. Relatedness of MIS with management activities, Management functions and decision making, Information System in Business and Management.

**Unit-IV**

Development of MIS- Methodology and Tools/ Techniques for systematic designing, implementation, evaluation. modification of MIS, A study of major financial, production, manpower and marketing MIS and case Studies.

**Unit -V**

Advanced MIS-concept, need and problems in achieving advanced MIS, Decision support System. Rationale of computer application, Decision support system (DSS).

**Reference Books:**

1. Managerial Economics: Joel Dean : Prentice Hall of India
2. Murdick, R.G., Ross, J.E. & Claggtt, J.R.: Information systems for Modern Managment, PHI
3. Thomas, R. & Prince: Information systems for planning and control.
4. Wigarders, K., Syensson, A., Sehong. I., Rydin, A. & Dahlgre. G. Structured Analysis & Design of Information system, Mcgraw Hill Book company, 1986.
5. Aktas : structured analysis and design of information system, PHI
6. Spargue and Watson : Decision Support System ,2nd Edn. Prentice Hall international. 1989.
7. David : Applied Decision Support, Prentice hall international, 1988.

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**Bachelor of Computer Application (BCA)**  
**BCA-P28**

**Practical based on BCA-21 & BCA -22**

**BCA – 21 : DATA STRUCTURE USING C++**

1. Program to calculate area of a circle.
2. Program for swapping two variables.
3. Program to find largest of three numbers.
4. program for simple calculator using switch/case.
5. Program to generate sum of N numbers.
6. Program to find factorial of a number.
7. Program to use for loop to print pattern like  
1  
12  
123  
1234  
12345
8. Program for Function Overloading.
9. Program for Class and Object.
10. Program for Friend Function.
11. Program for Static Data Member and Static Member Function.
12. Program for Parameterized Constructor.
13. Program for Copy Constructor.
14. Program for Destructor.
15. Program for Unary Operator Overloading.
16. Program for Binary Operator Overloading.
17. Program for Single Inheritance.
18. Program for Multilevel Inheritance.
19. Program for Multiple Inheritance.
20. Program for Virtual Function.
21. Program for Push and pop operation on stack using array.
22. Program for Insertion and deletion operation on queue using array.
23. Program for Insertion and deletion operation on circular queue using array.
24. Program for Insertion sort.
25. Program for Bubble sort.
26. Program for Quick sort
27. Program for selection sort.
28. Program for Linear search.
29. Program for Binary search.
30. Program for Linked List creation, insertion and deletion.





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## Bachelor of Computer Application (BCA)

### BCA- 22 DBMS & RDBMS

1. Assignment to create simple tables , with only the primary key constraint ( as a table level constraint & as a field level constraint) (include all data types)
2. Assignment to create more than one table, with referential integrity constraint, PK constraint.
3. Assignment to create one or more tables with following constraints, in addition to the first two constraints (PK & FK) a. Check constraint b. Unique constraint c. Not null constraint
4. Assignment to drop a table from the database, to alter the schema of a table in the Database.
5. Assignment to insert / update / delete records using tables created in previous Assignments. ( use simple forms of insert / update / delete statements)
6. Assignment to query the tables using simple form of select statement Select from table [where order by ] Select from table [where group by i. having <math>\diamond</math> order by <math>\diamond</math>]
7. Assignment to use various additional operator available for conditional statement like between, in any, all etc.
8. Assignment to query table, using set operations (union, intersect)
9. Assignments to query tables using nested queries
10. Assignments to query more than one table using following joins
  - a. Cartesian Product
  - b. Inner Joins
  - c. Equi-Join
  - d. Table Aliases
  - e. Non-Equi Join
  - f. Non-Key Join
  - g. Reflexive Join
  - h. Natural Join
  - i. Outer Joins
  - j. Right Outer Join
  - k. Left Outer Join
  - l. Full Outer Join