

VIKRAM UNIVERSITY, UJJAIN

SYLLABUS

SEMESTER WISE SCHEME

BACHELOR OF SCIENCE SUBJECT: COMPUTER APPLICATIONS (3 Years- 6 Semesters)

B.Sc.– Part – I, II & III (With Subject: Computer Applications)

2010-2011

and

Onwards

B.Sc.-Part-I Semester Wise Scheme
(With Subject: Computer Applications)

Semester – I

Course	Theory Max. Marks	CCE	Max. Marks
B.Sc.-CA-101 Digital Electronics	35	15	50
B.Sc.-CA-102 Programming and Problem Solving in C	35	15	50
B.Sc.-CAP101 Practical (Based on B.Sc.-CA-102)	35	15	50

Semester – II

Course	Theory Max. Marks	Practical Max. Marks	Max. Marks
B.Sc.-CA-201 Operating Systems	35	15	50
B.Sc.-CA-202 Data Base Management System	35	15	50
B.Sc.-CA P201 Practical (Based on B.Sc.-CA-201)	35	15	50

B.Sc.- Part-II Semester Wise Scheme
(With Subject: Computer Applications)

Semester – III

Course	Theory Max. Marks	Practical Max. Marks	Max. Marks
B.Sc.-CA-301 Data Structures	35	15	50
B.Sc.-CA-302 Systems Analysis and Design	35	15	50
B.Sc.-CAP301-Practical (Based on B.Sc.-CA-301)	35	15	50

Semester – IV

Course	Theory Max. Marks	Practical Max. Marks	Max. Marks
B.Sc.-CA-401 Programming with Visual Basic	35	15	50
B.Sc.-CA-402 Internet & E-Commerce	35	15	50
B.Sc.-CA-P401- (Based on B.Sc.-CA-401)	35	15	50

**B.Sc.- Part-II Semester Wise Scheme
(With Subject: Computer Application)**

SEMESTER: V

PAPER CODE	PAPER NAME	MARKS		
		EXTERNAL	INTERNAL	TOTAL
B.Sc.-CA-501	INTERNSHIP PROJECT	150	150	300

Semester – VI

Course	Theory Max. Marks	Practical Max. Marks	Max. Marks
B.Sc.-CA-601 Software Engineering	35	15	50
B.Sc.-CA-602 Programming With JAVA	35	15	50
B.Sc.-CA-P601 Practical (Based on B.Sc.-CA-602)	35	15	50

B.Sc. - I Semester (Computer Application)

B.Sc.-CA -101 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.

Books :

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

B.Sc.-CA-102 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 v/s array; Pointer to pointer; Array of pointer & its limitation; Function returning pointers; Pointer to function, Function as 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, #elif, #endif, #ifdef and #ifndef; Variable argument list functions.

Books :

1. Kerninghan & Ritchie: 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

B.Sc.- II Semester (Computer Application)

B.Sc.-CA-201 Operating Systems

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, 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.

Books

- i. Operating System by Silberschatz
- ii. Operating System by Deitel
- iii. Modern operating system by Tanneubacem.

B.Sc.-CA-202 Data Base Management System

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

Types of relational calculus i.e. Tuple oriented and domain oriented relational calculus and its operations. SQL: Data definition in SQL, update statements and views in SQL QUEL & QBE: Data storage and definitions, Data retrieval queries and update statements etc.

Unit IV

Data Base Design: Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, 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.

Unit V

Case study of relational database management systems: Oracle and Microsoft access, Oracle tools.

Books :

1. Data Base Management System by C.J. Date
2. Data Base Management System by Ullman
3. Fundamental of database system by Elmasri / Navathe the Benjamin / Cunnings Publishing company inc.
4. Data base design by Gio Wiederhold. McGraw Hill
5. Fundamental of Data Base Management System by Leon & Leon, Vikas Publishing House Pvt. Ltd.

B.Sc.- III Semester (Computer Application)

B.Sc.-CA-301 Data Structures

Unit-I

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

Unit –II

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

Unit –III

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

Unit –IV

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.

Unit –V

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

Books :

1. Fundamentals Of Data Structure, By S. Sawhney & E. Horowitz
2. Data Structure : By Trembley & Sorrenson
3. Data Structure : By lipschuists (Schaum's Outline Series Mcgraw Hill Publication)
4. Fundamentals Of Computer Algorithm: By Ellis Horowitz and Sartaj Sawhney

B.Sc.-CA-302 Systems Analysis and Design

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.

Unit -II

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 –III

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.

Unit -IV

Management standards – Systems analysis standards, Programming standards, Operating standards. Documentation standards – User Manual, system development manual, programming manual, programming specifications, operator manual. 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.

Unit-V

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.

Books:

1. System Analysis & Design by V K Jain, Dreamtech Press
2. Modern System Analysis & Design by A Hoffer, F George, S Valaciah Low Priced Edn. Pearson Education.
3. Information Technology & Computer Applications, by V.K.Kapoor, Sultan Chand & Sons, New Delhi.

B.Sc.- IV Semester (Computer Application)

B.Sc.-CA-401 Programming with Visual Basic

Unit-I

Basic of Visual Basic : The Integrated Development Environment : The Menu Bar, The Toolbars, The Project Explorer, The Toolbox , The Properties Window, Your First/VB Project : Remaining and Saving the Project. The Elements of the User Interface . Programming an Application : Programming the command Buttons, Grouping Controls. Visual Development and Events-Driven Programming : A Few common Properties , A Few Common Methods, A Few Common Events .

Unit- II

Customizing the Environment : The Editor Tab, The Editor Format Tab, The General Tab, The Docking Tab, The Environment Tab, The Advanced Tab. Visual Basic Projects : Building a Loan Calculator : Deciding How the Loan Application Works, Design the User Interface, Programming the Loan Application, Validating the Data. Building a Math Calculator : Designing the User Interface, Programming the Math Application, Adding More Features, Error Trapping. A Project's Files : The Project File, The Form File, Moving and Copying Projects, Executable files.

Unit- III

Visual Basic : The Language. Variables : Declaring Variables, converting Variable Types, User-Defined Data Types, Special Values, Examining Variable Types, Forcing Variable Declarations, A Variable Declarations, A Variable's Scope The Lifetime of a Variable. Constants . Arrays : Declaring Arrays, Specifying Limits, Multidimensional Arrays, Dynamic Arrays, Arrays of Arrays.

Unit- IV

Procedures : Subroutines, Functions , Calling Procedures Arguments : Argument-Passing Mechanisms, Using Optional Arguments, Passing an Unknown Number of Arguments, Named Arguments. Function Return Values : Functions Returning Custom Data Types, Functions Return Values Control flow Statements : If ... Then, If ... Then ... Else , Select Case, Loop Statements : Do Loop, For Next, While Wend, Nested Control Structures, The Exit Statement.

Unit- V

Working with Forms : An Application with Multiple Forms : The Startup Object The Appearance of Forms : The Start-Up Form, Loading, Showing, and Hiding Forms, Controlling One Form from within Another. Designing Menus : The Menu Editor, Programming Menu Commands, Building Dynamic forms at Runtime Drag-and-Drop Operations : The DragMode Property , The Drag-Drop and DragOver Methods.

Book :

1. Mastering in Visual Basic 6

B.Sc.CA-402 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 VBScript, 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 MouseOver, On Focus, OnChange, OnLoad etc. Getting data with forms.

Unit–V

E - Commerce An introductions, 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.

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

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. Prentice-Hall 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

B.Sc. - VI Semester (Computer Application)

B.Sc.-CA-601 Software Engineering

Unit- I

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

Unit -II

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 -III

Design Concepts, 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.

Unit -IV

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.

Unit V

Software Process and Project Metrics: Measures, Metrics and Indicators, Metrics in the Process and Project Domains, Software Measurement, Metrics of Software Quality

Books:

1. Software Engineering: A Practitioner's Approach by P.S. Pressman Fourth edition 1997, McGraw-Hw pub.
2. An Integrated Approach to Software Engineering – Pankaj Jalote, 1991, Narosa Pub.
3. Software Engineering University Press – by I. Sonunerville Oxford university press 1996
4. Fundamentals of Software Engineering Leon and Leon – Vikas Publishing House Pvt. Ltd.

B.Sc.-CA-602 Programming With JAVA

Unit-I

C++ Vs JAVA, JAVA and Internet and WWW, JAVA support systems, JAVA environment. JAVA program structure, Tokens, Statements, JAVA virtual machine, Constant & Variables, Data Types, Declaration of Variables, Scope of Variables, Symbolic Constants, Type Casting. Operators : Arithmetic, Relational, Logical Assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions & its evaluation. If statement, if...else... statement, Nesting of if...else... statements, else...if Ladder, Switch, ? operators, Loops – While, Do, For, Jumps in Loops, Labelled Loops.

Unit-II

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods. Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control.

Unit-III

Arrays: One Dimensional & two Dimensional, strings, Vectors, wrapper Classes, Defining Interface Extending Interface, Implementing Interface, Accessing Interface Variable, System Packages, Using System Package, Adding a Class to a Package, Hiding Classes.

Unit-IV

Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface.

Unit-V

Local and Remote Applets Vs Applications, Writing Applets, Applets Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display, HTML Tags & Applets, Getting Input from the User.

Books :

1. Balaguruswamy, “Programming In Java”, 2nd Edition, TMH Publications
2. “Peter Norton, Guide To Java Programming, Techmedia Publications