

ST. ALOYSIUS' COLLEGE (AUTONOMOUS)

JABALPUR (M. P.), INDIA

Reaccredited 'A+' by NAAC with CGPA (3.68/4.0)

College with Potential for Excellence by UGC

DST-FIST supported

BACHELOR IN COMPUTER APPLICATION (BCA)

PROGRAM OUTCOME: Bachelor in Computer Applications is an undergraduate programme to start career in applications in IT firm. It helps the students to understand the concepts of key areas in Computer Science. It provides sound academic base to analyze and apply latest technologies to solve problems in the areas of computer applications. It also provides analysis and synthesis involved to develop practical skills to provide solutions to industry, society and business. To develop skilled manpower in the various areas of information technology like: Database management, Software Development, Computer-Languages, Software engineering, Web based applications etc.

PROGRAM SPECIFIC OUTCOME: After completion of Bachelor in Computer Application students will be able to work in IT industries, various public and private sectors etc. They will be able to work on different profiles like web developer, UI designers, testers, coders, SEO developers etc.

SCHEME

BCA – I/ First Year (Annual System)

Group	Paper Code	Subject	Internal			Theory	Total	Practical	Grand Total
			3 Months	6 Months	Total				
Group-I	BCA-11	Fundamentals of Computers and PC-Software	5	5	10	40	50	--	100
	BCA-12	Computer System Architecture	5	5	10	40	50	--	
Group-II	BCA-13	Programming & Problem Solving through C	5	5	10	40	50	--	100
	BCA-14	Internet & Web Technology	5	5	10	40	50	--	
Group-III	BCA-15	Cyber Security	5	5	10	40	50	--	100
	BCA-16	Discrete Mathematics & Algebra	5	5	10	40	50	--	
Group-IV	BCA-17	Foundation Course ---- Same as B.Sc./B. Com./B. A.----					100	--	100
Group-V	BCA-P18	Practical based on BCA11, BCA13 & BCA14	--	--	--	--	--	50	50
TOTAL							400	50	450

BCA – II/ Second Year (Annual System)

Group	Paper Code	Subject	Internal			Theory	Total	Practical	Grand Total
			3 Months	6 Months	Total				
Group-I	BCA-21	Data Structure using C++	5	5	10	40	50	--	100
	BCA-22	Data Base Management System & RDBMS	5	5	10	40	50	--	
Group-II	BCA-23	Software Engineering	5	5	10	40	50	--	100
	BCA-24	Operating System with UNIX /LINUX	5	5	10	40	50	--	
Group-III	BCA-25	Accounting & Financial Management	5	5	10	40	50	--	100
	BCA-26	Computer oriented Numerical Methods	5	5	10	40	50	--	
Group-IV	BCA-27	Foundation Course ---- Same as B.Sc./B. Com./B. A.----					100	--	100
Group-V	BCA-P28	Practical based on BCA21, BCA22 & BCA24	--	--	--	--	--	50	50
TOTAL							400	50	450

BCA I YEAR

PAPER-I FUNDAMENTALS OF COMPUTERS AND PC-SOFTWARE

Group	Paper Code	Lectures	Theory		Internal	Total
			MAX	MIN		
I	BCA-11	20/Unit	40	13	10	50

Course Objective: Analysis problems and designing and implementing algorithmic solutions. Solving problems properly, achieving an implementation that is correct, effective and efficient. Knowledge of computer equipment, including both hardware and software.

Course Outcome: Analyzing problems, and designing and implementing algorithmic solutions. Solving problems properly, achieving an implementation that is correct, effective and efficient. Using computers at user level, including operative systems and programming environments. Knowledge of computer equipment, including both hardware and software. Identifying information needs to solve problems, recovering information and applying it to the resolution.

UNIT-I

Introduction to Computers: History of development of Computers. Computer system concepts. Characteristics, Capabilities and limitations, Generations of Computers. Von Neumann Architecture ,Classification of Computers , Instruction Execution Cycle • Basic Components of a computer system – Control Unit, ALU, I/ O Devices, Memory – RAM, ROM, EPROM, PROM, Flash Memory and other types of memory. Types of Software – System software, Application software, Utility Software, Demo ware, Shareware, Freeware, Firmware and Free Software. Operating Systems – Functions, Types – Batch Processing, Single User, Multi User, Multiprogramming, Multi-Tasking. Programming languages – Machine, Assembly, High Level, 4 GL. Data representation in computers. Computer Viruses. Disk Operating System (DOS). Introduction, History & Versions of DOS. DOS basics. Physical structure of disk, drive name, FAT, file & directory structure and naming rules, booting process, DOS system files. Basic DOS Commands.

UNIT-II

Windows: features of windows — desktop, start menu, control panel, my computer, windows explorer, accessories. Managing multiple windows, arranging icons on the desktop, creating and managing folders, managing files and drives, logging off and shutting down windows. Entertainment – CD player, DVD Player, Media Player, Sound Recorder, Volume Control. WORD PROCESSING: Introduction to Word processing, Names of some commonly used word processing software. Introduction to MS-Word: Feature, document creating, formatting, standard toolbar, drawing toolbar, tables and other features. Mail-merge, insertion of files, pictures, clipboard, graphs, print formatting, page numbering and printing documents. Spell Check, Thesaurus, Find & Replace, Inserting Header, Footer, page number & pictures. Working with Tables, Introduction to MS - power point, Blank presentation, creating, saving and printing a presentation, adding slide to a presentation, slide view, outline view, slide sorter view, notes view and slide show view. Changing text font and size, selecting text style and color, to set header and footer. Using, bullets, clipart and word art gallery. Applying design template creating graph. Adding transitions and Animation effects, setting timings for slide show preparing note pages, preparing audience handouts.

UNIT-III

Introduction To Spreadsheet (MS-Excel): Definition And Advantages of Electronic Worksheet, Working On Spreadsheets: Cell Referencing, Range & Related Operations, Setting, Saving And Retrieving Worksheet File, Inserting, Deleting, Copying And Moving of Data Cells, Inserting And Deleting Rows & Columns, Copying, inserting, Renaming the sheet of workbook. General Short-cut

commands, Entering text and numeric data, entering date and time different functions, formatting text and numeric data. Functions and Other Features: Classification and Usage of Various Built-In-Functions In Worksheet, Passwords, Protecting A Worksheet Printing of the worksheet, page margin setting and adding header and footer, Transferring Data to and From Non Worksheet Files, Creating, Naming & Executing Macros. Creating graphs.

UNIT-IV

PC Maintenance and Troubleshooting: Opening the PC and identification. Study of different blocks, Assembling and disassembling. Basic Device Configuration and Installation-Printers, Microphone, Monitor, Mother Board, Sound Card, Video Card, tips on Trouble Shooting. Introduction to Computer Hardware, Components of Mother-boards & its types, Ports, Slots, Connectors, add on cards, Power supply units, and cabinet types. Storage devices: Primary & Secondary storage medium. Introduction to servers and network security Types of servers: Files servers, Email Servers, Proxy servers etc. Basics of Internet and Intranet: Types of Internet connections: Dialup, Broadband, Leased Line, Wi-Fi, Wi-Max, 2G, 3G, 4G, WWW, E-mails, Search Engines, Social Networking. Cloud application. Audio-video Conferencing. Voice over Internet Protocol (VOIP).

UNIT-V

Overview of System Analysis and Design, Business System Concepts, System Development Life Cycle, Preliminary Investigation, Feasibility Study, System Analysis, System Design and Testing, Implementation & Evaluation. Overview of MIS: Introduction, Role of IT, MIS - characteristics and application areas, Business and Technology trends -specialization, management by methodology, decentralization, internationalization etc. Characteristics of a good Business Unit. Data and Information, Difference between data and information Introduction to data Processing, fields, Records and Files. Types of files: Master files and Transaction file. Introduction to ERP, SCM.

TEXT BOOKS:

1. Computers Fundamentals and Architecture by B. Ram
2. Microsoft Windows XP Step by Step , PHI
3. William Stallings, Operating System, Pearson Education
4. Norton, Introduction to Computers, McGraw Hill
5. Ron Mansfield, Microsoft Office, BPB Publication
6. Fundamentals of Computers: P. K. Sinha
7. System Analysis and Design by Elias M Awad.

REFERENCES BOOKS:

1. P C Software for Windows by R K Taxali
2. P C Software Bible by S.Jaiswal
3. Computers Today: Suresh K.Basandra
4. Operating System: Achyut S. Godbole
5. Management Information systems by Gerald V. Post & David L. Anderson.
6. Understanding Computer Fundamentals & Dos By G.K. Iyer
7. MS-Office Interactive course by Greg Perry, Techmedia
8. MS Office Complete Reference TMH Publication.

BCA I YEAR

PAPER-II COMPUTER SYSTEM ARCHITECTURE

Group	Paper Code	Lectures	Theory		Internal	Total
			MAX	MIN		
I	BCA-12	20/Unit	40	13	10	50

Course Objective: The course is intended as a general introduction to the architecture of computer systems. To understand various representation techniques (fixed point and floating point representation). To familiarize with logic gates and the working combinational and sequential circuit. To understand the various memory management techniques.

Course Outcome: Students will be able to understand the computer arithmetic with regards to its architecture. Student will be able to compare different memory management schemes. Students will be able to understand the functional units of a computer.

UNIT-I

DATA REPRESENTATION- Data types, Number Systems: Binary number system, Octal & Hexa-Decimal Number system. **Fixed-Point Representation:** 1s & 2s complement, Binary fixed-point representation. Arithmetic operation on binary numbers, overflow & underflow.

UNIT-II

DIGITAL LOGIC CIRCUITS: Logic gates, AND, OR, NOT, GATE & their truth tables, NOR, NAND & XOR gates. **BOOLEAN ALGEBRA: Demorgan's theorem.** **MAP SIMPLIFICATION:** Minimization techniques, K-Map. Sum of product & product of sums. **COMBINATIONAL & SEQUENTIAL CIRCUITS:** Half adder, full adder, full subtractor, Flip-Flops-RS, & T Flip-Flops, Shift registers, counters.

UNIT-III

CPU ORGANISATIONS- ALU & CONTROL CIRCUIT: Idea about arithmetic circuit program control, Instruction sequencing. **INTRODUCTION TO MICROPROCESSOR:** Microprocessor Architecture (8086), System buses, Register, program counter, Block diagram of a Micro Computer System. Microprocessor control signals, Interfacing devices. **INTRODUCTION TO MOTHER BOARD:** Idea about different cards and their functions, SMPS.

UNIT-IV

INPUT-OUTPUT ORGANISATION: 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

MEMORY ORGANISATION : Auxiliary memory, Magnetic drum, Disk & Tape Semiconductor 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.

TEXT BOOK :

Computer System Architecture by: M. MORRIS MANO

BCA I YEAR

PAPER-III PROGRAMMING AND PROBLEM SOLVING THROUGH 'C'

Group	Paper Code	Lectures	Theory		Internal	Total
II	BCA-13	20/Unit	MAX	MIN	10	50
			40	13		

Course Objective: The course is designed to provide complete knowledge of C language. Students will be able to develop logics which will help them to create programs, to understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing, to develop an understand the compilation process.

Course Outcome: Student will be able to illustrate the flowchart and design an algorithm for a given problem and to develop IC programs using operators, to develop conditional and iterative statements to write C programs, to exercise user defined functions, to inscribe C programs that use Pointers to access arrays, strings and functions, to exercise user defined data types including structures and unions to solve problems, to inscribe C programs using pointers and to allocate memory using dynamic memory management functions, to illustrate flowchart and algorithm, write C programs using operators, pointers, array, strings, functions, to exercise conditional and iterative statements & to Write C programs.

UNIT-I

Classification of programming language: Structured programming concepts, modular programming, top-down programming approach. **Problem solving using computer:** coding, compilation, debugging and testing, documentation, implementation and maintenance. **Problem-Solving Techniques:** Steps for Problem-Solving, Design of Algorithms, Definition, Features of Algorithm. Flowcharts, Basic Symbols used in Flowchart Design. **Basics of C:** History of C, salient Features of C, Structure of a C Program, a Simple C Program, Compiling a C Program, Link and Run the C Program.

UNIT-II

Variables and Constants: Character Set, Identifiers and Keywords, Rules for Forming Identifiers, Data Types, Qualifiers, Variables, Declaring Variables, Initialising Variables, Constants, Types of Constants, operators, expressions, operator precedence and associativity. **Conditional Statements and Loops:** Decision Control Statements: if Statement, switch Statement, Loop Control Statements: while Loop, do-while Statement, forLoop, Nested Loop, gotoStatement, Break Statement, Continue Statement. Storage Classes, Managing input/output function: formatted and unformatted.

UNIT-III

Functions: Definition of a Function, types of function, Declaration of a Function, Function Prototypes, passing arguments to a function, call by value, call by reference, command line argument, recursion. **Pointers:** pointers and their characteristics, address and indirection operators, pointer Type declaration and assignment, pointer arithmetic, passing pointers to functions, array of pointers, introduction to pointer to pointer.

UNIT-IV

Array: one dimensional array Declaration, Initialization, insertion, deletion of an element form an array, finding the largest/smallest element in an array, two dimensional arrays, addition/multiplication of matrices. **String:** Declaration and Initialization of Strings, Array of Strings, Built-in String Functions strlen, strcpy, strcmp, strcat, strlwr, strrev Function, Other String Functions. **Structures and Unions:** Declaration of Structures, Accessing the Members of a

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

UNIT-V

File Handling: Concept of files, Open a file using the function fopen(), Close a file using the function fclose(), file opening mode. Input and Output using file pointers, Character Input and Output in Files, String Input / Output Functions, Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files, text file vs binary file. **Graphics programming:** introduction, functions, stylish liens, drawing and filling images, palettes and colours.

Text Books:

1. E. Balagurusamy , “ Programming in ANSI C”
2. How to solve it by computer by R.G.Dromy, PHI
3. Let us C by YashwantKanetkar
4. Programming in C by S.S.Bhatia
5. A first course in Programming with C, T. Jeypoovan

References Books:

1. Programming in C:Denis Ritchie
2. “C The Complete Reference”, H. Schildt, Tata McGraw Hill
3. Programming and problem solving through ‘C’(Elsevier)

BCA I YEAR

PAPER-IV INTERNET & WEB TECHNOLOGY

Group	Paper Code	Lectures	Theory		Internal	Total
II	BCA-14	20/Unit	MAX	MIN	10	50
			40	13		

Course Objective: The course is intended as a general introduction to the Internet and techniques related to Internet. To familiarize with main structure of packet and networks. To understand various protocols and topologies. To learn the technologies related to web development.

Course Outcome: Students will learn various concepts and features of Internet and web. Students will be able to work with HTML, script, Ajax etc. Students will learn about transmission email and other methods of transmission.

UNIT-I

Introduction: Internet, Growth of Internet, Owners of the Internet, Anatomy of Internet, ARPANET and Internet history of the World Wide Web, basic Internet Terminology, Net etiquette. Internet Applications – Commerce on the Internet, Governance on the Internet, Impact of Internet on Society – Crime on/through the Internet.

Internet Technology and Protocol -Packet switching technology, Internet Protocol TCP/IP, Router, Internet Addressing Scheme: Machine Addressing (IP address), E-mail Addresses, Resources Addresses.

UNIT-II

Internet Connectivity types: level one, level two and level three connectivity, Setting up a connection: hardware requirement, selection of a modem, software requirement, modem configuration, Internet accounts by ISP: Telephone line options, Protocol options, Service options, Telephone line options – Dialup connections through the telephone system, dedicated connections through the telephone system, ISDN, Protocol options – Shell, SLIP, PPP.

Network definition, Common terminologies: LAN, WAN, Node, Host, Workstation, bandwidth, Interoperability, Network administrator, network security, **Network Components:** Servers, Clients, Communication Media, **Types of network:** Peer to Peer, Client Server, Addressing in Internet: DNS, Domain Name and their organization, understanding the Internet Protocol Address. **Network topologies:** Bus, star and ring, Ethernet, FDDI, ATM and Intranet.

UNIT-III

Email Networks and Servers, Email protocols –SMTP, POP3, IMAP4, MIME6, Structure of an Email – Email Address, Email Header, Body and Attachments, Email Clients: Netscape mail Clients, Outlook Express, Web based E-mail. Email encryption- Address Book, Signature File. **Current Trends on Internet:** Languages, Internet Phone, Internet Video, collaborative computing, e-commerce. Overview, SGML, Web hosting, HTML. Documents Interchange Standards, Components of Web Publishing, Document management, Web Page Design Consideration and Principles, Search and Meta Search Engines, WWW, Browser, HTTP.

UNIT-IV

HTML page structure, **HTML Attributes**, HEAD Elements, Input elements, HTML Text, HTML links, HTML document tables, HTML Frames, HTML Images, multimedia, Introduction to CSS.

Introduction to JavaScript: Basic Syntax. Control Structures. Writing Functions. Working with Arrays. The Document Object Model. Events Handling.

UNIT-V

Introduction to AJAX: AJAX, RIA & WEB 2.0. **Interactivity Tools:** ASP, VB Script, JAVA Script, JAVA and Front Page, Flash, Internet Security Management Concepts, Information Privacy and Copyright Issues. Overview of Internet Security, Firewalls.

Text Books :

1. Greenlaw R and Hepp E "Fundamentals of Internet and www" 2nd EL, Tata McGrawHill, 2007.
2. Ivan Bayross, "HTML, DHTML, JavaScript, Perl CGI", 3rd Edition, BPB Publications.
3. D. Comer, "The Internet Book", Pearson Education, 2009.

Reference Books:

1. M. L. Young, "The Complete reference to Internet", Tata McGraw Hill, 2007.
2. Godbole AS & Kahate A, "Web Technologies", Tata McGrawHill, 2008.
3. Jackson, "Web Technologies", Pearson Education, 2008.
4. B. Patel & Lal B. Barik, "Internet & Web Technology", Acme Learning Publishers
5. Leon and Leon, "Internet for Everyone", Vikas Publishing House.

BCA I YEAR

PAPER-V CYBER SECURITY

Group	Paper Code	Lectures	Theory		Internal	Total
			MAX	MIN		
III	BCA-15	20/Unit	40	13	10	50

Course Objective: Cyber security is one of the greatest challenges of contemporary society, and it will only become more complicated as we progress therefore the depth of knowledge and wealth of skills required to engage with and overcome these challenges. Cyber security comprises technologies, processes and controls that are designed to protect systems, networks and data from cyber-attacks. Effective cyber security reduces the risk of cyber-attacks, and protects organizations and individuals from the unauthorized exploitation of systems, networks and technologies.

Course Outcome: The study of Cyber Security helps to gather and analyze data, and learn techniques to accurately present and communicate findings. It aims to empower and enhance proficiency in cyber security among learners and provides guidance on cyber security trends, industry best practices, protective measures against cyber threats, and more. A solid cyber security foundation will identify technology gaps and propose the appropriate action to take to mitigate the risk of an attack. This provides organizations the confidence to build their cyber security strategies.

UNIT-I

Basic of Communication Systems, Transmissions Media, ISO/OSI and TCP/IP Protocol Stacks, Local Area Networks, Internetworking, Packet Formats, Wireless Networks, Working of Internet.

UNIT-II

Security principles, threats and attack techniques, Introduction to security, Information, security, Security triad, Security management, Authentication and access control, Security threats and attacks, Security management, Authentication and access control Identification, Authentication: Authentication by passwords, Protecting passwords, Access control structures, Types of access control.

UNIT-III

Cryptography, Cryptographic mechanisms, Conventional Encryption Principles, Public Key Cryptography Principles, Applications of Public-Key Cryptosystems, Requirements of Public-key Cryptography, RSA Public-key algorithm, Digital signatures and Certificates.

UNIT-IV

Bell–LaPadula (BLP) Model: State Set, Security Policies, Star Property, Tranquility, Aspects and Limitations of BLP, Security models: The Biba Model, Chinese wall model, Clark–Wilson Model, SSL/TLS protocol, Firewalls and Intrusion detection.

UNIT-V

Unix security: Architecture, Principals, Subjects, Objects, Access Control, Management Issues. Windows Security: Architecture, Components of Access Control, Administration. Database Security: Relational Databases, Access Control, Statistical Database Security. Software Security: Malware Taxonomy, Hackers, The rlogin Bug and SQL Injection.

Text Books:

1. Computer Security, 2nd edition

Author: Dieter Gollmann, Publisher: John Wiley & Sons, 2016, ISBN: 0-470-86293-9

2. Security in Computing, Fourth Edition

Author: Charles P. Pfleeger, Shari Lawrence, Publisher: Pearson India

3. Cryptography and Network Security

Principles and Practices 3rd edition, Author: William Stallings Pearson Education.

BCA I YEAR

PAPER-VI DISCRETE MATHEMATICS AND ALGEBRA

Group	Paper Code	Lectures	Theory		Internal	Total
III	BCA-16	20/Unit	MAX	MIN	10	50
			40	13		

Course Objective: This course is designed to make students realize the concepts of mathematics, its applications to real –world problems.

Course Outcome: Upon successful completion of this course, the student will be able to:

- Comprehend the important mathematical concepts in abstract algebra such as set, relation and functions and their types and properties.
- Confer the knowledge of different types of logical connectives, truth tables, tautologies, and normal forms (conjunctive and disjunctive).
- Understand the notion of groups, abelian groups, permutation groups, ring, field- their properties and theorems.
- Impart fundamental concepts, results and techniques in graph theory and its applications.
- Present and analyse significant concepts of matrices, types, inverse, rank and normal form of matrices. Solution of Linear equations through application of matrices.

UNIT-I

Definition of Sets, Venn Diagrams, complements, Cartesian products, power sets, counting principle, cardinality and countability (Countable and Uncountable sets), proofs of some general identities on sets, pigeonhole principle. Relation: Definition, types of relation, composition of relations, domain and range of a relation, pictorial representation of relation, properties of relation, partial ordering relation. Function: Definition and types of function, composition of functions, recursively defined functions.

UNIT-II

Proposition logic, basic logic, logical connectives, truth tables, tautologies, contradiction, normal forms (conjunctive and disjunctive), modus ponens and modus tollens, validity, predicate logic, universal and existential quantification. Notion of proof: proof by implication, converse, inverse, contrapositive, negation, and contradiction, direct proof, proof by using truth table, proof by counter example.

UNIT-III

Binary composition and its properties definition of algebraic structure; Groyas Semi group, Monoid Groups, Abelian Group, properties of groups, Permutation Groups, Sub Group, Cyclic Group, Rings and Fields (definition and standard results)

UNIT-IV

Graph terminology, types of graph connected graphs, components of graph, Euler graph, Hamiltonian path and circuits, Graph coloring, Chromatic number. Tree: Definition, types of tree (rooted, binary), properties of trees, binary search tree, tree traversing (preorder, inorder, postorder). Finite Automata: Basic concepts of Automation theory, Deterministic finite.

UNIT-V

Determinants properties, solution of simultaneous equations by Cramer's rule. Definition of special kinds of matrices, Review of matrices, inverse of matrix. Normal forms, Linear dependence, Rank,

Application to theory of solutions of system of linear equations, linear transformation, Orthogonal, Unitary and Hermitian matrices, Eigen values and Eigen vectors.

Text/Reference Books:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Mc.Graw Hill, 2002.
2. J.P.Tremblay& R. Manohar, "Discrete Mathematical Structure with Applications to Computer Science", Mc.Graw Hill, 1975.
3. V. Krishnamurthy, "Combinatorics:Theory and Applications", East-West Press.
4. Seymour Lipschutz, M.Lipson, "Discrete Mathemataics" Tata McGraw Hill, 2005.
5. Kolman, Busby Ross, "Discrete Matheamtical Structures", Prentice Hall International.
6. A text book of Discrete Mathematics by H K Pathak and D C Agrawal , Shikshasahitya Prakashan, Meerut.

BCA II YEAR

PAPER-I-DATA STRUCTURES USING C++

Group	Paper Code	Lectures	Theory		Internal	Total
I	BCA-21	20/Unit	MAX	MIN	10	50
			40	13		

Course Objective: The paper comprise of programming perception of C++ and the concept of data structure. The basic objective of programming in C++ is to develop a greater understanding of functional, logic, and object-oriented programming paradigms in programming language design and also understanding the design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing. The objective of Data Structure is to introduce the concepts of Abstract data Type, performance measurement, time and space complexities of algorithms, to discuss the implementation of linear data structures such as stacks, queues and lists and their applications, non-linear data structures such as trees and graphs, and various sorting and searching techniques.

Course Outcome: Understand the use of object-oriented concepts to implement object oriented programs in C++ with applications to encapsulation, inheritance and polymorphism and develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include: arrays, linked lists, binary trees, heaps, and hash tables. Students will develop the knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.

Unit I

Introduction, OOPS languages, characteristics of OOP's languages, application of OOP's, OOP's paradigm, concepts: object, class, data abstraction, data encapsulation, inheritance, and polymorphism. Static and dynamic binding, message passing, benefits of OOP's, disadvantage of OOP's.

Unit II

C++ Programming Concepts: input and output in C++, functions in C++- value parameters, reference parameters, Parameter passing, function overloading, arrays, pointers, new and delete operators, class and object, access specifiers, friend functions, constructors and destructor, Operator overloading, Inheritance and Polymorphism. Exceptions-throwing an exception and handling an exception

Unit III

Basic Concepts – Data Structures, Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Complexity Analysis Examples, Introduction to Linear and Non Linear data.

Stack:Definition, Array implementation of stack (static stack): Operations PUSH, POP, And TRAVERSE. Applications of stack: Infix, Prefix, Postfix representation and evaluation using stack, Use of stack in recursive implementation.

Queue:Definition, Array implementation of queue (static queue): Operations INSERT, DELETE and TRAVERSE. Introduction to Circular queue: Definition & implementation, Priority queue, Double ended queue, Applications of queue

Unit IV

Introduction to linked list: Definition, advantaged, basic operations on linked list, stacks and queues using linked list, doubly linked list, circular linked list, applications of linked list.

Searching and Sorting Techniques: Sequential search, binary search, insertion sort, selection sort, quick sort, bubble sort, heap sort, comparison of sorting methods.

Unit V

Tree: Trees-basic terminology ,binary trees, tree representations as array and linked list, basic operations on binary tree, traversal of binary trees:- inorder, preorder, postorder. Applications of binary tree, threaded binary tree, AVL tree, Introduction to B-Tree & B+ tree. Hash Table, Collision resolution technique.

Graphs: Definition, Terminology, Directed, Undirected and Weighted Graph, Representation of Graph, Graph Traversal-Depth first, Breadth first search, Spanning tree, Minimum Spanning tree, Shortest path algorithm.

Practicals:

Notes: As per the syllabus and under guidance of respective faculty every student has to perform minimum 50 lab exercise covering all units with equal weightage.

Text Books:

1. Object Oriented Programming with C++, Balaguruswamy Tata Mgraw Hill (2008).
2. Object Oriented Programming in C++, Robert Lafore, Sams; 4 edition.
3. YedidyahLangsam Moshe J. Augenstein, Aaron M. Tenenbaum, “**Data Structures using C & C++**”, PHI
4. G.S.Baluja, “**Data Structures Through C++**”,DhanpatRai& Co.,4th Edition
5. Fundamentals of Data Structures BySartajSahani.

Reference Books:

1. Seymour Lipschutz,“**Data Structures**”, Schaum’s Outline Series, Tata McGrawHill.
2. Adam Drodzek, “**Data Structures & Algorithm in C++**”, 2nd Edition

BCA II YEAR
PAPER-II-DATABASE MANAGEMENT SYSTEM & RDBMS

Group	Paper Code	Lectures	Theory		Internal	Total
I	BCA-22	20/Unit	MAX	MIN	10	50
			40	13		

Course Objective: The major objective of this is to provides a good formal foundation on the relational model of data, to present SQL and procedural interfaces to SQL comprehensively, an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design, present the concepts and techniques relating to query processing by SQL engines, the concepts and techniques relating to ODBC and its implementations.

Course Outcome: Students should understand, appreciate and effectively explain the underlying concepts of database technologies, Design and implement a database schema for a given problem-domain, Normalize a database, Populate and query a database using SQL DML/DDL commands. Declare and enforce integrity constraints on a database, Programming PL/SQL including stored procedures, stored functions, cursors, packages.

Unit I

Purpose of database system, views of data, data models: relation, network, hierarchical, instances and schemas, data dictionary, types of database languages:-DDL, DML, DCL, TCL, structure of DBMS, advantages and disadvantages of DBMS, 3-level architecture proposal:-external, conceptual & internal levels, levels of data abstraction, Database users and DBA, Classification of Database Management Systems, Components of database system, Traditional File Systems vs. Modern Database Systems, Applications of DBMS, Data Independence.

UnitII

Entity relationship model as a tool of conceptual design: entities & entities set, relationship, relationship set & relationship types, attributes, role, participation and mapping constraints, keys, strong and weak entities, Advance ER Model Features: generalization, specialization & aggregation, reducing ER diagram to tables, Roles, Participation.

Unit III

Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys: primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules: entity & referential integrity ,extension and intention, relational algebra: select, project, Cartesian product, different types of joins: theta, equi, natural, outer joins, set operations.

Evaluation of SQL, Between clause, Distinct Clause, Order by Clause, Group by Clause, SQL Functions, Sub queries, Handling null value, Aggregate function, User Defied Function, View. Relational Calculus, Introduction, Tuple Relational Calculus, Domain Relational Calculus.

PL/SQL Programming using Oracle, Oracle Data types, Looping and Decision Making, Working with Stored Procedure, Trigger, Cursor, Package, Index, Synonym and Sequence. Various Programming Examples.

Unit IV

Functional Dependencies, Good & Bad Decomposition and Anomalies as a database: A consequences of bad design, Universal relation, Normalization: 1NF, 2NF, 3NF &BCNF normal forms, multivalued dependency, join dependency, 4NF, 5NF.

Relational Database design, Features of good relational database design, Codd's Rule, Integrity constraints, Armstrong Axioms, Closure Set of Functional Dependency, Closure Set of Attributes.

Unit V

Basic concepts: -Indexing and Hashing, B-tree Index files, Hashing: Static & Dynamic hash function, Index definition in SQL: Multiple key accesses. Transaction Management, ACID properties, Serializability, Concurrency Control, Lock and types of Locks, Two Phase Locking Protocol, Check Points, Recovery Techniques, Deferred and Immediate data modification. Emerging

Database Technology: Data Warehouse, Data Mining, Distributed database, Mobile Database, Object Oriented Database, Geographical Database.

Practicals

Note: As per the syllabus and under guidance of respective faculty every student has to perform minimum 25 lab. exercise covering all units with equal weightage.

Text Books-

1. Database System Concepts by Henry Korth and A. Silberschatz.
2. Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication
3. Database Management System by SeemaKedar, Technical Publication

Reference Books-

1. An Introduction to Database System by BipinDesa
2. An Introduction to Database System by C.J.Date.
3. Atul Kahate, "Introduction to Database Management Systems",
4. Raghu Ramakrishnan, "Database Management Systems",
5. G.K.Gupta, "Database Management Systems", Tata McGraw Hill, 2011.

BCA – II YEAR

PAPER-III-SOFTWARE ENGINEERING

Group	Paper Code	Lectures	Theory		Internal	Total
II	BCA-23	20/Unit	MAX	MIN	10	50
			40	13		

Course Objective: Students will gain knowledge of basic SW engineering methods and practices, and their appropriate application. Students will understand software process models, software requirements and the SRS documents. They will know modularity, coding standards, verification and software testing approaches such as unit testing and integration testing.

Course Outcome: Basic knowledge and understanding of the analysis and design of complex systems. Ability to apply software engineering principles and techniques. Ability to develop, maintain and evaluate large-scale software systems. To produce efficient, reliable, robust and cost-effective software solutions. Ability to work as an effective member or leader of software engineering teams. To manage time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals.

Unit I

Introduction: Software Engineering-Software Process- Generic process model-Prescriptive process model-specialized, unified process-Agile development-Agile Process- Extreme Programming- Other agile Process models-Software engineering Knowledge-core Principles-Principles that guide each framework Activity.

Unit II

Requirements: Requirements Engineering-Establishing the Groundwork-Eliciting Requirements-Developing use cases-Building the requirements model-Negotiating, validating Requirements-Requirements Analysis-Requirements Modelling Strategies.

Unit III

Design Modeling With Uml: Modeling Concepts and Diagrams - Use Case Diagrams - Class Diagrams - Interaction Diagrams - State chart Diagrams - Activity Diagrams - Package Diagrams - Component Diagrams – Deployment Diagrams - Diagram Organization- Diagram Extensions. Design Process- Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes- Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements.

Unit IV

Coding: Programming Principles and Guidelines-common coding errors, Structured programming, Information Hiding, Some Programming Practices, Coding Standards. Coding Process-An incremental coding process, Test Driven Development. Refactoring-Basic concepts, Bad Smells. Common Refactoring. **Testing:** Software Testing Fundamentals, Test case Design, White-Box Testing, Basis Path Testing. Control Structure Testing, Black-Box Testing.

Unit V

Testing: Strategic Approach to software Testing- Strategic Issues , Unit Testing, Integration Testing, Validating Testing, System Testing, Art of Debugging. Reengineering- Business Process Reengineering, Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering, Economics of Reengineering. **SRS:** Need for SRS, Characteristics of an SRS, components of an SRS, structure of a Requirements Document.

TEXT BOOKS :

1. Roger S, “Software Engineering – A Practitioner’s Approach”, seventh edition, Pressman, 2010.
2. Pearson Edu, “Software Engineering by Ian Sommerville”, 9 th edition, 2010.
3. UgrasenSuman , “Software Engineering: Concepts and Practices” , Cengage Learning India, 2013

REFERENCES :

1. Hans Van Vliet, “Software Engineering: Principles and Practices”–, 2008.
2. Richard Fairley, “Software Engineering Concepts”, 2008.

BCA II YEAR
PAPER-IV-OPERATING SYSTEM with UNIX/LINUX

Group	Paper Code	Lectures	Theory		Internal	Total
			MAX	MIN		
II	BCA-24	20/Unit	40	13	10	50

Course Objective: The course is intended as a general introduction to the techniques used to implement operating systems and related kinds of systems software. To familiarize with main structure of Operating System and their working and understand the operations performed by Operating System. The objective is to learn the different memory management techniques and various scheduling policies of Operating system.

Course Outcome: Students will learn various concepts and features of Operating systems and will be able to compare various operating systems. Students will learn algorithm of CPU Scheduling, Memory Scheduling and disk scheduling.

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, paging combined with segmentation.

Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation. Security threads protection intruders-Viruses-trusted system. Introduction to distributed systems and parallel processing

Unit IV

Unix operating system, background, philosophy, help facility, The file system, structure of file system, Basic Command related to file system.

Utilities: more, file, wc, file comparison (cmp, comm, diff) , lp, banner, cal, date, who, tty, sty commands. The Bourne shell: sh preceding a command by its own combining commands, pattern matching, echo, pipes, tees, shell variables and shell scripts, simple filters, Advanced filters.

The process: shell process, parent and children process status, system processes, multiple jobs , foreground and background, wait commands, pre mature termination of process, job execution with low priority, multiple jobs in foreground, shell layers, timing processes.

Unit V

Communication and scheduling, Execute at later running jobs, periodically. Programming with shell: system variable, profile, conditional execution, script termination, Conditional and loop control statements, set and shift statement.

System Administration: super user, security, user services, floppy disk, management operation, files system, administration backups.

Practicals

Note: As per the syllabus and under guidance of respective faculty every student has to perform minimum 25 lab. exercise covering all units with equal weightage.

TEXT BOOK

1. Operating System Concepts, Addison Wesley, 4th Edition, A. Silberschatz and P. Galvin. 1994.
2. Sumitabha Das, "Unix : Concepts and Applications", Third Edition, 2006, Tata Mc-Graw Hill
3. Modern Operating System, A.S Tanenbaum., Prentice Hall of India
4. Operating System by Deitel

REFERENCE BOOK:

1. Maurice J. Bach, "Design of the Unix Operating System", Third Edition, 2000, PHI.
2. ISRD Group, Basics of OS, UNIX and SHELL Programming" TMH (2006)
3. A User guide to unix system", Thomas Rebecca yate, Second Edition, 2002, .Tata McGraw Hill.
4. Stephen Prata "Advanced Unix -A programmer's Guide.

BCA – II YEAR

PAPER-V-ACCOUNTING AND FINANCIAL MANAGEMENT

Group	Paper Code	Lectures	Theory		Internal	Total
III	BCA-25	20/Unit	MAX	MIN	10	50
			40	13		

Course Objective: This course will expose students to a broad range of accounting concepts and their terminology. This will prepare the learners for a mix of accounting professional activities including public accounting, governmental accounting and corporate accounting and will make aware with the financial statements in accordance with the accepted accounting principles.

Course Outcome: This course will impart knowledge and understanding of the principle and concepts of financial accounting and develop the skill required for the preparation of financial statement and accounts of various business and companies.

Unit I

Introduction: Financial Accounting-definition and Scope, objectives of Financial Accounting, Accounting v/s Book Keeping Terms used in accounting, users of accounting information and limitations of Financial Accounting.

Unit II

Conceptual Frame work: Accounting Concepts, Principles and Conventions, Accounting Standards concept, objectives, benefits, brief review of Accounting Standards in India, Accounting Policies, Accounting as a measurement discipline, valuation Principles, accounting estimates.

Unit III

Recording of transactions: Voucher system; Accounting Process, Journals, Subsidiary Books, Ledger, Cash Book, Bank Reconciliation Statement, Trial Balance. Depreciation: Meaning, need & importance of depreciation, methods of charging depreciation.(WDV & SLM).

Unit IV

Preparation of final accounts: Preparation of Trading and Profit & Loss Account and Balance Sheet of sole proprietary business.

Introduction to Company Final Accounts: Important provisions of Companies Act, 1956 in respect of preparation of Final Accounts. Understanding of final accounts of a Company.

Unit V

Computerised Accounting: Computers and Financial application, Accounting Software packages. An overview of computerized accounting system - Salient features and significance, Concept of grouping of accounts, Codification of accounts, Maintaining the hierarchy of ledger, Generating Accounting Reports.

Recommended Books:

1. Fundamentals of Accounting & Financial Analysis: By Anil Chowdhry (Pearson Education)
2. Financial accounting: By Jane Reimers (Pearson Education)
3. Accounting Made Easy: By Rajesh Agarwal& R Srinivasan (Tata McGraw –Hill)
4. Financial Accounting for Management: By Amrish Gupta (Pearson Education)
5. Financial Accounting for Management: By Dr. S. N. Maheshwari (Vikas Publishing House).

BCA II YEAR
PAPER-VI-COMPUTER ORIENTED NUMERICAL METHODS

Group	Paper Code	Lectures	Theory		Internal	Total
III	BCA-26	20/Unit	MAX	MIN	10	50
			40	13		

Course Objective: The primary objective of the course is to understand the construction of numerical algorithms. Understand the concepts of interpolation and approximation of functions by simpler computational building blocks, finding the numerical differentiation and divided difference, numerical quadrature and integrations, numerical solutions of ordinary differential equations and boundary value problem.

Course Outcome: Student will be able to use numerical methods for solving a problem, to get the accuracy, to assess the reliability of the numerical results, to determine the effect of round off error or loss of significance.

Unit I

Numerical Computations : Computer Arithmetic - Floating Point Number Operations. Iterative Methods : Bisection Methods, False Position Methods, Newton Raphson Method, Secant Method, Convergence of Solution (Bisection Method, False Position Method).

Unit II

Simultaneous Linear Equation : Solution of Simultaneous Linear Equation – Gauss Elimination Method, Gauss – Seidal Method, Gauss – Jordan Elimination Method, Triangularization Method, Ill Conditioned Equation & Refinement of solution .

Unit III

Difference Operators And Interpolation: Definition Of Forward, Backward, Shifting, Central Difference and Averaging Operators and their Relationships. Newton's Forward Interpolation Formula, Newton's backward Interpolation Formula Newton's divided Interpolation Formula. Lagrange's Interpolation Formula.

Unit IV

Curve Fitting : Curve Fitting Method, Least Curve Fitting, Non Linear Curve Fitting. Numerical Integration : General Quadrature Formula : Newton- Cote's Formula, Trapezoidal Rule, Simpson's one Third Rule, Simpson's Three Eight Rule.

Unit V

Numerical Solutions of Ordinary Differential Equations : Euler's Method , Euler's Modified Method. Taylor's Series Method, Picard's Method, RungeKutta Second Order and Fourth order Method.

TEXT BOOK:

1. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India.
2. Engineering Mathematics -III by D.K. Jain , Shree Ram Prakashan [Unit I - V]

REFERENCE BOOKS:

1. S. S. Sastry, Introductory Methods of Numerical Analysis. M. K. Jain, S.R.K. Iyengar & R. K. Jain, Numerical Methods for Scientific and Engineering Computation.
2. H. C. Saxena, Finite Differences and Numerical Analysis.
3. Modes A., Numerical Analysis for Computer Science.
4. Numerical Analysis by gupta and malik . (TEXT)
5. Numerical Analysis by Shastri
6. Computer based Numerical Algorithm by Krishnamurthy.