

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.

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: This course is designed into two sections Fundamental and PC-Software, Fundamental section is designed to understand the basic terminologies of computer including hardware and software. PC-Software section focuses on providing basic training of Office automation software.

Course Outcome: After completing the course students will be able to understand the basic operations of computer and will be able to opt for jobs as an Office Automation Clerk, Support Assistant.

UNIT-I

Introduction to Computers: History of development of Computers. Characteristics, Capabilities and limitations, Generations of Computers. Classification of Computers, Basic Components of a computer system – Control Unit, ALU, I/ O Devices, Memory – RAM, ROM, with its type, Flash Memory. Types of Software – System software, Application software, Utility Software, Open source software. Operating Systems – Functions, languages and packages. Binary data representation in computers. Computer Viruses. Secondary storage device, FAT, file & directory structure and naming rules, booting process.

UNIT-II

Linux: Features of Linux — Prons and Cons of Linux, Workspace, The Panel, Taskbar, Titlebar, Window Manager, Manipulating Windows: Focus, Logout, Maximize and Minimize, resize, move, rollup, unroll, close, move to workspace, Logout, shutting down the system, Launchers, date and time, file manager, creating, deleting, moving and modifying the permissions of folders, Trash Can, Graphic image access, Creating and managing folders.

LibreOffice: Introduction to LibreOffice, Advantages of LibreOffice, Minimum requirements, Toolbars, displaying or hiding toolbars, sub-menus and tool palattes, moving toolbars, floating toolbars, customizing toolbars.

UNIT-III

Introduction to Writer: Introduction to writer, Features of writer, Parts of main window, Menu bar, Rulers, Status bar, context menus, slide bar, Starting new documents, opening existing documents, saving documents, Save command, Save As command, password protection, changing password, saving document automatically, opening and saving files, renaming and deleting files, using the navigator, undoing and redoing changes, reloading a document, closing a document, word and character count, page style, selecting text, selecting vertical block of text, cutting copying and pasting text, find and replacing text, insert special characters, macros, checking spelling and grammar, using synonyms and the thesaurus, Auto Correct, footnote, Endnote, bookmark, hyperlink, line number, paragraph settings, border, DropCaps, Formatting characters: font name, size, effects, bullets and numbering, Formatting pages: page break, page margins, page number, Inserting Header, Footer, page number, border, background, print a page, Template, insert images, resizing, rotate, flipping, compress and deleting an image, working with drawing tools: insert, resize, grouping, rotating, positioning image with text, wrapping text. Working with fontwork object, Working with Tables, Mail Merge.

UNIT-IV

Introduction to Impress: Introduction, features, creating, Adding, saving, renaming and removing slides, and printing a presentation, adding, deleting and formatting comment, slide view, outline view, slide sorter view, notes view and slide show view. Changing text font and size, selecting text style and color, set header and footer, Using, bullets, ClipArt and word art gallery. Applying design template, Inserting graph adding transitions and animation effects, setting timings for slide show preparing note pages, preparing audience handouts.

Introduction To CALC Spreadsheet: Definition of Calc, Workbook, Working On worksheet, cells, title bar, menu bar, toolbar, formula bar, status bar, creating, opening and saving spreadsheets, password protection, sheet navigation, working with rows and columns, viewing Calc, editing and formatting data, merging and splitting cells, formatting data, Auto format of cells and sheets, conditional formatting, hiding and showing data, sorting records, find and replace, creating & formatting charts and graphs, using style and templates, working with graphics. Drawing tools, printing a spreadsheet, adding header and footer, formulas and functions.

UNIT-V

Overview of System Analysis and Design, 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. Characteristics of a good Business Unit.

TEXT BOOKS:

1. Computers Fundamentals and Architecture by B. Ram
2. William Stallings, Operating System, Pearson Education
3. Norton, Introduction to Computers, McGraw Hill
4. Fundamentals of Computers: P. K. Sinha
5. System Analysis and Design by Elias M Awad.

REFERENCES BOOKS:

1. Computers Today: Suresh K.Basandra
2. Operating System: Achyut S. Godbole
3. Management Information systems by Gerald V. Post & David L. Anderson.
4. Understanding Computer Fundamentals & Dos By G.K. Iyer

Practical list

1. Write steps for creating a formatted CV having the following fields objective, name, father's name, mother's name, DOB, address, email-id, qualification, hobbies etc.
2. Create a formatted "Appreciation Certificate" and "Certificate of Proficiency" for the best student.
3. Create a formatted table using Table Menu and do all the operation of the table.
4. Create a formatted pay slip of 10 employee having following fields:
Employee No, Employee Name, Designation, Phone No, Address, Basic Pay, DA (60% of basic), HRA, Gross Pay.
5. Create a formatted mark sheet and also prepare a chart.
6. Do the following things with tables
 - a. Maximize row width and height.

- b. Centre text in cells.
 - c. Change text and cell color
7. Create a presentation using animation on topic “Basics of Computers”.
 8. Do the following things with Header and Footer
 - a. Use Header & Footer to insert a header, including your last name and the page number, positioned at the top right side of the page.
 - b. Your name should be separated from the number using a vertical line, similar to “Smith | 1”.
 - c. Use Roman numerals (i, ii, iii, etc.) for the page numbers for the Table of Contents, List of Figures, and List of Tables pages.
 9. Create a presentation on College Assembly using image, video, and song with 10 slides.
 10. Send an invitation letter to your five friends for birthday party using Mail Merge.

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 introduced 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 to compare different memory management schemes. Students will 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
			MAX	MIN		
II	BCA-13	20/Unit	40	13	10	50

Course Objective: The course aims to provide exposure to problem-solving through programming. It aims to train the student to the basic concepts viz. conditional and decision making, file handling of the C-programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts.

Course Outcome: After the course the students will be able to identify and abstract the programming task, will be able to write pseudo-code of the task, choose the right data representation formats based on the requirements of the problem and hence use the language to efficiently solve the task.

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, for Loop, Nested Loop, goto Statement, 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 from 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.

Text Books:

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

References Books:

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

Practical List

Integers

1. C Program to Check if a given Integer is Odd or Even
2. C Program to Calculate the Sum of Odd & Even Numbers
3. C Program to Check if a given Integer is Positive or Negative
4. C Program to Find the Number of Integers Divisible by 5
5. C Program to Read Two Integers M and N & Swap their Values
6. C Program to Accept two Integers and Check if they are Equal
7. C Program to Compute the Sum of Digits in a given Integer
Conversions
8. C Program to Convert the given Binary Number into Decimal
9. C Program to Convert a Decimal Number to Binary & Count the Number of 1s
10. C Program to Convert a Given Number of Days in terms of Years, Weeks & Days
Recursions
11. C Program to find Sum of Digits of a Number using Recursion
12. C Program to find Reverse of a Number using Recursion
13. C Program to find Sum of N Numbers using Recursion
14. C Program to find whether a Number is Prime or Not using Recursion
Structure
15. C Program to Display the Inventory of Items in a Store
16. C Program to Display the ATM Transaction
Functions
17. C Program to Illustrate Pass by Reference
18. C Program to Illustrate Pass by Value
Use of Arguments
19. C Program to Input 3 Arguments and Operate Appropriately on the Numbers
20. C Program to Print the Program Name and All its Arguments

BCA I YEAR
PAPER-IV INTERNET & WEB TECHNOLOGY

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

Course Objective: The course is intended to introduce the concepts of various techniques related to Internet, familiarize with the structure of various topologies and protocols and to learn the static web development technologies.

Course Outcome: Students will be able to work with various concepts and features of Network, Internet and also able work with static web development using HTML, JavaScript and CSS.

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, Clients Server, Addressing in Internet: DNS, Domain Name and their organization, understanding the Internet Protocol Address. **Network topologies:** Bust, 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.
4. "HTML5 Black Book" 2nd Edition Dreamtech Press.

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.

Practical list

1. Write a program to write a paragraph using text formatting tag, paragraph tag and heading tag.
2. Write a program to create a navigation menu using list and hyperlink.
3. Write a program to design a banner using image tag and border.
4. Design a webpage on National Leader.
5. Design a webpage of your resume using table tag and image.
6. Design a webpage to print electricity bill.
7. Design email signup form.
8. Write a java script to convert lower case to upper case.
9. Write a java script to print table of an entered number.
10. Write a java script to find maximum and minimum value among three entered amount.
11. Write a java script for password validation.
12. Write a java script to change the back color using prompt.
13. Write a java script to find a number is even or odd.
14. Create a web page using CSS.
15. Write a java script to print the reverse of an entered number.

**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, Internet working, 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
			MAX	MIN		
III	BCA-16	20/Unit	40	13	10	50

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 Mathematics" Tata McGraw Hill, 2005.
5. Kolman, Busby Ross, "Discrete Mathematical 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.

TEXT BOOKS

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

Reference Books

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

List of Practical

1. Display int, float, char and string using cin and cout.
2. Program using read(), write() and getline().
3. Program to add two numbers.
4. Program to check eligibility to admission.
5. Program to check whether entered number is even or odd.
6. Program to check percentage and grade of a student.
7. Program to print days of week.
8. Program to calculate sum of digits of entered number.
9. Program to check that given number is palindrome or not.
10. Program to calculate area of rectangle, triangle and sphere using function overloading.
11. Program to access private members of a class using member function.
12. Program to implement multilevel inheritance.
13. Program to implement multiple inheritance.
14. Program to read values using constructors.
15. Program to declare default argument in constructor to obtain power of a number.
16. Program to implement multiple virtual base class.
17. Program to declare pure virtual function.
18. Implementation of stack using array.
19. Implementation of queue using array.
20. Insertion, deletion and traversal of singly link list.

21. Insertion, deletion and traversal of doubly link list.
22. Program for linear and binary search.
23. Sorting: selection, bubble, insertion and quick sort.
24. Convert infix to postfix.

BCA II YEAR
PAPER-II DATABASE MANAGEMENT SYSTEM

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

Course Objective: To give knowledge of the Relational Model of Data Management. This course contains approaches to organize, store, retrieve and process data, architecture and design techniques for effective implementation, different anomalies and their solutions and a platform for understanding of SQL and PL/SQL.

Course Outcome: Student will be able learn database creation and modification. Data definition, manipulation, control using SQL command. They will learn the concepts of joining the database which will help them access data from different relations. Students will be able to implement the programming using PL/SQL for automated and fast database activities.

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.

UNIT-II

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 Defined 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.

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.

Practical List

SQL

1. Create table employee with column id, name, dob, designation, salary. Insert 10 rows.
2. Create table salesman with fields: num, name, city, commission. Insert into 10 rows.
3. Create table customer with field: num, name, city, rating, num.insert 5 row.
4. Update data commission 500 rs if rate is less 5.
5. Change the table structure employee, add new column address, drop column designation and add column post. Rename the column commission to comm of table salesman.
6. Display the name of following student
 - a) Started with 'A'. b) Ended by 'S' c) name contains word 'F' except start and end. d) Second letter is 'E';
7. Display the name of following student:
 - a) Commission is between 500 to 3000 b) Salary is less than 5000. c) Date of birth is greater than 10-May-1991. d) Salary is greater than 5000 d) rating is 10 e) 10 % of salary.
8. Display the name of following student:
 - a) Name is ascending order and descending b) name of employees from the same city c) name of employees from the same city having average salary 10000.
9. Perform group function: sum, count, min, max, avg.
10. Perform date function: sysdate, add_months, months_between, last_day(), Next_day()
11. Perform Set operation: Union, Minus, Intersect.
12. Add primary key, unique key, check constraints, null constraints in employee.
13. String: Character, CHR, concat, initcap, lenth, lower, upper, lpad, rpad, Rtrim, ltrim,substr,
14. Number: abs, ceil, floor, round, sign, trunc, power, sqrt,

PL/SQL

1. Write a program to add two number.

2. Write a program to compare two number and display largest number.
3. Write a program to compare three number and display largest number.
4. Write a program to check whether the given number is prime or not.
5. Write a program to print odd number between 1 to 100.
6. Write a program to compare two dates.
7. Write a program to print the financial year of given date.
8. Write a procedure to fetch data from table emp using explicit cursor.
9. Write a procedure to fetch data from order table using explicit cursor with attributes.
10. Write a procedure to implement too_many_rows, no_data_found, Zero_Divide and Others exception for prime number.
11. Write a procedure to implement defined exception in financial year.
12. Write a function to check that given no is prime or not. If prime then return 1 or not prime than return 0.
13. Write a procedure to insert 1000 rows in a table called student using cursor, for loop and exception.
14. Write a procedure to create trigger that will restrict to delete, update and Insert DML operation in the data from table student.
15. Write a procedure to insert a row data is inserted and delete from the table student the field are id, operation date, operation data, operation type and studentid.
16. Perform export a .dmp file and import same file into the user "Vivekanand".

BCA – II YEAR
PAPER-III INTERNET OF THINGS AND PYTHON PROGRAMMING

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

Course objective: The course is designed to acquire basic programming and object-oriented skills in python. Also the course is intended to familiarize students with *Arduino as IDE, programming language & platform* and focusing to make them understand product design and prototyping in Internet of Things.

Course outcome: After the completion of the course, the students will be able to design Smart System applications using *Arduino* boards and *basic* components. The students will also be able to solve real life problems using various libraries of Python

UNIT-I

Introduction, types of Arduino, Explore Arduino IDE: File(New, Open, Open Recent, Examples, Close, Save, Save as, Page Setup, Print, Preference), Edit(Undo, Redo, Cut, Copy, Paste, Select All, Find), Sketch(Verify/Compile, Upload, Show Sketch Folder, Include Library), Tools (Auto Format, Archive Sketch, Fix Encoding and Reload, Serial Monitor, Serial Plotter, Board, Port, Get Board Info).

UNIT-II

Variables, Data types, collecting and showing data through serial port, Strings and operations with strings, Operators and loops, Exploring Arduino Uno: USB port, External power jack, Analog pins, Digital pins, ICSP (In Circuit Serial Programming), Microcontroller, reset button, Connecting Arduino to PC. Main functions: setup () function, loop () function. Installing package.

UNIT-III

What is Python, Python Features, Python Applications, Python and PyCharm Installation, Python IDE, Python Code Basics- Python Variables, Python Data Types (Lists, Tuples, Sets, Dictionary, Strings, Numeric), Python Operators, Python Conditional Statements (If Statement, Elif Statement, Else Statement, Python Loops (While Loop, For Loop, Nested Loop), I/O Operations.

UNIT-IV

Python Functions, Uses of Functions, File Handling (Open File, Read / Write File, Close File), Object and class (defining a class, creating an object), `__init__()`, object methods, self parameter.

UNIT-V

Python NumPy- array(one, multi-dimensional), NumPy array vs list, NumPy operations (ndim, iemsize, dtype, reshape, slicing, linspace, max/min, addition, vertical and horizontal stacking, ravel). Python Matplotlib, types of plot, Python Pandas, Pandas Operations: (Slicing the data frame, Merging & Joining, Concatenation, Changing the index, Change Column headers, Data munging).

Text Books:

- Learning C for Arduino by Syed Omar Faruk Towaha.
- Learning Python by Mark Lutz,O'Reilly Publication, 5th Edition

- Python Programmin for beginners by Jason Cannon, Createspace Independent Publishing platform, 2014

List of practical

Arduino

1. Write a program to Blink LED using Arduino IDE.
2. Write a program to take input from button (Micro-switch) using Arduino IDE.
3. Write a program to take Analog input from DHT sensor using Arduino IDE.
4. Write a program to demonstrate switch-case with the IR sensor using Arduino IDE.
5. Write a program to display Text on LCD (16*2) Display using Arduino IDE.

Python

1. Write a program which will find factors of given number and find whether the factor is even or odd. Hint: Use Loop with if-else statements
2. Write a code which accepts a sequence of words as input and prints the words in a sequence after sorting them alphabetically. Hint: In case of input data being supplied to the question, it should be assumed to be a console input.
3. Write a program, which will find all the numbers between 1000 and 3000 (both included) such that each digit of a number is an even number. The numbers obtained should be printed in a comma separated sequence on a single line. Hint: In case of input data being supplied to the question, it should be assumed to be a console input. Divide each digit with 2 and verify is it even or not.
4. Write a program that accepts a sentence and calculate the number of letters and digits. Suppose if the entered string is: Python0325Then the output will be: LETTERS: 6 DIGITS:4. Hint: Use built-in functions of string.
5. Design a code which will find the given number is Palindrome number or not. Hint: Use built-in functions of string.
6. A website requires a user to input username and password to register. Write a program to check the validity of password given by user. Following are the criteria for checking password:
 1. At least 1 letter between [a-z]
 2. At least 1 number between [0-9]
 3. At least 1 letter between [A-Z]
 4. At least 1 character from [\$#@]
 5. Minimum length of transaction password: 5.
 6. Maximum length of transaction password: 12
7. Write a for loop that prints all elements of a list and their position in the list. a = [4,7,3,2,5,9]
8. Please write a program which accepts a string from console and print the characters that have even indexes.
9. Please write a program which accepts a string from console and print it in reverse order.
10. Please write a program which count and print the numbers of each character in a string input by console.
11. With two given lists [1,3,6,78,35,55] and [12,24,35,24,88,120,155], write a program to make a list whose elements are intersection of the above given lists.

12. By using list comprehension, please write a program to print the list after removing the value 24 in [12,24,35,24,88,120,155].
13. By using list comprehension, please write a program to print the list after removing the 0th,4th,5th numbers in [12,24,35,70,88,120,155].
14. By using list comprehension, please write a program to print the list after removing delete numbers which are divisible by 5 and 7 in
15. Write a program to compute $1/2+2/3+3/4+\dots+n/n+1$ with a given n input by console (n>0).
16. Use Case

Domain –Telecom

focus –Optimization

Business challenge/requirement

LifeTel Telecom is the latest entrant in the highly competitive Telecom market of Singapore. It issues SIM to the verified users. Till now verification was manual through the photocopy of approved id card document. However, government has recently introduced Social ID called Reference ID which is mapped to fingerprint of user. LifeTel should now verify user against the fingerprint and Reference ID

Key issues Build a system where when user enters Reference ID it is encrypted, so that hackers cannot view the mapping of Reference ID and finger print

Business benefits

Company will be able to quickly issue SIM to user and expected gain in volume is approximately 10 times as the manual process of verification is replaced with secure automated system

Approach to Solve

You have to use fundamentals of Python taught in module 1

- 1.Read the input from command line –Reference ID
- 2.Check for validity –it should be 12 digits and allows on number and alphabet
- 3.Encrypt the Reference ID and print it for reference

Enhancements for code

- 1.Allow some special characters in Reference ID
- 2.Give the option for decryption to user

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

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

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, premature 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.

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.

Practical List

1. Write a shell script program to display “HELLO WORLD”.
2. Write a shell Script program to check whether the given number is even or odd.
3. Shell script to create a simple calculator that performs basic arithmetic operations
4. Calculate area of circle.
5. Calculate Simple Interest.
6. Copy contents from one file to another file.
7. Find greatest number among three numbers.
8. Print reverse of an input number.
9. Enter marks and basic information of student and print marksheet.
10. Print list of prime number between a range entered by user.

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 this course is to make understand numerical computation which include linear equation, interpolation, and differential equation there by understanding the implementation of the numerical methods.

Course Outcome: Students will be able to use numerical methods for solving numerical 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 Liner Equation: Solution of Simultaneous Liner Equation – Gauss Elimination Method, Gauss – Seidal Method, Gauss – Jordan Elimination Method, L U Decomposition of a System of Linear Equations, 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 Modifies Method. Taylor's Series Method, Picard's Method, Runga Kutta 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 Shastri
5. Computer based Numerical Algorithm by Krishnamurthy

BCA III YEAR
PAPER-I OBJECT ORIENTED PROGRAMMING USING JAVA

Group	Paper Code	Lectures	Theory		Internal	Total
I	BCA-31	20/Unit	MAX	MIN	10	50
			40	13		

Course objective: The course will enable to understand the fundamentals of OOPS concept of programming with various class libraries. It will provide a platform to understand Java SDK environment to create, debug and execute Java Program.

Course outcome: Students will be able to understand:

- The concept of Object-Oriented Programming & Java Programming Constructs.
- The basics of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords.
- The concept of exception handling and Input/output operations.
- Design and develop Java applet using Abstract Window Toolkit.

UNIT-I

OOP concepts:-Data abstraction , encapsulation , inheritance, polymorphism, classes and objects, procedural and Object oriented programming paradigms.

Java Programming-History of Java, comments, datatypes, variables, constants, , scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow block scope, conditional statements, loops, break and continue statements. simple java program , arrays, console input and output, constructors, methods, parameter passing, static fields and methods, access control, this keyword, overloading methods and constructors recursion, String class.

UNIT-II

Inheritance-Definition , hierarchies, super and subclasses , Member access rules, super keyword, preventing inheritance: final classes and methods , the Object class and its methods. Polymorphism-Dynamic binding, method overriding, abstract classes and methods. Interfaces: Interfaces VS Abstract classes, defining an interface , implementing interfaces, extending interface. Inner classes: Uses of inner classes, local inner classes, anonymous inner classes, static inner class. Packages: Definition, Creating and Accessing a package, understanding CLASSPATH, importing packages.

UNIT-III

Exception handling-Dealing with errors, benefits of exception handling, the classification of exceptions-exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, built in exceptions

Multi-Threading:-Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication.

UNIT-IV

Files: streams -byte streams, character streams, text input/ Output binary input/ output Random access file operations, file management using file class. Connecting to Database-JDBC type 1 to 4 drivers , connecting to a data base , querying a data base and processing the results, updating data with JDBC.

UNIT–V

Applets –Inheritance hierarchy for applets, differences between applets and applications ,life cycle of an applet, passing parameters , applet security issues.

GUI Programming with java-The AWT class hierarchy, Inroduction to Swing, Swing VS AWT, Hierarchy for Swing components, containers-JFrame, JApplet,JDialog,JPanel, Overview of some swing components-Jbutton, JLabel,JTextfield,JTextarea, simple Swing Applications, LayoutManagement-Layout Manager types-border , grid and flowEvent handling: Events, event sources , event classes, event Listeners, Relationship between event sources and Listeners Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes.

TEXT BOOK

1. Complete Reference (Java 2) – Herbert Schildt - Tata McGraw Hill
2. Programming with java E. Balagurusamy Tata McGraw Hill, New Dehli, 2ndedition 2002.

REFERENCE BOOKS :

1. Joseph O’Neil, Teach yourself java, Tata McGraw Hill, New Dehli, 2001.
2. Java script : Don Gosselin, Thomson Learning (vikas Publication)
3. Java in a nut shell – Flanagan – Orielly Publication

Practical List

1. Write a java program to check prime number.
2. Write a java program to print Fibonacci series without using recursion and using recursion.
3. Write a java program to check palindrome number.
4. Write a java program to print factorial of a number.
5. Write a java program to check Armstrong number.
6. Write a java program to sort an array element using bubble sort algorithm.
7. Write a java program to perform linear search in java.
8. Java Program to print the largest element in an array.
9. Java Program to addition of two matrices.
10. Java Program to find the transpose of a given matrix.
11. Java Program to count the total number of characters in a string.
12. Java Program to count the total number of vowels and consonants in a string.
13. Java Program to determine whether a given string is palindrome.
14. Java Program to find Reverse of the string.
15. Java Program to Calculate grades of Student.
16. Java Program to perform Arithmetic Operation using Method Overloading.
17. Write a program in Java to demonstrate single inheritance, multilevel inheritance and hierarchical inheritance.
18. Write a program in Java to demonstrate implementation of multiple inheritance using interfaces.
19. Write a program in Java to create, write, modify, read operations on a Text file.

BCA III YEAR
PAPER-II COMPUTER NETWORKS

Group	Paper Code	Lectures	Theory		Internal	Total
I	BCA-32	20/Unit	MAX	MIN	10	50
			40	13		

Course Objective: The course is designed to provide understanding of the computer network, network models, different hardware and software resources, protocols, error handling, encryption techniques, transmission media for wired and wireless communication.

Course Outcome: Students will be able to learn the working concepts of different reference model, devices, protocol working according to network, routing method, working of emails, internet naming system, and concepts utilized in network security.

UNIT I

Introduction: Computer Network, Goals and Applications, Models – OSI and TCP/IP, Types of networks: LAN, MAN and WAN, Topologies, LAN components – File server, Workstations, Network Adapter Cards. Networking medium: twisted pair, coaxial cable, optical fiber, Digital data rates, Serial Data Formats, Encoded data Formats, Connection Oriented and Connectionless services, Switching Techniques – Circuit Switching, Packet Switching, Message Switching.

UNIT II

Data Link Layer: Design Issues, Framing, Error detection: Parity Check, LRC, VRC, Check Sum and Cyclic Redundancy Check (CRC); Correction Technique: Hamming code. Flow Control: Elementary Data Link Protocols: An Unrestricted Simplex Protocol, Simplex Stop-and-Wait Protocol, Sliding Window Protocols: One-Bit Sliding Window Protocol, Go Back N and Selective Repeat. Data link layer in the Internet: SLIP and PPP.

UNIT III

Limits of Communication, RS 449 Interface Standards, RS 422 and RS 423. Multiplexing methods : FDM, TDM, WDM, sampling theorem and quantization, Delta Modulation. MAC Sublayer: Multiple access protocols: Pure Aloha, Slotted Aloha, CSMA Protocols; Collision- Free Protocols; IEEE MAC Sublayer protocols: 802.3, 802.4, 802.5: Ethernet, Fast Ethernet, Token Bus, Token Ring, FDDI, Wireless LANs.

UNIT IV

Network Layer: Design issues, Routing Algorithms: Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing. Link State Routing, Hierarchical Routing, Broadcasting Routing, Multicast Routing. The Network Layer in the Internet: Internet Protocol, IP addresses and Internet Control protocols.

UNIT V

Transport Layer: Elements of Transport Protocols, Addressing, Connection Establishment & Release, Flow Control & Buffering, Multiplexing. Introduction to UDP & TCP.

Application layer: DNS, WWW and HTTP, Cookies, Proxy Server. E-mail Protocols (SMTP, POP3, IMAP, MIME), FTP, TELNET. Network Security: Cryptography, Symmetric- key Algorithms: DES, AES, Public-key Algorithms: RSA, Digital Signatures.

Text Books:

1. Data & Network Communication by Michael A. Miller
2. Data Communications and Networking, B.A. Forouzan, Tata McGraw-Hill.

Reference Books:

1. Deitel & Deitel, Goldberg,” Internet and World Wide Web-How to Program”, Pearson Education Asia,2001
2. Computer Networks-A. S. Tanenbaum.

BCA III YEAR
PAPER-III WEB PROGRAMMING

Group	Paper Code	Lectures	Theory		Internal	Total
II	BCA-33	20/Unit	MAX	MIN	10	50
			40	13		

Course objective: To acquire knowledge and Skills for creation of Web Site considering both client- and server-side Programming. To create Web application using tools and techniques used in industry and to be familiarized with open source Frameworks for web development.

Course outcome: Students will be able to develop a web application and understand the design and server connectivity concept.

UNIT-I

Web Technology: Introduction to WWW, web browsers, web servers, HTTP, URL.

HTML: Introduction, Objective, Structure, HTML Command Tags: Text, List, Table, creation of links, inserting graphics, forms. **Cascading style sheets:** Introduction to CSS, creating style sheets, Types of CSS.

UNIT-II

A Brief History of PHP, PHP Characteristics, Installing and Configuring PHP on Windows, PHP Language Basics: Lexical Structure, Data Types, Variables, Expressions and Operators, Decision Statements, Flow Control Statements, Embedding PHP in Web Pages. **Strings:** String Constants, Printing Strings, Accessing Individual Characters, String Handling Functions: length, Word count, string position, reverse, replace.

UNIT-III

Arrays: Indexed Arrays, Associative Arrays, Identifying Elements of an Array, Storing Data in Arrays, Multidimensional Arrays, extracting multiple values, converting between arrays and variables, Traversing Arrays, Sorting.

Functions: Calling a Function, defining a Function, Variable Scope, Function Parameters, Return Values, Variable Functions, Anonymous Functions. **Object Oriented Programming Concepts:** Classes, Objects, Member Functions, Encapsulations, Inheritance, and Polymorphism. (only basic definitions of these topics)

UNIT-IV

Form Handling in PHP: Setting Up Web Pages to Communicate with PHP, Handling Text Fields, Text Areas, Check Boxes, Radio Buttons, List Boxes, Password Controls, Hidden Controls, Image Maps. **File Handling:** Working with files and directories, File Open and Read, File Create and Write, Reading and writing Character in file, reading entire file, Rename and Delete File, getting information of files, ownership and permissions.

UNIT-V

Database Access: Using PHP to access a database. Introduction to MySQL, connectivity with MySQL. XML: What is XML? XML document structure, PHP and XML, XML parser, the document object model, the simple XML extension, changing a value with simple XML.

TEXT BOOKS:

1. Programming PHP by Rasmus Lerdorf and Kevin Tatroe, O'Reilly Publications
2. Beginning PHP5 by Wrox Publication
3. HTML 5, Black Book by DreamTech Press

4. Mastering PHP: BPB Publication
5. PHP 5.1 for beginners by Evan Bayross and Sharman Shah, SPD Publications
6. PHP 5.2 The Complete Reference by Steven Holzner, McGraw Hill Edition 2008.

Practical List

1. Write HTML codes for displaying image and demonstrate hyper linking.
2. Write HTML codes to attach video on webpage using embed tag in html.
3. Create a Feedback Form Using Form handling.
4. Create a contact form using form tag.
5. Write a code for creating static page design using division tag.
6. Write a code for design menu system using list tag.
7. Design Google Page using HTML5.
8. Apply CSS formatting to create page.
9. (i) Write a PHP script to display Welcome message.
(ii) Write a PHP script to demonstrate use of arithmetic operators, comparison operators, and logical operators.
10. (i) Write a PHP script to get type of variable using `gettype()`.
(ii) Write a PHP script to set type of variable using `settype()`.
11. Write a PHP script to set type of variable using type casting.
12. (i) Write PHP Script to print Fibonacci series.
(ii) Write PHP Script to generate result and display grade.

(iii) Write PHP Script to find maximum number out of three given numbers.
13. (i) Write PHP Script using two dimensional arrays such as addition of two 2×2 matrices.
(ii) Write PHP Script for FOR EACH loop execution.
14. (i) Write PHP script Using user defined function.
(ii) Write PHP script to demonstrate use of string function.
15. Write PHP script to demonstrate use of date/time functions and Math functions.
16. Create form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page (e.g. student registration/inventory/library form).
17. Write two different PHP script to demonstrate passing variables from one page to another.
18. (i) Write two different PHP script to demonstrate passing variables with sessions.
(ii) Write PHP script to demonstrate passing variables with cookies.
19. Write a Program to upload image with extension gif or jpeg.
20. (i) Write a PHP script to connect MYSQL server from your website.
(ii) Write a PHP script to create and drop database.
21. (i) Create database using phpMyAdmin.
(ii) Write a program to read input data, from table and display all this information in tabular form on output screen.
22. Write a program to manipulate data and display all this information using table format.
23. Create form to search data.
24. Develop small PHP application(s) using forms and database with update and delete option.
25. Open and Read a file

BCA III YEAR
PAPER-IV MANAGEMENT INFORMATION SYSTEM

Group	Paper Code	Lectures	Theory		Internal	Total
II	BCA-34	20/Unit	MAX	MIN	10	50
			40	13		

Course objective: To provide the students with the comprehensive knowledge to successfully participate in applying information technology in corporate decision making. Provide the knowledge of contemporary issues related to the field of managing information system.

Course outcome: Apply modern tools, techniques and technology in a functional and productive manner in their professional activities. The students will be able to maintain cost-effective Information System (IS) that support operational, managerial and strategic activities of organization.

UNIT-I

Management & Organizational Support Systems for Digital Firm: Definition of MIS; Systems approach to MIS: Report writing s/w, MIS and Human factor, Considerations, concept of organizational information sub-system, MIS & problem solving. Case Studies.

UNIT-II

Information Systems & Business Strategy: Information Management. Who are the users? Manager & Systems, Evolution of Computer based information system (CBIS), Model of CBIS. Information services organization: Trend to End-User computing, justifying the CBIS, Achieving the CBIS, Managing the CBIS, Benefits & Challenges of CBIS implementation. Strategic Information System, Business level & Firm level Strategy, Case Studies.

UNIT-III

Information Systems In the Enterprise: Systems from Management & Functional perspective & their relationship: Executive Information System, Decision Support System Sales & Marketing Information System, Manufacturing Information System, Human-Resource Information System. Finance & Account Information System. Case Studies.

UNIT-IV

Information Technology for Competitive Advantage: Firm in its environment, what are the information resources? Who manages the information resources? Strategic planning for information resources. End-User Computing as a strategic issue, Information resource management concept. Case Studies.

UNIT-V

E-Commerce & International Information System: Introduction to E-Commerce, Business Intelligence. E-Commerce strategy, Electronic Data Interchange, E-commerce methodology, E-commerce technology, Business application of the Internet. Electronic Business success strategies. Managing International Information Systems: IIS architecture, Global business drivers, challenges, strategy: divide, conquer, appease, co-optation, business organization, problems in Implementing global information systems, Computer crime, ethics & social issues.

Text Books:-

1. MIS A Concise Study, S.A. Kelkar, PHI.
2. MIS managing the digital firm, Kenneth C. Laudon& Jane P. Laudon (Pearson Education).
3. ElectronicCommerce: Greenstein, Merylin, Tata Mc.Graw Hill

Reference Books :-

1. MIS, Suresh K. Basandra (Wheelers)
2. Introduction to computer Information System for Business, Mark G. Simkin, S. Chand & Co., 1996.
3. Analysis & Design of Information Systems, James A. Senn. MCGraw-Hill International.

BCA-III YEAR

PAPER-V COMPUTER GRAPHICS AND MULTIMEDIA

Group	Paper Code	Lectures	Theory		Internal	Total
III	BCA-35	20/Unit	MAX	MIN	10	50
			40	13		

Course objective: The objective of this course is to introduce the concept of Computer Graphics and Image Manipulation using GIMP. Course will provide an understanding of mapping of a world coordinates to device coordinates, clipping, transformation of object and it will also provide knowledge of GNU Image Manipulation Program for image retouching and editing.

Course outcome: The students will understand the concept of Computer Graphics, they will be able to design algorithm for clipping, dimensional graphics and transformations. Students will gain a working knowledge on GIMP and develop their skills in editing and altering photographs for through a basic understanding of the tool bar and layers. This course prepares students for activities involving in design, development and animation of objects.

UNIT – I

A brief background about applications of Computer Graphics. Overview of graphic systems, video display devices, refresh cathode ray tubes, raster and random screen display, color CRT monitors, flat panel displays, LCD's. Design and architecture of raster scan and random scan display systems. A brief introduction to input devices and hardcopy devices. Output primitives, DDA and Bresenham's 2D line drawing algorithms, parallel line algorithms.

UNIT – II

Midpoint circle generating algorithm, Ellipse generating algorithm, Character generation, attributes of output primitive, line and curve attributes, character attributes, Basic Transformation, Composite Transformation

UNIT – III

Clipping operations, Cohen Sutherland line clipping, Liang Barsky line clipping, Nicholl-Lee-Nicholl line clipping, polygon clipping, Sutherland Hodgeman and Weiler-Atherton polygon clipping, text and curve clipping.

UNIT- IV

GIMP Introduction : What Is GIMP? Working with GIMP's Interface , Images and Canvases(Parts of the Image Window,The Concept of a 'Canvas'), Working with Files (Opening Files,Creating a Blank New Image, Working in the Image Window, Copying and Pasting, Saving Files)

UNIT – V

A Brief Overview of GIMP's Tools: Selection Tools(Rectangle Select, Ellipse Select, Free (Lasso) Select, Fuzzy Select, Select by Color) , Image Tools(Duplicate , Mode, Transform, Print Size, Scale, Flatten Image),Transform Tools (Crop , Flip , Move , Perspective, Rotate, Scale ,Shear), Paint Tools, Color Tools, Working with Layers (Creating a New Blank Layer, Linking or Grouping Layers Together, Deleting a Layer, Merging Layers).

Text Book:

Computer Graphics by Donald Hearn and M. Pauline Baker, Second Edition, PHI

GIMP for Absolute Beginners by Jan Smith with Roman Joost APRESS

Reference Books:

GIMP Bible by Jason van Gumster and Robert Shimonski , Published by Wiley Publishing, Inc

BCA III YEAR
PAPER-VI CLOUD COMPUTING

Group	Paper Code	Lectures	Theory		Internal	Total
III	BCA-36	20/Unit	MAX	MIN	10	50
			40	13		

Objective of the Course: The course will enable students to learn basics of cloud computing, key concepts of virtualization, different Cloud Computing services, Cloud implementation, key components of Amazon Web Services and Cloud Backup and solutions.

Course Outcome: After the completion of the course, the students will be able to define Cloud Computing and memorize the different Cloud service and deployment models, learn importance of virtualization along with related technologies, using different cloud computing services, analyzing the components of open stack & Google Cloud platform and understand the key components of Amazon web Service and to design & develop backup strategies for cloud data based on features.

UNIT-I

Introduction: Historical development, Vision of Cloud Computing. Characteristics of Cloud Computing as per NIST, Cloud Computing reference model, Cloud computing environments, cloud services requirements, cloud and dynamic infrastructure, cloud Adoption and rudiments. Overview of cloud applications: EGC Analysis in the cloud Protein structure predication, Gene Expression Data Analysis, Satellite Image Processing, CRM /and ERP, Social Networking.

UNIT-II

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and fault tolerance, Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management, Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

UNIT-III

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental Concepts of Compute, storage, networking, desktop and Application Virtualization, Virtualization benefits, server Virtualization, Block and file level storage virtualization Hypervisor Management software, Infrastructure Requirements, Virtual LAN(VLAN) and Virtual SAN(VSAN) and their Benefits.

UNIT-IV

Cloud Security: Cloud Information Security Fundamentals, Cloud Security Services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing. Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.

UNIT-V

Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition, Cloud Federation Stack, Third party Cloud Services. Case Study: Google App Engine, Microsoft Azure, Hadoop, Amazon, Aneka.

Recommended Text:

1. Buyya, Selvi, "Mastering cloud Computing" TMH Pub
2. KumarSaurabh, "cloud Computing", Wiley Pub
3. Krutz, Vines, "cloud Security", Wiley Pub
4. Velte, "Cloud Computing-A Practical Approach", TMH Pub
5. Socinesky, "Cloud Computing", Wiley Pub

List of Experiments

1. Installation and configuration of Hadoop/Euceliptus etc.
2. Service deployment & usage over cloud.
3. Management of cloud resources.
4. Using existing cloud characteristics & services models.
5. Cloud Security Management
6. Performance evaluation of services over cloud. Grading System 2013-14