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.

Learning outcomes

PLO-1. Design and develop computer programs/computer -based systems in the areas related to algorithms, web design, IoT and data analytics.

PLO-2. Ability to pursue higher studies of specialization and to take up technical employment.

PLO-3. Ability to formulate, to model, to design solutions, procedure and to use software tools to solve real world problems and evaluate.

PLO-4. Ability to operate, manage, deploy and configure software operation of an organization.

PLO-5. Ability to present result using different presentation tools.

PLO-6. Ability to use emerging technologies and tools.

PLO-7. Display ethical code of conduct in usage of Internet and Cyber systems.

PLO-8. Apply standard Software Engineering practices and strategies in real-time software project development

PLO-9. The ability to apply the knowledge and understanding noted above to the analysis of a given information handling problem.

PLO-10. The ability to work independently on a substantial software project and as an effective team member.

SCHEME
BCA – III/ Third Year (Annual System)

Group	Paper Code	Subject	Internal			Theory	Total	Practical	Grand Total
			3 Months	6 Months	Total				
Group-I	BCA-31	Object Oriented Programming Using Java	5	5	10	40	50	--	100
	BCA-32	Computer Networks	5	5	10	40	50	--	
Group- II	BCA-33	Web Programming	5	5	10	40	50	--	100
	BCA-34	Management Information System	5	5	10	40	50	--	
Group- III	BCA-35	Computer Graphics and Multimedia	5	5	10	40	50	--	100
	BCA-36	Cloud Computing	5	5	10	40	50	--	
Group- IV	BCA-37	Foundation Course-Same as B.Sc./B. Com./B. A.					100	--	100
Group- V	BCA-P38	Project based on BCA31 & BCA33	--	--	--	--	--	50	50
	TOTAL						400	50	450

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

In each group student is required to obtain minimum 27 marks in theory and 7 marks in internal assessment to pass.

Pattern of Question papers shall be as given below:

There will be three sections in each paper. All questions from each section will be compulsory.

Section A(5=5*1): this section will contain 5 objective type questions. One question from each unit of one mark.

Section B(10=2*5): 5 questions from each unit of 2 marks each with internal choice.

Section C(25=5*5):5 questions from each unit of 5 marks with internal choice.

BCA III YEAR
PAPER-I OBJECT ORIENTED PROGRAMMING USING JAVA

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 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 Abstrct classes,defining an interface , implementing interfaces, extending interface. Inner classes:Uses of inner classes, local inner classes, anonymous inner classes, static inner classe. 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/ outputRandom 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,JPannel, 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

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

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)
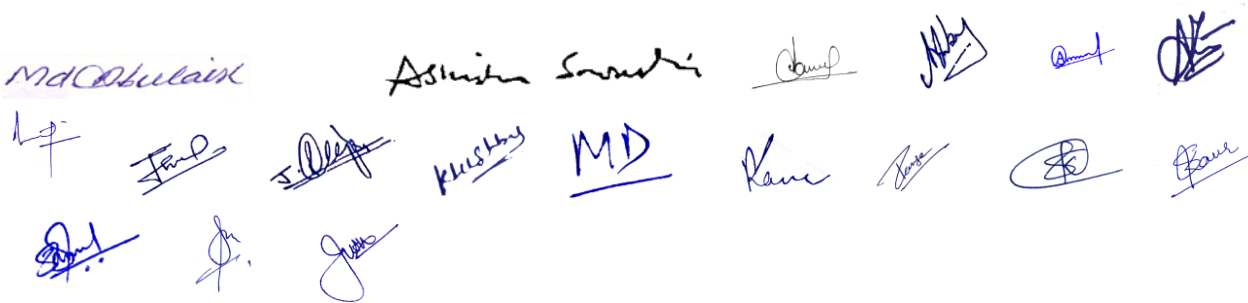
UNIT-IV
Form Handling in PHP: Setting Up Web Pages to Communicate with PHP, Handling Text Fields, Text Areas, Check Boxes, Radio Buttons, List Boxes, Password Controls, Hidden Controls, Image Maps. **File Handling**: Working with files and directories, File Open and Read, File Create and Write, Reading 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, 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. Create a Feedback Form Using Form handling.
3. Write a code for design menu system using list tag.
4. Apply CSS formatting to create page.
5. (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.

6. Write a PHP script to set type of variable using type casting.
7. (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.

8. (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.

9. (i) Write PHP script Using user defined function.
   (ii) Write PHP script to demonstrate use of string function.

10. Write PHP script to demonstrate use of date/time functions and Math functions.
11. Write a program to read input data, from table and display all this information in tabular form on output screen.
12. Write a program to manipulate data and display all this information using table format.
13. Create form to search data.
14. Develop small PHP application(s) using forms and database with update and delete option.
15. Open and Read a file

BCA III YEAR
PAPER-IV MANAGEMENT INFORMATION SYSTEM

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, 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, 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? Strategic planning for information resources. End-User Computing as a strategic issue, 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

Course objective: The objective of this course is to introduce the concept of Computer Graphics andImage 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

Objective of the Course: The course will enable students to learn basics of cloud computing, key concepts of virtualization, different Cloud Computing services, and 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 to Cloud Computing: Historical development, Vision, Characteristic as per NIST, The cloud computing reference model, environments, services requirements, cloud and dynamic infrastructure, Adoption and rudiments. Overview of Cloud Applications: Scientific Applications- Healthcare: ECG in the cloud, Biology: protein structure prediction, gene expression data analysis for cancer diagnosis, Geoscience: satellite image processing. Business and consumer applications-CRM and ERP, Social Networking.

UNIT-II
Cloud Computing Architecture: The cloud reference model- Architecture, Types of clouds. Open Challenges- 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, "could 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