Bachelor of Computer Applications (B.C.A.)

Old Course Applicable from Academic Year 2011-12 onwards

Programme Outcomes:
The three-year Bachelor's Degree in Computer Applications is designed:
1. To provide a strong foundation in fundamentals of computers.
2. To prepare the students with exceptional skills of problem solving, communication and leadership skills.
3. To produce employable I.T. workforce, that will have sound knowledge of I.T. and business fundamentals that can be applied to develop and customize solutions for Small and Medium Enterprises (S.M.Es).

Course Code Name	**Course Objectives /Course Outcome**	**Learning Outcome**
Semester I		
BCA101 Problem Solving and Programming Concepts	Objective: • To make the student understand how to solve a problem using computers, learn a programming language, implement, debug and execute programs for real life problems. Course Outcomes: • Formulate algorithms, pseudo-code and flowcharts for programs. • Understand the different programming concepts. • To learn error detection and correction.	Learning Outcomes: • Understand the evolution of programming languages and know the strengths and weaknesses of each generation. • Analyze and design algorithms for problems. • Design solutions for problems using a programming language. • Implement different constructs available in a programming language. • Effectively trace and debug a program.
BCA102	Objectives:	Learning Outcomes:

Computer Organization and Architectures	• To provide a broad overview of the architecture and functioning of computer systems. • To learn the basic concepts behind the architecture and organization of computers. Course Outcomes: • Study the representation of numbers stored in digital computers. • Understand the basics of instruction set and the impact on processor design. • Understand the design of the functional units of a digital computer system. • Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.	• Demonstrate computer architecture concepts related to the design of modern processors, memories and Input Outputs. • To develop the logic for assembly language programming. • Analyze the performance of available computers.
BCA103 Business Accounting	Objectives: • To introduce concepts of financial accounting and management with a scope for applying these concepts into day-to-day tasks. • To determine financial performance and financial position of a business. Course Outcomes: • Understanding the principles and standards of Business Accounting. • To monitor the flow of finance within a business. • To understand the different types of shares.	Learning Outcomes: • Recording of financial business accounts. • Analyze and determine the financial performance and financial position of a business. • Use business decision making tools. • Understand the different types of shares.
BCA 104	Objectives: • To introduce the basic fundamentals of mathematics.	Learning Outcomes: • To learn trigonometric functions and identities.

Basic Mathematics	• To develop the basic Mathematical skills of the students. Course Outcomes: • Use logarithms and perform operations on logarithms. • Understand different operations on complex numbers. • Apply the knowledge of matrices and determinants to solve the problems. • To analyze sequences and progressions.	• Understand the limit of a function and prove the continuity of the function. • To understand the concepts of coordinate geometry with respect to straight lines and circles. • To learn the concept of derivatives, integration and vectors. • Understand the properties of numbers. • Identify and understand different operations on complex numbers. • Understand the concept of matrices and determinants and use Cramer's rule. • Understand the concept of straight lines and their properties.
BCA105 Problem Solving and Programming Laboratory	Objectives: • To learn the process of computer problem solving and concepts through some programming language. • The students will be able to enhance their analyzing and problem-solving skills. Course Outcomes: • To learn the phases of program development and execution. • Analyzing the complexity of problems, convert the problems into small modules and then translate them into programs. • Understand and apply the in-built functions and customize functions for solving problems. • Understand and apply the concept of pointers, memory allocation techniques for dealing with a variety of problems.	Learning Outcomes: • To write well-documented programs. • To understand some programming Integrated Development Environment and the different utilities. • Know the basic and advanced programming constructs by implementing them in a programming language. • Successfully debug and execute a program.

	• Apply the logical ability to solve problems.	
BCA106 IT Tools Laboratory	Objective: • To familiarize and learn the use of various types of IT tools. Course Outcomes: • To identify the different components and peripheral devices of a Personal Computer. • To familiarize the students with the preparation of documents and presentations with office productivity tools. • To learn the basic setup and customization of a Learning Management System.	Learning Outcomes: • To configure the Basic Input Output System setup for a standard Personal Computer. • To identify the different components of a Personal Computer. • To explain the different features of a spreadsheet. • To use presentation maker software. • To setup an e-mail account to send and receive e-mails. • To demonstrate the basic setup and customization of a Learning Management System.
BCA107 Environmental Studies	Objectives: • To study about environment and ecosystem. • To study different types of natural resources. • To study the concept of biodiversity and its conservation. • Basic knowledge and concept of causes, effect and control of different types of environmental pollution. Course Outcomes: • Gain knowledge about environment and ecosystem. • Learn about natural resources, its importance and environmental impacts of human activities on natural resources. • Gain knowledge about the conservation of biodiversity and its importance.	Learning Outcomes: • Demonstrate a scientific understanding of the physical and biological dynamics of global ecologies including first-hand knowledge of local and regional ecosystem. • To recognize the physical, chemical, and biological components of the earth's systems and show how they function. • Understand the interactions of environmental components.

	• Creating awareness of problems of environmental pollution, its impact on ecosystem and control measures. • To study the impact of population growth on environment.	

Semester II		
BCA201 **Data Structures**	Objectives: • To provide the knowledge of basic data structures and their implementations. • To understand importance of data structures in context of writing efficient programs. • To develop skills to apply appropriate data structures in problem solving. Course Outcomes: • Ability to choose appropriate data structures to represent data items in real world problems. • Implement and know the application of algorithms for sorting and pattern matching. • Ability to design programs using a variety of data structures such as stacks, queues, binary trees, search trees, heaps, graphs, and B-trees.	Learning Outcomes: • Implement basic data structures. • Know the strength and weaknesses of different data structures. • Use the appropriate data structure in the context of a given problem. • Develop programming skills required to solve the given problem.

BCA202 Operating System Concepts	Objectives: • To make the students aware of different types of Operating Systems and their services. • To learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system. • To know virtual memory concepts. • To learn secondary memory management. Course Outcomes: • Analyze basic concepts of operating system and their structures. • Analyze various issues related to process scheduling, resource management and deadlocks. • Interpret the issues and challenges of memory management. • Synthesize the concepts of I/O management, file system implementation and problems related to security and protection.	Learning Outcomes: • Have sound knowledge of different services provided by Operating System. • To use different process scheduling algorithms and synchronization techniques to avoid deadlock. • Know the different memory management techniques like paging, segmentation and demand paging etc.
BCA203 Cost Accounting	Objectives: • Recognize and apply appropriate theories, principles and concepts relevant to cost accounting. • Exercise appropriate judgment in selecting and presenting information using various cost accounting methods. Course Outcomes: • Acquire the basic knowledge on cost accounting concepts. • Classification of cost and overheads, levels of material control, purchase and stores control.	Learning Outcomes: • Understand cost accounting as a branch of accounting and its objectives. • Understand and familiarize various cost concepts and classification of cost. • Understand and familiarize the process of manufacturing, various methods of valuation of materials. • Understand the preparation of contract account and the various processes in manufacturing and accounting of a product.

	• Understand the techniques of costing, preparation of cost sheet, need for material control, control of idle time of labor, methods of calculation of labor turnover and classification of overheads.	• Identify and understand the various techniques of costing.

BCA204 Discrete Mathematics	Objectives: • To introduce fundamentals of digital electronics and the basic terminologies used in computer science to solve practical problems. • To introduce the concepts and perform the operations associated with sets, functions, and relations. • To use Graph Theory for solving problems. Course Outcomes: • Ability to apply mathematical logic to solve problems. • Understand Sets, Relations, Functions and Discrete Structures. • To learn various properties of Relations. • To learn the concept of permutations and combinations.	Learning Outcomes: • Analyze logical propositions via truth tables. • Prove mathematical theorems using mathematical induction. • Understand sets and perform operations and algebra on sets. • Determine the properties of relations, identify equivalence and partial order relations. • Identify functions and determine their properties. • Use permutations using its factorial form.
BCA205 Data Structures Laboratory	Objectives: • To develop skills to design and analyze simple linear and non-linear data structures. • To strengthen the ability of the students to identify and apply the suitable data structure for the given real-world problem. • Enables them to gain knowledge in practical applications of data structures. Course Outcomes: • Implement different sorting and searching algorithms.	Learning Outcomes: • Be able to design and analyze the time and space efficiency of the data structure. · • Be capable to identity the appropriate data structure for given problem. • Have practical knowledge on the applications of data structures.

	• Implement the stack, Queue, and their applications. • Implement various types of linked lists and their applications. • Perform the basic operations on trees and graphs.	
BCA206 Operating Systems Laboratory	Objectives: • The course will introduce the basic principles in Operating Systems. • To learn the set-up, functioning and structure of desktop and advanced operating systems. Course Outcomes: • Learn the Installation and configuration of Operating System. • Learn to customize the desktop-based Graphical User Interface Operating system. • Learn file formats and directory structure of web-based Operating system. • Study network connectivity by configuring Transmission Control Protocol/Internet Protocol.	Learning Outcomes: • Successfully install an operating system on any Desktop/Personal Computer. • Customize and configure the desktop. • Usage of file and directory commands. • Create shell scripts for common routine tasks. • Customize, configure web-based operating system. • Configure Transmission Control Protocol/Internet Protocol.
BCA207 Environmental Studies	Objective: • To provide the students with the ability to investigate environmental issues from a rigorous interdisciplinary perspective by integrating insights and information from the natural sciences, social sciences, and humanities. Course Outcomes: • Articulate the interconnected and interdisciplinary nature of environmental studies.	Learning Outcomes: • Demonstrate an integrative approach to environmental issues with a focus on sustainability. • Analyze the social, economic, and political and policy dynamics involved in both the emergence and the resolution of environmental problems. • Understand and evaluate the global scale of environmental problems.

	• Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences, and humanities in environmental problem solving. • Reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.	
Semester III		
BCA301 Object Oriented Concepts	Objective: • To study the object- oriented concepts that can be applied for developing software using the object-oriented methodology. Course Outcomes: • Understand the significance of object-oriented paradigms. • Study Object Oriented language constructs. • Handle various built-in as well as user-defined exceptions.	Learning Outcomes: • To understand the problems of procedure-oriented programming and implement object-oriented paradigms using a programming language. • To program basic problem statements using Classes and Objects. • To understand the meaning of Exception and the methods of handling exceptions • To manipulate file with read and write operations.
BCA302 Database Management Systems	Objective: • To provide a strong formal foundation in database concepts, technology and to apply it for software development. Course Outcomes: • To Understand the Limitations of the Traditional File Systems and the need for Database • Understand emerging trends in database technology. • To introduce various data models. • Study real life scenarios with Entity Relationship model.	Learning Outcomes: • Know the basic database concepts and the various mechanisms used in database systems namely the security, integrity and access. • Design data models, databases and apply normalization techniques. • Apply queries in Structured Query Language (S.Q.L.) and relational formal query language. • To understand the significance of data warehousing and data mining.

BCA303 Management Accounting	Objective: • The objective of this paper is to provide in-depth study of the body of knowledge comprising of various techniques of costing. Course Outcomes: • Understand the role and importance of a management accountant in an organization. • Processing of reports in organizations. • Learn the meaning of budget and budgeting and the overall function of budgetary control.	Learning Outcomes: • Use the different tools and techniques of management accounting. • Learn the function of management accounting. • Prepare various types of budgets. • To understand the techniques of marginal costing.
BCA304 Introduction To Economics	Objective: • To introduce and study the concepts of economics and the factors that affect the social economy. Course Outcomes: • Learn the laws of demand and supply. • Learn the concepts of equilibrium.	Learning Outcomes: • Know the meaning of economics and the different markets. • Know the concepts of marginal utility. • Know the concepts and types of elasticity of demand.
BCA305 Object Oriented Programming Laboratory	Objective: • To learn to implement object-oriented concepts through some object-oriented programming language. Course Outcomes: • Write programs to demonstrate the object-oriented concepts.	Learning Outcomes: • To write programs to implement classes, objects, constructors, inheritance, overloading etc. • To know the methods of exception handling. • Create files and perform read/write operations using a program.

	• Impart knowledge of creating files.	
BCA306 Database Management Systems Laboratory	Objective: • To implement the relational database concepts, practically using some database management system software that can be used as a backend tool for an application. Course Outcomes: • Model real-world concepts using Entity Relationship modeling. • Create and execute triggers and procedures. • Demonstrate reports for the system.	Learning Outcomes: • Demonstrate the basics of Data Definition Language and Data Manipulation Language. • Convert the Entity Relationship model into tables as a fundamental concept for building applications. • Identify and assign the appropriate key to the fields of the tables. • To learn to assign database privileges and roles to users of the system.
BCA307 Communication And Presentation Skills	Objective: • To teach the process of interpersonal and group communication and develop skills of communication and idea presentation. Course Outcomes: • Understand the difference between formal and informal communication. • Study the complete communication process and the aspects of effective communication.	Learning Outcomes: • Learn to prepare for interviews. • Apply skills to prepare class presentation. • Learn to use real-time feedback for instant reaction.
Semester IV		
BCA401 Software Engineering	Objective: • To study the concepts of software engineering with the aim of acquiring skills to develop software applications, following all standardized procedures and techniques. Course Outcomes: • Understand the different phases of software development.	Learning Outcomes: • To learn why, how and when the concept of software engineering evolved. • To understand the meaning of Software Process and the characteristics of the software development process.

	• Apply the principles of software engineering to design, develop and manage a software system. • Create software using the different Software Development Life Cycle Models.	• To learn the importance and how to document the Software Requirements Specification for a software system.
BCA402 Computer Networks	Objective: • To introduce the concepts, terminologies and technologies used in modern day data communication and computer networking. Course Outcomes: • Develop an understanding of the fundamental concepts of computer networks. • Understand the basic taxonomy and terminology in the computer networking area. • Understand the architecture of Open Systems Interconnection and Transmission Control Protocol/Internet Protocol model.	Learning Outcomes: • Know the applications of networks in all fields of modern world. • Understand data encoding and data framing techniques with error detection and correction methods. • Understand Routing algorithms and transport layer service protocols. • Understand significance of cryptography and data security principles. • Understand different I.E.E.E. standards for computer networking.
BCA403 Management Functions	Objective: • To introduce the different concepts of management functions within an organizational framework. Course Outcomes: • Understand the function and different types of planning. • Study different types of power and authority. • Learn theories of leadership.	Learning Outcomes: • Familiarize the function of planning in Indian perspective. • Study delegation of authority within an organization. • Learn the different aspects of decision making.
BCA404	Objective: • To introduce the concepts of analyzing data using mathematical and statistical techniques.	Learning Outcomes: • Develop the ability to carry out testing of hypothesis on a population based on statistical measures of samples.

Data Analysis And Statistical Techniques	Course Outcomes: • Analyze statistical data using measures of association. • Plotting of frequency polygons and histogram. • Understand different clustering and classification techniques. • Acquire knowledge of data mining and applying Apriori algorithm.	• Carry out simple linear regression analysis. • Develop the ability to compute descriptive statistics including diagrammatic representation and interpretation.
BCA405 Graphical Interface Design Laboratory	Objective: • To design software applications using the graphical interface designing programming language. Course Outcomes: • To learn the different form controls in a GUI and understand the characteristics and use of each. • To learn the different events in form design. • To learn to handle runtime errors caused by some abnormal conditions.	Learning Outcomes: • Plan and design user friendly forms. • Learn different components of GUI. • Create simple database software applications. • Design graphical artwork on their own. • Generate reports for effective information presentation.
BCA406 Data Analysis And E-Accounting Laboratory	Objectives: • To develop basic skills in data analysis by implementing different techniques. • Maintaining accounts with common software applications. Course Outcomes: • Understand Linear Programming Problem (L.P.P) formulation and develop solutions for the same. • Learn image processing concepts with gray scale and colored images. • To learn to use computer software for managing accounts.	Learning Outcomes: • Use Equation Solver to solve the simple problems. • Use the different statistical concepts for data representation. • Demonstration of different computer aids for managing accounts.
BCA 407	Objective:	Learning Outcomes:

Technical Writing Skills	• To teach the concepts of technical writing and enable the students to create effective technical documentation. Course Outcomes: • Understanding fundamentals of written communications. • Understanding the definition, description, process explanation and other common forms of technical writing.	• Create effective reports based on data collected from different sources. • Understand the conventions and formats of business letter writing.
Semester V		
BCA501 Software Testing	Objective: • To provide a basic understanding of the software testing concepts and technologies. • Course Outcomes: • Learn the importance of testing phase in software development process. • Understand the key issues in software testing and the principles followed during testing. • Introduction to automated testing process, need for documentation and maintenance. • Use Software Configuration Management tools and techniques.	Learning Outcomes: • Get an overview of several software testing techniques and test metrics. • Gain insights on organizational issues in testing and career paths in testing. • Understand the planning, management, process and reporting of test cases for software.
BCA502 Web Technology	Objective: • To understand the fundamentals of web designing and acquire skills in developing web applications using latest tools in web technology. Course Outcomes: • Gain insights on the world wide web history, architecture, and protocols associated with it • Write client-side and server-side scripts for web interaction.	Learning Outcomes: • Analyze web pages to identify various elements of Hyper Text Mark-up Language (H.T.M.L.) and Cascading Style Sheets (C.S.S.). • Demonstrate Extensible Mark-up Language (X.M.L.) as a language for data exchange between applications. • Know the document object model, and its applicability in client-side scripting.

	• Create interactive and secure web sites for basic applications.	• Understand the functions and types of server-side scripting.
BCA_CS_E01 (C.S.Elective - I) Android Programming	Objective: • To study the framework and concepts of programming applications for the Android Platform. Course Outcomes: • Learn to design the graphical interface for Android applications. • Learn to use data in data-driven applications in Android. • Learn to use messaging systems on Network message gateways. • Learn to use Android Applications as web services.	Learning Outcomes: • Understand the basics of Android Mobile Operating System. • Usage of data in data-driven Android applications. • Create activities and intents in Android. • Learn the use of views for creating user interface. • Use messaging systems on network message gateways.
BCA_NCS_E14 (N.C.S. Elective - I) Human Resource Management	Objectives: • To introduce the different concepts of Human Resource Management within an organization. • To understand the need for career planning, effective communication, counseling and time management for better organizational management. Course Outcomes: • Gain an insight into the contribution of Human Resource Management in an organization. • Understand the skills and knowledge needed for fair recruitment process. • To study different appraisal methods. • To study the importance of time management for individuals and organizations.	Learning Outcomes: • Plan the human resource requirements of an organization. • Know the internal and external factors influencing recruitment decisions. • Study effective training methods for workers and managers. • Understand the need of planning a career and the various opportunities available.
BCA_NCS_E11	Objectives:	Learning Outcomes:

(N.C.S. Electives - I) Operations Research	• To learn the scientific techniques and tools for problem solving. • To study various operations research models. • Formulate and arrive at optimal solutions. Course Outcomes: • Identify and develop operational research models for a given system. • Apply modern methods of mathematical science to obtain optimal solutions for complex problems.	• Study mathematical tools for solving problems. • Understand the basics of theory of games. • Understand Billman's Principle of optimality and Dynamic programming.
BCA505 Web Technology Laboratory	Objectives: • To acquire skills in developing web applications using latest tools and technologies in web designing. Course Outcomes: • Learn web page creation and scripting. • Design responsive and dynamic websites.	Learning Outcomes: • Setup up and use a web-server for testing and deploying web applications. • Learn client-side scripting using a scripting language and server-side scripting using database connectivity and report generation. • Demonstrate hosting of websites.
BCA506 Project Work	Objectives: • Designing a Hardware/Software Project with advanced technologies and methodologies of choices. Course Outcomes: • To be able to meet industry standards. • To able to develop a professional hardware/software project.	Learning Outcomes: • Develop an effective professional project. • Demonstrate a thorough and systematic understanding of project contents. • Implement methodologies and professional way of documentation and communication.
Semester VI		
BCA601	Objectives: • To develop an in-depth understanding of essential components comprising management information systems (M.I.S) implemented through software.	Learning Outcomes: • Analyze pros and cons of office automation systems.

Management Information Systems	• To provide awareness of Management Information System (M.I.S) and understand the role of Management Information System (M.I.S.) in effective decision making. Course Outcomes: • Study the basic concepts and technologies used as Management Information Systems. • Understand the difference between data, information, knowledge and wisdom. • Learn the usage of Management information systems in an organization.	• Understand the significance of information in organizational management. • Understand decision making models and its utility in an organization. • Knowledge of real-world information systems in different domains.
BCA602 Multimedia Technology	Objectives: • To learn different multimedia formats and its uses. • To learn the design concepts of computer multimedia and its applications. Course Outcomes: • To gain in-depth knowledge of multimedia development software. • Identify, describe, and apply multimedia technologies in learning environments.	Learning Outcomes: • Demonstrate the basic concepts of multimedia technology. • Create different multimedia files using text, graphics, audio and video media.
BCA_CS_E02 (C.S.Elective - II) Content Management Systems	Objectives: • To introduce learners to several Content Management Systems. • To set up websites using a Content Management System. Course Outcomes: • Compare and analyze the features of various Content Management System (C.M.S.).	Learning Outcomes: • Learn to use Word Press C.M.S. • Design quality C.M.S. sites using Cascading Style Sheets. • Setup and use Moodle C.M.S. • Setup and use Joomla C.M.S. • Maintain a Wiki site.

	• Learn to create dynamically manageable C.M.S. • Plan and develop dynamic web content using various C.M.S.	
BCA_NCS_E01 (N.C.S. Elective - II) Advertising	Objective: • To learn the basic procedures and policies of advertising. • Course Outcomes: • Learn the Architecture of an Advertising Firm. • Introduction to advertising concepts. • Create effective advertisements with the use of multimedia.	Learning Outcomes: • Understand the process and tools for advertisement creation. • Get an overview of the different market research methods and media used for advertising. • Introduce the steps and procedures for managing advertising campaigns.
BCA605 Multimedia Laboratory	Objective: • To learn the different multimedia formats and use the knowledge to create content. Course Outcomes: • To learn the usage of graphics, audio and video editing software. • To create effective multimedia content with the help of several multimedia software.	Learning Outcomes: • Design and edit audio streams. • Design 2D animations. • Apply different editing effects on videos.
BCA606 Project Work	Objectives: • Designing a Hardware/Software Project with advanced technologies and methodologies of choices. Course Outcomes: • To be able to meet industry standards. • To able to develop a professional hardware/software project.	Learning Outcomes: • Develop an effective professional project. • Demonstrate a thorough and systematic understanding of project contents. • Implement methodologies and professional way of documentation and communication.