Department of Computer Science: Bachelor of Computer Applications (BCA)		
Course Code	**Course Name**	**Course Outcome**
BCA/1/CC/01	English Language & Communication Skills	CO1 Inculcate the importance of English as the lingua franca CO2 Enhancement of reading and writing skills using effective mediums CO3 To hone their communication skills through correct grammar usage CO4 Improve their communication skills to cater to business and professional needs.
BCA/1/CC/02	Basic Mathematics	CO1. Able to apply knowledge of discrete mathematics appropriate to the discipline. CO2. Able to analyze and solve problems based on Matrix & determinants CO3. Understand Statistics and its applications and also will be able to calculate Mean, median and mode. CO4.Able to apply and understand sequence, series and progression CO5.Understand types of matrices and their properties
BCA/1/CC/03	Introduction to Information Technology	CO1. Understanding working principle of computer with memory CO2. Able to know function and its uses of input and output devices CO3. Able to differentiate software types and hardware and its interaction between them CO4. Understand different medium of data transmission and their relatives pros and cons CO5. Understand internet, applications and security of internet CO6. Explore opportunities of employment in information Technology
BCA/1/CC/04	Digital Computer Fundamentals	CO1. Understanding various number system and codes. CO2. Apply Boolean laws and rules to simplify simple expressions. CO3. Able to analyse and design various combinational and sequential circuits such as Flip-Flops, Registers, and Counters. CO4. Knowledge gain skill to use the methods of systematic reduction of Boolean expression using K-Map CO5. To be able to interpret logic gates and its operations

BCA/1/CC/05	PC Applications & Internet Technology Lab	CO1. Perform various windows basic commands. CO2. Construct their own website for their business and personal. CO3. Incorporate various windows basic and scripting commands in real life situation.
BCA/1/CC/06	Office Automation Lab	CO1.Bridge the fundamental concepts of computers with the present level of knowledge of the students CO2. Familiarize Operating Systems, Programming languages, peripheral devices and internet. CO3. Protect information and computers from basic abuses/attacks CO4. Connect it to external devices, write documents. CO5.Create worksheets, prepare presentations.
BCA/2/CC/07	Personality and Soft Skills Development	CO1 Build confidence, help them to look life in a positive way and create positive energy CO2 Improve health and leadership skills while decreasing stress CO3 Provide students with a strong conceptual and practical framework to build, develop and manage teams CO4 Develop overall personality thereby enhancing their career prospects CO 5 Strengthen their commitment to growth, analytical thinking adaptability; inculcating the value of time management
BCA/2/CC/08	Discrete Mathematics	CO1. Perform operations on discrete structures such as sets, relations and functions and be familiar with concepts like Groups and Rings CO2.Understand the basic principle of sets and operations in sets and prove basic set equalities. CO3. Able to apply counting principles to determine probabilities. CO4. Understand the number system and its applications CO5. Able to solve problems in Computer Science using graphs and trees.
BCA/2/CC/09	Programming Language through C	CO1. Demonstrate knowledge on C Programming constructs CO2. Develop simple applications in C using basic constructs CO3. Design and implement applications using arrays and strings CO4. Develop and implement modular applications in C using functions. CO5. Develop applications in C using structures and pointers.

BCA/2/CC/10	Accounting and Financial Management	CO1. Understand the fundamental accounting concepts, conventions & terminologies. CO2. Learn the importance, functions & objectives of books of entry, subsidiary books, bank reconciliation statement and final accounts. CO3. Able to construct a step to prepare books of entry, subsidiary books, bank reconciliationstatement and final accounts using double entry book keeping. CO4. Invent the errors located in books of entry & subsidiary books.
BCA/2/CC/11	Programming in C Lab	CO1. Write the C program for a given task or algorithm. CO2. Read, understand and trace the execution of programs written in C language. CO3. Implementing C programs using arrays, pointers, decision making statements and loopingstatements. CO4.Write programs that perform operations using derived data types.
BCA/2/CC/12	Tally ERP 9.0 Lab	CO1. Describe the need of tally software in private or government organization. CO2. Design a method to backup and restore a company data. CO3. Solve the required tax and GST for a company.
BCA/3/CC/13	Operating Systems	CO1. Understand, identify and describe the services provided by operating systems. CO2. Understand and solve problems involving process control, mutual exclusion, synchronization and deadlock. CO3. Implement processor scheduling, synchronization and disk allocation algorithms for a given scenario. CO4. Understand memory management and deadlock handling algorithms. CO5. Understand different types of operating system.
BCA/3/CC/14	Data Structure using C	CO1. Develop C programs for any real world/technical application. CO2. Apply advanced features of C in solving problems. CO3. Write functions to implement linear and non–linear data structure operations. CO4. Suggest and use appropriate linear/non–linear data structure operations for solving a given problem. CO5. Appropriately use sort and search algorithms for a given application. CO6. Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.

BCA/3/CC/15	Database Management Systems	CO1. Identify scenarios where the use of file system will be more profitable over database management system and vice versa. CO2. Demonstrate the basic elements of a relational database management system CO3. Perform normalization operations on tables.CO4. Ability to identify the data models for relevant problems CO4. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data CO5. Describe the importance of security and integrity in DBMS and the corresponding steps to ensure them. CO6. Identify the possible causes of database failure and rectify them.CO8. Apply normalization for the development of application software's
BCA/3/CC/16	Computer Organization and Architecture	CO1. Understand the theory and architecture of central processing unit. CO2. Analyze some of the design issues in terms of speed, technology, cost, performance. CO3. Design a simple CPU with applying the theory concepts. CO4. Use appropriate tools to design verify and test the CPU architecture. CO5. Learn the concepts of parallel processing, pipelining and interprocessor communication. CO6. Understand the architecture and functionality of central processing unit. CO7. Exemplify in a better way the I/O and memory organization.
BCA/3/CC/17	Oracle Lab	CO1. Explain the steps to handling large database. CO2. Create his/her own database and practice various database commands. CO3. Write a method to implement basic DDL, DML and DCL commands. CO4. Describe data selection method and functions of operators used in queries and restrict data retrieval and control the display order.

		CO5. Write sub queries, aggregate and understand their purpose. CO6. Join multiple tables using different types of joins.
BCA/3/CC/18	Data Structure using C Lab	CO1. Design and analyse the time and space efficiency of the data structure. CO2. Identify the appropriate data structure for given problem. CO3. Able to apply the practical needs of applications of data structures. CO4. Understand and able to develop the different data structure
BCA/4/CC/19	Environment and Ecology	CO1. Understand the fundamental physical and biological principles that govern naturalprocesses. CO2. Relate the natural environment as a system and how human activities affect the system CO3. Predicts the benefits of environment. CO4. Understand environmental resource management process and describe sustainabilityconflicts from multiple perspectives. CO5. Analyze and integrate the social and natural sciences to understand diverse environmental.
BCA/4/CC/20	Web Programming	CO1. Explain the history of the internet and related internet concepts that are vital in understanding web development. CO2. Describe the insights of internet programming and implement complete application over the web. CO3. Design a web site by using PHP, MySQL, JavaScript and Java.
BCA/4/CC/21	Computer Networking- I	CO1. Understand concepts of computer networks, list network configurations, types, topologies, the applications of computer networks in different fields, network models and description of physical layer. CO2. Reason the need for flow and error control at the data link layer and explain the associated protocols. CO3. Enumerate the shared channel access methods, associated protocols and Wired & Wireless LAN standards and implementations. CO4. List the types of networking devices / equipment and also explain the addressing scheme used at the network layer. CO5. Understand how network layer, transport layer and application layer facilitate the transfer of message from one node to another in a global network

BCA/4/CC/22	Object Oriented Programming in C++/Java	CO1. Able to solve real world problems using OOP techniques. CO2. Able to understand the use of abstract classes. CO3. Able to solve problems using java collection framework and I/o classes. CO4. Able to develop multithreaded applications with synchronization. CO5. Able to develop applets for web applications. CO6. Able to design GUI based applications.

BCA/4/CC/23	Web Programming using PHP Lab	CO1. Describe the function of a server. CO2. Explain the various steps in designing creative and dynamic website. CO3. Write HTML, JavaScript, CSS and PHP. CO4. Write the scripting language using PHP, JavaScript and Java. CO5. Describe the hierarchy of object oriented programming.
BCA/4/CC/24	C++/Java Programming Lab	CO1. Explain the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements. CO2. Solve, compile, test and run Java programs comprising more than one class, to address a particular software problem. CO3. Describe the principles of object oriented programming.
BCA/5/CC/25	Software Engineering-I	CO1. Understand the software product and process, lifecycle models, software characteristics,components and applications, methods and tools. CO2. Ability to translate end-user requirements into system and software requirements, and structure the requirements in a Software Requirements Document (SRD). CO3. Extract and analyses software requirements specifications for different projects. CO4. Able to design some basic level of software architecture/design and apply standard codingpractices. CO5. Understand management concepts like cost estimation, scheduling and reviewing theprogress and identify and implement of the software metrics. CO6. Able to apply different testing and debugging techniques and analyzing their effectiveness.
BCA/5/CC/26	Computer Graphics	CO1. Understand the concept, tools and applications of Computer Graphics CO2. Describe a number of problems and topics drawn from computer graphics, and explores them through the lens of dynamic geometry software. CO3. Able to understand the 2D and 3D computer graphics. CO4. Use geometric transformations on graphics objects and their application in composite form. CO5. Able to justify a number of problems and topics drawn from computer graphics. CO6. Extract scene with different clipping methods and its transformation to graphics display device.

BCA/5/CC/27	GUI Programming	CO1. Describe the working environment of visual basics using a control structure. CO2. Relate the module, components and menu editor and its concept in a simple manner. CO3. Describe the functions of controls such text box, rich text box and etc…write coding easily. CO4. Develop the project with database using ODBC, DAO, ADO and visual data manager include the active controls and other control to perform particular task.
BCA/5/EC/28	Elective-I (a) Cloud Computing	CO1. Articulate the main concepts, key technologies, strengths, security, privacy and limitations of cloudcomputing. CO2. Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc. CO3. Synthesize the appropriate cloud computing solutions and recommendations according to the applications used. CO4. Understand the underlying principle of cloud virtualization, cloud storage, data management and data visualization. CO5. Understand the different cloud platforms and tools to generate new ideas and innovations in cloud computing.
	(b) E-commerce and E-governance	CO1. Understand and demonstrate E-Commerce models, E-payment systems and security CO2. Make Classification of E-Commerce and E- Governance CO3. Understand an online services are used in tourism, real estate, e-auctions CO4. Think innovatively and analyze critically to startup New Successful Business Ideas. CO5. Understand different models of E-Governance and its related benefits
	(c) IT Act and Cyber Laws	CO1. Able to understand the needs, scope and applications of Cyber law CO2. Gain the knowledge of different types and working of malware and security hazards Incident of real-world. CO3. Configure firewall and other security setting in computer CO4. Understand the need of amendment of IT Act CO5. Perform the malware and spam email identification, analysis, virus scanning and cleaning and other services using security tools CO6. Explain and practice the Cyber Law, Ethics, and Intellectual Property Rights, Patent and Trademark

BCA/5/CC/29	Minor Project	CO1. Explain acquired knowledge within the chosen area of technology for project development. CO2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach. CO3. Reproduce, improve and refine technical aspects for engineering projects. CO4. Work as an individual or in a team in development of technical projects. CO5. Communicate and report effectively project related activities and findings.
BCA/5/CC/30	Programming with VB.NET Lab	CO1. Understand the .NET framework and some of the major enhancements to the new versionof visual basic. CO2. Applying the basic structure of a visual basic.NET project and use main features of theintegrated development environment (IDE). CO3. Create applications using Microsoft Windows® Forms. CO4. Create applications that use ADO. NET. CO5. Work with XML documents, crystal reports.
BCA/6/EC/31	Elective-II (a) Software Engineering-II	CO1. Choose the appropriate method according to the project objectives. CO2. Describe the importance of object orientation in software engineering. CO3. Explain the techniques of object oriented analysis, design and testing. CO4. Schedule the project life time. CO5. Utilize necessary diagram for software project.
	(b) Software Project Management	CO1. Apply suitable capability Maturity model for specific scenarios & determine the effectiveness. CO2. Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project CO3. Compare and differentiate organization structures and project structures. CO4.Implement a project to manage project schedule, expenses and resource with the application of suitable project management tools CO5. Understand and able to apply the software testing principles.
	c)Management Information System	CO1. Know the complex software within the context of business user needs through trainingpresentation and written documentation. CO2. Able to distinguish relationships between programming language and information system. CO3. Understand the concept of data processing and decision making. CO4. Able to plan and manage project implementation.

BCA/6/EC/32	Elective III	
	(a) Data Warehousing	CO1. Understand the fundamental concepts, benefits and problem areas associated with data warehousing. CO2. Understand the various architectures, infrastructures and main components of a datawarehouse. CO3. Able to design a data warehouse, and be able to address issues that arise when implementinga data warehouse. CO4. Able to compare and contrast OLAP and data mining as techniques for extracting knowledgefrom a data warehouse. CO5. Able to implement data mining techniques like clustering, association rule and decision tree on the real data set.
	(b) Computer Networking –II	CO1. Explain how communication works in computer networks and to understand the basic terminology of computer networks. CO2. Describe the role of protocols in networking and to analyse the services and features of the various layers in the protocol stack. CO3. Design issues in network security and understand security threats, security services and mechanisms to counter.
	(c) Mobile Computing	CO1. Relate the students with the buzz words and the basics of mobile telecommunication system CO2. Explain the GSM architecture and Identify solution for each functionality at each layer CO3. Choose the required functionality at each layer for given application CO4. Describe the concept of mobile payment system CO5. Use simulator tools and design Ad hoc networks CO6.Develop a mobile application.
BCA/6/CC/33	Major Project	CO1.Undertake problem identification, formulation and solution. CO2.Demonstrate skills, abilities and specialization. CO3.Solve real life problems related to industry, academic institutions and research.