GOA VIDYAPRASARAK MANDAL'S

GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS

FARMAGUDI, PONDA, GOA

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

Choice Based Credit System (C.B.C.S.) effective from 2019-20 onwards

Programme Outcomes:

The three-year Bachelor's Degree in Computer Applications is designed:

1. To impart quality education on par with international standards.
2. To obtain knowledge and skills in need-based courses.
3. To apply standard software engineering practices and strategies in software project development using open-source programming environment to deliver a quality product for business success.
4. To inculcate in students, responsibility and self-discipline in the learning process.

Course Code Name	Course Objectives /Course Outcome	Learning Outcome
Semester I		
CAC-101 Problem Solving and Programming Concepts	Objective: • To make the student understand how to solve a problem using computers, learn a programming language, and 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. • Understand the evolution of programming from machine level to assembly and higher-level languages. • Identify the various data types, operators used in programming. • Understand the sequential and branching flow in programming. • Understand the need and process flow of algorithms and flowcharts. • Identify and analyze the use of program constructs like if else, loops, switch case. • Identify and understand the working and the use of functions.
CAC-102	Objectives:	Learning Outcomes:

Computer Organization and Architecture	• 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. • Develop logic for assembly language programming. • Analyze the performance of available computers. • Understand the different components of the computer with emphasis on their functioning. • Understand the Evolutionary History of Computers. • Understand the representation of Data and Operations, Instruction Sets, Addressing Modes and Data Formats. • Understand the structure of the Central Processing Unit and key features of processor generations. • Understand the different I/O Peripheral Devices, functioning of I/O Modules, I/O techniques, different channels of I/O and its Processors, external interface of I/O Devices and relationship of I/O devices with Operating system. • Understand the various storage systems, structure and function of the Control Unit and the basic concept of Micro programmed Control Unit.
CAC-103 Basic Mathematics	Objectives: • To introduce the basic fundamentals of mathematics.	Learning Outcomes: • Learn trigonometric functions and identities. • Understand the limit of a function and prove the

	• 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.	continuity of the function. • Understand the concepts of coordinate geometry with respect to straight lines and circles. • Learn the concepts of derivatives, integration and vectors. • Understand the properties of numbers. • Identify and understand different operations on complex numbers. • Understand the concepts of matrices and determinants and use Cramer's rule. • Understand the concept of straight lines and their properties.
CAC-104 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 concepts of pointers, memory allocation techniques for dealing with a variety of problems.	Learning Outcomes: • Write well-documented programs. • 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.	
GE-101		
ESA-101 Environmental Studies-I	Objectives: • To study about environment and ecosystem. • To study the 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. • Creating awareness of problems of environmental pollution, its impact on ecosystem and control measures. • To study the impact of population growth on environment.	Learning Outcomes: • Demonstrate a scientific understanding of the physical and biological dynamics of global ecologies including first-hand knowledge of local and regional ecosystem. • Recognize the physical, chemical, and biological components of the earth's systems and show how they function. • Understand the interactions of environmental components.
SEC-101		
Semester II		
CAC-105 Data Structures	Objectives: • To provide the knowledge of basic data structures and their implementations. • To understand the importance of data structures in context of writing efficient programs. • To develop skills to apply appropriate data structures in problem solving.	Learning Outcomes: • Implement basic data structures. • Know the strength and weaknesses of different data structures. • Use the appropriate data structure in the context of solution of a given problem.

	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.	• Develop programming skills which are required to solve given problem.
CAC-106 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 Input Output management, file system implementation and problems related to security and protection.	Learning Outcomes: • Have sound knowledge of different services provided by Operating Systems. • Use different process scheduling algorithms and synchronization techniques to avoid deadlock. • Know the different memory management techniques such as paging, segmentation and demand paging etc.
CAC-107	Objectives:	Learning Outcomes:

Applied Mathematics	• To introduce the concepts of mathematical logic. • 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 Relation. • To learn the concept of permutations and combinations.	• 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.
CAC-108 Data Structures Laboratory	Objectives: • To develop skills to design and analyze simple linear and nonlinear data structures. • To strengthen the ability of the students to identify and apply the suitable data structure for a given real world problem. • Enable them to gain knowledge in practical applications of data structures. Course Outcomes: • Implement different sorting and searching algorithms. • Implement the stack, Queue, and their applications. • Implement various types of linked lists and their applications. • Perform basic operations on trees and graphs.	Learning Outcomes: • Be able to design and analyze the time and space efficiency of the data structures. • Be capable to identity the appropriate data structure for given problem. • Have practical knowledge on the applications of data structures.
GE-201		
ESA-102	Objective:	Learning Outcomes:

Environmental Studies-II	• To enhance 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. • 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.	• 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.
SEC-201		
Semester – III		
CAC-109 Object Oriented Concepts	Objectives: • To learn and understand the difference between Procedure Oriented and Object-Oriented Programming Languages. • To learn and understand the Concepts of Object-Oriented Programming Language. • To learn and understand Polymorphism, Inheritance and Exception handling. • To learn the basic concepts of Unified Modeling Language. Course Outcomes: • Understand the significance of object-oriented paradigms.	Learning Outcomes: • Describe the meaning of Object-Oriented paradigms. • Implement programs using Object-Oriented concepts. • Design basic programs using Object-Oriented concepts. • Demonstrate the conceptual models of Unified Modeling Language.

	• Program basic problem statements using Classes, Objects and other Object-Oriented paradigms. • Learn Unified Modeling Language concepts. • Handle various built in as well as user-defined exceptions.	
CAC-110 Database Management Systems	Objectives: • To understand and learn database concepts. • To learn Data Definition Language and Data Manipulation Language. • To learn and design the database for an enterprise. • To learn how to organize, maintain & retrieve data effectively & efficiently. • To learn and implement recent changes in technology. Course Outcomes: • To Understand the Limitations of the Traditional File Systems and the need for Database. • Introduction to data models, database design process, normalization process and transaction processing. • Familiarize with emerging trends in database technology. • Apply queries in SQL and relational formal query language. • To understand the significance of transaction processing.	Learning Outcomes: • Understand the fundamental elements of a database management systems. • Compare and contrast between the existing data models and recognize emerging data models for databases. • Design and develop a logical design model to represent database application scenarios. • Transform the logical design model to relational model. • Analyze and design an improved database through normalization. • Understand the basic concepts of transactions processing in DBMS. • Understand and recognize the emerging trends in Database Technology.
CAC-111 Object Oriented Programming Laboratory	Objectives: • Learn to write object-oriented programs. • Learn advanced concepts in object-oriented approach. • Learn use of Classes, Objects and Functions in Java language. Course Outcomes:	Learning Outcomes: • Create object-oriented programs. • Use advanced concepts in object-oriented systems while programming. • Program in Java language.

	• Write programs to demonstrate the object-oriented concepts. • Implement the methods of exception handling. • Understand the usage of java packages such as Vectors, Linked Lists, HashMaps.	
CAC-112 Database Management Systems Laboratory	Objectives: • Designing and conceptualizing a relational data model. • Implementing the relational database concepts through some Database Management Systems Package. • Managing users and access control. • Using a Database Management Systems package as a backend tool for an application. Course Outcomes: • Model real-world concepts using Entity Relationship modeling. • Create and execute triggers and procedures. • Form relational database tables by converting Entity Relationship models. • Identify and assign the appropriate keys to the fields of the tables.	Learning Outcomes: • Implement and use a relational database management system. • Design and implement relational database concepts using data definition language for a given problem-domain. • Design, implement and manipulate the database schema using Structured Query Language for a given problem-domain. • Design and implement transaction processing for a given database.
GE-301		
GE-302		
CAA101 Communication And Presentation Skills	Objectives: • To introduce the fundamentals of communication. • To teach the process of interpersonal and group communication. • To develop skills of communication and idea presentation.	Learning Outcomes: • Define the basic concept of communication and explain the complete communication process. • Describe the different methods, forms of communication.

	• To hone soft skills in learners, grooming them for verbal communication. Course Outcomes: • Understand the difference between formal and informal communication. • Study the complete communication process and the aspects of effective communication. • Learn the techniques to prepare, plan and conduct interviews. • Improve the presentation skills by introducing several presentation techniques.	• Describe the process of conducting and appearing for a job interview. • Describe the aspects of matter researching and presentation preparation. • Explain the use of modern aids and software of presentation.
Semester – IV		
CAC-113 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. • Apply the principles of software engineering to design, develop and manage a software system. • Create software using the different Software Development Life Cycle Models.	Learning Outcomes: • Learn why, how and when the concept of software engineering evolved. • Understand the meaning of Software Process and the characteristics of the software development process. • Learn the importance and documentation of the Software Requirements Specification for a software system.
CAC-114 Data Communications	Objectives: • To learn and understand the fundamentals of data communications. • To understand the conceptual and analytical differences between Analog and Digital communication.	Learning Outcomes: • Understand the basic components of a data communication system.

	• To understand the network layered architecture and the protocol stack. • To learn & understand Computer Networking essentials. Course Outcomes: • Understand the basic concepts of data communication components. • Learn different network topologies and their advantages. • Identification of transmission mediums. • Detect and rectify different errors.	• Identify the different types of network topologies and understand their advantages and disadvantages. • Understand the basic protocols of computer networks, and how they can be used to assist in network design and implementation. • Understand IP addressing and analyst how to assign Internet Protocol addresses in a network. • Identify and compare the different types of Transmission media. • Recognize the different internetworking devices and understand their functionality. • Explain the fundamentals of cryptography such as symmetric/asymmetric encryption, digital signatures, and hash functions.
CAC-115 CASE Tools Laboratory	Objectives: • Learn to use centralized repositories and versioning tool, design and execute unit test cases using any testing tool. • Learn to document the code and generate documentation using documentation tool. • Learn to use tools for debugging and defect tracking, code refactoring. • Understand and apply scrum methodology. • Learn and understand testing tool to test web application and build tool to build application. Course Outcomes: • Study how to use maven building tool. • Use pair programming strategies.	Learning Outcomes: • Implement centralized repositories and versioning tool. • Design and execute test cases using testing tool. • Design effective code documentation using tools. • Demonstrate proficiency in using debugging and defect tracking tool. • Perform refactoring of the code using tools efficiently. • Demonstrate the understanding of entry level scrum agile methodology of Software Development. • Implement tools to build and test web applications.

	• Learn to use selenium testing tool.	
CAC-116 User Interface Design Laboratory	Objectives: • Identify the target audience and create user personas to create an audience appropriate interface design. • Construct a user-interaction strategy for a given problem. • Sketch a series of graphical user-interfaces for a given scenario. • Implement a designed user-interface to demonstrate its functionality and usability. • Design and Implement Web Interfaces. Course Outcomes: • To understand different components of Graphical User Interface. • To learn form validation and report layout planning. • Coding and managing the websites.	Learning Outcomes: • Design a user-interaction strategy that solves a real-world problem using design principles, guidelines, and heuristics. • Design a usable and compelling user-interface given a set of requirements and available technologies. • Design effective user interface for stand-alone web application.
GE-401		
GE-402		
CAA-102 Technical Writing Skills	Objective: • To teach the concepts of technical writing and enable the students to create effective technical documentation. Course Outcomes: • Understanding the fundamentals of written communication. • Understanding the definition, description, process explanation and other common forms of technical writing.	Learning Outcomes: • Create effective reports based on data collected from different sources. • Understand the conventions and formats of business letter writing.

Generic Electives (G.E.)		
CAG-101 Business Accounting	Objective: • To introduce concepts of financial accounting and management with a scope for applying these concepts into day-to-day tasks. Course Outcomes: • To determine financial performance and financial position of a business. • To understand the different types of shares. • To study the recording of financial business accounts. • To understand the need for provisions and reserves.	Learning Outcomes: • Analyze and apply the recording of financial business accounts and understanding the concepts and convention of accounting. • Understand the need for provisions and reserves through the various methods of depreciation. • Analyze and determine financial performance and financial position of a business, through final accounts. • Understand the different types of shares and learn the process of issue of shares.
CAG-102 Cost Accounting	Objective: • To introduce concepts of cost accounting techniques in as applicable in product costing. Course Outcomes: • To introduce the students to cost accounting and its objectives. • To understand the importance of cost accounting in an organization. • To introduce the various techniques of costing and preparation of cost sheet.	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. • Identify and understand the various techniques of costing.

CAG-103 Advertising	Objective: • To introduce the concepts of advertising as a publicity tool for launching products and services. Course Outcomes: • To introduce the concept of advertising and the process of advertisement creation. • Learn the use of multimedia in creating advertisements. • Create effective advertisements for a given product.	Learning Outcomes: • Understand the use of different 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.
CAG-104 Human Resource Management	Objective: • To introduce the different concepts of Human Resource Management within an organization. Course Outcomes: • Understand the need for career planning, effective communication, counseling and time management for better organizational management. • 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 the recruitment decisions. • Study effective training methods for workers and managers. • Understand the need of planning a career and the various opportunities available.

CAG-105 Entrepreneurship Development	Objective: • To provide students with substantial knowledge about the requirements of setting up a firm and exercising entrepreneurship skills. Course Outcomes: • To gain an insight into the concept of entrepreneurship. • Understand of the stages of business opportunities. • Learn the purpose and structuring of a project report	Learning Outcomes: • Understand the significance of purposeful innovation. • Study local market and identify business opportunities • Formulate reports with appropriate structure for a given project.
CAG-106 Marketing Fundamentals	Objective: • To learn the basic concepts of marketing. Course Outcomes: • Gain knowledge about marketing concepts. • Acquire knowledge of designing and promoting products. • Learn about Product placement and distribution.	Learning Outcomes: • Introduce the concept of marketing and market structures. • Gain an understanding of designing products. • Understand the concepts of pricing products. • Learn product placement and distribution. • Learn the concepts of promoting products.
CAG-107 Critical Thinking and Problem Solving Techniques	Objectives: • To understand and explain the importance of critical thinking. • To understand the core concepts associated with critical thinking. • To construct a logically sound and well-reasoned argument. • To identify appropriate solutions using specific approaches. • Critical thinking process to build, analyze and evaluate varying viewpoints in solving problems. • The best technique for making decisions. • To Avoid common decision-making mistakes Course Outcomes:	Learning Outcomes: • Define and explain critical thinking and its need. • Identify the relevant arguments (reasons, claims, pros and cons, etc.) • Analyze and evaluate claims, assertions, and arguments. • Predict implications and consequences. • Construct well-reasoned solutions/conclusions. • Implement problem solving approaches, tools with well-reasoned view point. • Implement critical thinking process to build, analyze and evaluate decisions.

	• Recognize critical thinking as a process of identifying, analyzing, evaluating, and constructing reasoning in deciding what conclusions to draw or actions to take. • Understand the dynamics of Critical Thinking and Decision Making. • To apply problem solving steps and tools.	• Demonstrate the application of various problem-solving approaches. • Demonstrate the understanding of deductive and non-deductive reasoning.
CAG-108 Data Analyses & Statistical Techniques	Objectives: • Concepts of analyzing data using Mathematical and Statistical Techniques. • Understanding basic Data Mining concepts. Course Outcomes: • Analyze statistical data using measures of association. • Understand different clustering and classification techniques. • Acquire knowledge of data mining and applying Apriori algorithm.	Learning Outcomes: • Perform probability and probability distributions on data. • Perform testing of hypothesis on a population based on statistical measures of samples. • Perform simple linear regression analysis. • Compute descriptive statistics including diagrammatic representation and interpretation. • Perform basic tasks in data mining.
CAG-109 Public Administration	Objectives: • To provide an understanding on the evolution and scope of Public Administration. • To understand Public Administration in the age of Liberalization, Privatization and Globalization. • The emerging techniques and tools in Public Administration. • To understand the Indian Administrative System. • To understand the aspects of Personnel Administration. • To cover the concepts of Financial Administration and Accountability. • To learn and understand the challenges to Indian Administration.	Learning Outcomes: • Explain the evolution and scope of Public Administration. • Describe Public Administration in the age of Liberalization, Privatization and Globalization. • Describe the emerging techniques and tools in Public Administration. • Describe the Indian Administrative System. • Describe the aspects of Personnel Administration. • Describe the concepts of Financial Administration and Accountability

	Course Outcomes: • Awareness about the evolution and growth of the discipline of Public Administration. • Knowledge about the evolution and growth of Indian Administration. • Conceptual clarity of Personnel Administration. • Knowledge of various aspects of Financial Administration	• Describe the challenges to Indian Administration.
CAG-110 Ergonomics	Objectives: • Introduction to ergonomic principles and their application in the design of work, equipment and workplace. • Learn Musculo-skeletal disorders, manual handling, ergonomic aspects of the environment. • Learn the key features in the design of workplaces. Course Outcomes: • Application of ergonomics in work environment. • Learning of different ergonomics methods and techniques. • Learn the sources of standards covering ergonomics, social aspects and training, instruction and supervision requirements.	Learning Outcomes: • Demonstrate ergonomic principles to the creation of safer, healthier and more efficient and effective activities in the workplace. • Perform ergonomic risk assessments. • Design appropriate control measures for ergonomic risk factors.
CAG-111 Social Engineering	Objectives: • Learn the concepts of Social Engineering. • Learn the importance of Social Engineering. • Learn the types of Social Engineering Attacks. • Learn Psychological principles used in Social Engineering. • Learn the Power of persuasion. • Identify and prevent Social Engineering Attacks. • Learn the usage of tools of Social Engineering. Course Outcomes:	Learning Outcomes: • Define Social Engineering. • Identify the types of Social Engineering attacks. • Choose tools for Social Engineering. • Compare social engineering techniques on effectiveness. • Explain techniques to prevent and mitigate Social Engineering attacks.

	• Learn different social engineering attacks and information-gathering techniques. • Create awareness about prevention and mitigation.	• Identify the possibility of downloading malicious software on unsuspecting user systems.
CAG-113 Ethics and CSR	Objectives: • Acquire knowledge of ethics in the modern era. • Understanding of Ethical decision-making approaches. • Understand the scope and complexity of Corporate Social responsibility in the global and Indian context. Course Outcomes: • To gain insights on the basic concepts of ethics in personal and professional life. • To study the current scenarios in Business, Environmental, Computer, Media and Research Ethics. • To learn the limitations of Sample, Ethical and Corporate codes and their implementation. • Significance and considerations for Ethics Audit, Ethics standards and Ethics Audit reporting.	Learning Outcomes: • Understand ethical theories and ethics in profession. • Analyze global issues in ethics. • Apply Ethical Code, Audit and living in real world. • Analyze Corporate Social Responsibility and its framework.
CAG-117 IT in Management	Objectives: • Understand Information Technology and its practices in managing the business. • Conceptualize the process of Technology acquisition in an Industry. • Familiar with impact and issues of Information Technology for managing business operations with social concern. Course Outcomes: • Understand the role of computer in modern business. • Knowledge of different business strategies.	Learning Outcomes: • Use various IT tools used for managing the Industrial operation. • Apply the decision for selecting the proper IT tools for Management operation. • Design the strategic plan for using Information Technology in Management.

	• Study software and hardware platform to improve business performance.	
CAG-118 Data Mining and Business Intelligence	Objectives: • Acquire the knowledge of various concepts and tools behind data warehousing and mining data for business intelligence. • Study data mining algorithms, methods and tools. • Identify business applications of data mining. Course Outcomes: • Apply suitable pre-processing and visualization techniques for data analysis. • Discuss the data warehouse concepts. • Understanding the prediction and Business Intelligence methods.	Learning Outcomes: • Use conceptualization of Business Intelligence techniques. • Apply data warehouse concepts for data analysis and report generation. • Develop industry level data mining skills using software tools. • Make use of relevant theories, concepts and techniques to solve real world Business Intelligence problems.
CAG121 Digital Marketing Fundamentals	Objectives: • To acquaint the students with basic principles and concepts of digital marketing & advertising. • To understand and familiarize the students with the concept of Digital Marketing techniques like AdWords, search advertising, and display advertising. • To understand the concept of Search Engine Optimization (SEO). Course Outcomes: • Learn the fundamentals of Digital Marketing. • Gain insights on search and display advertising with AdWords. • Understanding search engine optimization.	Learning Outcomes: • Apply the understanding of the digital landscape and build a case to leverage online channels. • Strategize, implement and optimize online campaigns successfully. • Develop and design Online Advertising campaigns, AdWords Campaign management and Campaign Basics across the search. • Drive organic traffic through Search Engine Optimization. • Apply the advanced concept of Search Engine Optimization to capture the right intent.
CAG-122	Objectives: • To understand the concept of Social Media Marketing platforms.	Learning Outcomes: • Have an understanding of Social Media Marketing.

Social Media Marketing and Analytics	• To have an understanding of video and mobile platform advertising. • To understand and apply the concept of web and google analytics. • To acquire an understanding of LinkedIn, Twitter, and Pinterest marketing. • To measure, analyze and optimize Social Media Marketing campaigns. • To create an effective Digital Marketing plan. Course Outcomes: • Understand the importance of social media marketing and its usage in day-to-day life. • Learn online advertising through Twitter, LinkedIn, Instagram & similar media for promotion. • Understand the working of google and web analytics.	• Able to use mobile and video media for online advertising, and AdWords campaign management. • Able to use Twitter, LinkedIn, Instagram & similar media for promotion. • Comfortably apply relevant tools and concepts to execute measure and monitor an annual online marketing plan and use analytics to drive actionable improvements. • Use new digital marketing techniques in a strategic marketing plan.
CAG-124 General Insurance	Objectives: • To learn and understand the Concepts of Insurance business. • To learn and understand the constitution of Insurance Regulatory and Development Authority Act. • To learn and understand the different types of insurance. • To know about emerging concepts in insurance industry. Course Outcomes: • Learn different insurance terminology. • To study insurance legislature and regulatory matters. • Understand the emerging concepts in insurance industry.	Learning Outcomes: • Basic understanding of insurance and insurance business. • Understand the Insurance Regulatory and Development Authority functioning and constitutions and other related Acts. • Comfortably understand the different avenues of insurance. • Exhibit an understanding and appreciation of insurance need and purpose.

CAG-126 Research Methodology	Objectives: • To understand Research and Research Process. • To acquaint students with identifying problems for research and develop research strategies. • To familiarize students with the techniques of data collection, analysis of data and interpretation. Course Outcomes: • Familiarize with basic research concepts. • Understand different types of research. • Identification and selection of research problems.	Learning Outcomes: • Prepare a preliminary research design for projects in their subject matter areas. • Accurately collect, analyze and report data. • Present complex data or situations clearly. • Review and analyze research findings • Get the knowledge of objectives and types of research.
Skill Enhancement Courses (S.E.C.)		
CAS-101 I.T. Tools Laboratory	Objective: • To familiarize and learn use of various Information Technology 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. • Learn to use basic Internet Applications.	Learning Outcomes: • Configure the Basic Input Output System setup for a standard Personal Computer. • Identify the different components of a Personal Computer and understand their usage. • Create spreadsheets for a given task. • Create effective presentations using appropriate software. • Setup an e-mail account to send and receive e-mails. • Demonstrate the basic setup and customization of a Learning Management System.
CAS-102 Programming in Scratch	Objective: • To introduce the Scratch platform and understand the usage of block-based coding interface. Course Outcomes:	Learning Outcomes: • Demonstrate the key programming concepts of sequence, repetition, selection, and variables in Scratch programs. • Build games using move and glide blocks.

	• Introduce the Scratch platform and block-based coding interface. • Produce Scratch programs that allow the user to interact with them with key presses, text answers, and motion.	
CAS-104 Open-Source Software	Objectives: • To introduce and use open-source software. Course Outcomes: • Learn the comparison between open-source software vs commercial software, and free software vs freeware. • Understand the different categories of open-source software application software.	Learning Outcomes: • Learn Linux operating system, GNU General Public License, GNU Lesser General Public License and other licenses. • Identify open-source software and commercial software and learn how to use them.
CAS-105 Operating Systems Laboratory	Objectives: • The course will introduce the basic principles of Operating Systems. • To learn the set-up, functioning and structure of desktop and advanced operating systems. Course Outcomes: • Learn the Installation and configuration of the Operating System. • Learn to customize the desktop-based Graphical User Interface Operating system. • Learn file formats and directory structure of web-based Operating systems. • 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.

CAS-106 Programming with Python	Objective: • Understand and implement the python programming concepts and their usage. Course Outcomes: • Learn and implement programs using fundamental programming constructs. • Ability to design programs using various data structures, sorting and searching techniques.	Learning Outcomes: • Learn the basic programming constructs by implementing them in a programming language. • Learn the programming-specific data types and their usage, use of different operators, and declare variables. • Learn and understand the use of if/if-else and switch statements, the different looping structures and to combine decision and looping structures, use of functions, recursion and iteration. • Implement classes, arrays, stacks and queues. • Implement the different sorting and searching techniques.
CAS-107 HTML & CSS	Objectives: • Understand the importance of the web as a medium of communication. • Understand the principles of creating an effective web page, including an in-depth consideration of information architecture. Course Outcomes: • Design webpages with well-structured HTML and appropriate CSS layout/styling patterns. • Learn to develop web pages using text formatting, graphics, audio, and video elements. • Create a webpage from start to finish by planning, designing, and implementing everything from scratch.	Learning Outcomes: • Understand and acquire skills pertaining to web applications in the development of a web applications interface. • Apply concepts and create simple static web pages using HTML and designing using CSS. • Understand and create dynamic web pages and to use Document Object Model concepts for client-side scripting.
CAS-108 PHP Programming	Objective: • To gain the PHP programming skills needed to successfully build interactive, data-driven sites.	Learning Outcomes: • Understand the working of client server model. • Apply concepts and implement web applications using PHP as a server-side scripting language

	Course Outcomes: • Analyze PHP scripts and determine their behavior. • Construct PHP scripts to create dynamic web content. • Create PHP scripts capable of inserting and modifying data in MySQL database. • Design web pages with the ability to retrieve and present data from MySQL database.	along with database connectivity and report generation.
CAS-112 Open Source Technology	Objectives: • Learn Free and Open-Source Software. • Linux installation and management basics. • Open-source software and installation. • Existing open-source projects. Course Outcomes: • Understand the difference between open-source software and commercial software. • Identify, install and run Linux operating system. • Install and manage applications.	Learning Outcomes: • Design applications using .NET • Analyze the use of .Net Components depending on the problem statement. • Implement and develop a .Net application with Database connectivity.
CAS-113 .Net Platforms	Objectives: • Set up a programming environment for .net programs. • Configure an .Net application. • Creating .Net applications using standard .net controls. • Connecting to data sources and managing them. Course Outcomes: • Study visual basics .net Integrated development environment. • Learn object oriented and event driven programming. • Retrieving and manipulating data using ADO.NET.	Learning Outcomes: • Design applications using .NET. • Analyze the use of .Net Components depending on the problem statement. • Implement and develop .Net applications with Database connectivity.
CAS-114	Objectives: • To use the UNIX and LINUX operating system.	Learning Outcomes:

Unix Environment and Scripting	• To use basic commands for editing and manipulating files, managing processes and interacting with the Bourne/Bourne Again Shell. • To use the programming constructs of the shell language to write scripts that may be used to simplify or automate tasks. • To work on UNIX/LINUX environment as a technical user or system administrator of a powerful, fast growing, multitasking, open operating system which is currently used on all types of computers from micros to mainframes. Course Outcomes: • Familiarize with GUI & command line processing. • Study different UNIX file types. • Understand different UNIX/LINUX commands. • Learn shell script programming.	• Customize a UNIX login account using environment variables, configuration files and startup scripts. • Maintain UNIX directories and files, manage UNIX jobs and processes, use of UNIX pipes and file redirection, manipulate data with proper use of Unix filters, role of an operating system and UNIX philosophy. • Operate in both graphical and text-based environments; automate a sequence of operations by writing a shell script. • Apply UNIX security tools to ensure UNIX directories and files are protected from unauthorized users.

Semester – V		
CAC-117 Web Technology	Objectives: • Learn fundamental concepts, technologies and tools in web technologies. • Learn frontend development tools for creating web pages. • Learn client-side and server-side scripting. • Learn to design, develop and host a complete functional website. • Learn security issues in web applications. 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. • Create interactive and secure web sites for basic applications.	Learning Outcomes: • Design user friendly websites using HTML and CSS. • Design dynamic web pages using client-side scripting language. • Explain the fundamentals of designing and developing websites and web applications along with the security aspects governing the internet.

CAC-118 Information Systems	Objectives: • To provide awareness and appreciation of Management Information Systems and to understand the need of Management Information Systems in organizations. • To develop an in-depth understanding of essential components comprising Management Information Systems. • To understand the role of Management Information Systems 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. • Learn the Architecture and significance of Data warehouse.	Learning Outcomes: • Explain the role of Information Systems in organizational Management to know knowledge, its classifications, capturing, storing and utilizing it in an organization. • Describe the characteristics of decision-making, decision-making models and tools. • Describe the concept of Office Automation Systems, Expert System and Executive Expert System. • Compare different information systems such as Enterprise Resource Planning, Supply Chain Management and Customer Relationship Management. • Effective use of Query and Reporting tools namely for Data Analysis, On-line Analytical Processing and Data Mining.
CAC-119 Web Technology Laboratory	Objective: • To teach web page creation and scripting. • To implement web tools to create web applications. • To learn client side and server-side scripting. Course Outcomes: • Introduction to Web Technology Protocols. • Design responsive and dynamic websites. • To setup up and use a webserver for testing and deploying web applications. • To learn client-side and server-side scripting language for database connectivity and report generation.	Learning Outcomes: • Design complete and functional web applications. • Design client and server-side scripts. • Design responsive and dynamic websites. • Demonstrate hosting of websites.

DSE-501		
DSE-502		
CAP-101 Project	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		
CAC-120 Multimedia Technology	Objectives: • Introducing terminologies and technologies in multimedia. • Learning different types and forms of multimedia. • Learn storage and access mechanism of each multimedia file type. Course Outcomes: • To gain in-depth knowledge of multimedia development software. • Identify, describe, and apply multimedia technologies in learning environments.	Learning Outcomes: • Explain the different types and forms of multimedia. • Describe the issues and principles in design and use of Multimedia. • Explain the concepts of graphic media and color modes. • Design 3D models. • Choose the best suitable file formats of graphic media, with focus on its storage and representation.
CAC-121 E-Commerce Applications	Objectives: • To develop an understanding of Web-based Commerce. • To equip students to assess e-commerce requirements of a business. • To enable the students to develop e-business plans and e-commerce applications. Course Outcomes:	Learning Outcomes: • Describe the basics of e-commerce. • Explain the design principles of e-commerce websites. • Explain the different models of e-commerce. • Describe the different electronic payment systems. • Explain the security issues, security mechanism and threats to e-commerce applications.

	• Explain business applications of e-commerce. • Study different types of models in E-commerce application. • Evaluate a website. • Compare Electronic Data Interchange and its features, electronic payment systems and security in E-commerce.	
CAC-122 Multimedia Technology Laboratory	Objectives: • Learn to process the different types of multimedia files. • Learn graphics editing through a graphic manipulation tool. • Learn to record and manipulate audio files. • Learn to capture and process video streams. • Learn computer-based animations. 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: • Explain the various image editing features. • Design and edit audio streams. • Capture videos and apply different editing effects on videos. • Design 2D, 3D animations.
DSE-601		
DSE-602		
CAP-101 Project	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.

Discipline Specific Electives (D.S.E.) Semester V		
CAD-103 Mobile Application Development	Objectives: • To understand system requirements for mobile applications. • To learn the fundamentals of Android Operating System. • To debug programs running on mobile devices. • To develop mobile applications. • To deploy the mobile applications in marketplace for distribution. Course Outcomes: • Apply Android programming concepts and develop various Android applications. • Develop Android applications using server-less database like SQLite.	Learning Outcomes: • Understand system requirements for mobile applications. • Learn the fundamentals of Android OS. • Learn to debug programs running on mobile devices. • Learn to develop mobile application. • Learn to deploy the mobile applications in marketplace for distribution.
CAD-105 Computer Graphics	Objectives: • To study the terminologies, types and forms of computer graphics. • To know algorithms for rendering shapes and polygons. • To Understand the principles of 2D and 3D graphics. • To Understand the principles of 3D computer graphics. Course Outcomes: • Understand the basics of computer graphics and applications of computer graphics. • Gain insights into various algorithms of computer graphics and transformation techniques on graphic objects.	Learning Outcomes: • Describe the concepts of computer graphics system. • Implement the algorithms to draw lines, circles and polygons. • Perform transformation techniques to scale, rotate and translate the object. • Perform the methods of enlarging visible portion of drawing. • Develop the logic for drawing the natural objects using different algorithms for curved lines.

	• Learn 2D and 3D concepts and extract scene with different clipping methods and its transformation.	
CAD-106 Human Computer Interaction	Objectives: • Introduce the foundations of Human Computer Interaction, design technologies and user interface design and development. Course Outcomes: • Learn the foundations of Human Computer Interaction. • Be familiar with the design technologies for individuals and persons with disabilities. • Learn the guidelines for user interface design and development. • Gain insights on mobile Human Computer Interaction.	Learning Outcomes: • Develop meaningful user interface. • Assess the importance of user feedback. • Design effective Human Computer Interaction for individuals and persons with disabilities. • Develop storyboard and design prototype. • Design Graphical User Interface, Web User Interface and Reports. • Perform Heuristic Evaluation of the design.
Discipline Specific Electives (D.S.E.) Semester VI		
CAD-109 Internet of Things	Objectives: • To learn and understand the concept of Internet of Things (IoT). • To study the constituent components of Internet of Things. • To design and develop IoT applications using different, Sensors/actuators. • To seek working knowledge of Arduino, Raspberry pi Boards and to develop cloud based IoT projects. • To use tool/techniques to convert IoT projects to IoT product. Course Outcomes: • Understand the application areas of IoT. • Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.	Learning Outcomes: • Explain the concepts of Internet of Things and gain knowledge to design IoT applications. • Describe the various components involved in IoT design methodology. • Design an IoT device to work with a Cloud Computing infrastructure. • Use IoT protocols for communication.

	• Learn building blocks of Internet of Things and characteristics.	
CAD-110 Data Science Concepts	Objective: • Learn fundamentals of Data Analysis and the Science behind it. Course Outcomes: • Learn Machine Learning algorithms for performing complex data analysis. • Learn Analyst's insight into a data set and its underlying structure. • To suggest hypotheses about the causes of observed phenomena. • To discover interesting patterns, correlations, associations and causal structures in the data found in data repositories.	Learning Outcomes: • Implement problems or subset of problems which the industry is currently working upon. • Perform Data Wrangling and Data Analysis. • Perform Feature Selection and Dimensionality Reduction. • Implement Machine Learning Algorithms. • Perform Supervised and Unsupervised Machine Learning. • Choose Machine Learning Algorithm given a data mining problem.
CAD-112 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.). • Learn to create dynamically manageable C.M.S. • Plan and develop dynamic web content using various 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.