K K Wagh ACS and CS College Nashik
Computer Application Department
Program Outcomes

PO	After the successful completion of BCA, the Graduate will able to
PO1	**Scientific Knowledge:** Apply the knowledge of mathematics, science fundamentals, and specialization to the solution of complex problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and sciences.
PO3	**Design/development of solutions:** Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern IT tools including prediction and modelling to complex activities with an understanding of the limitations.
PO6	**The Graduate and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice.
PO7	**Environment and sustainability:** Understand the impact of the professional solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the professional practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex activities with the professional community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the science and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Outcome		
Computer Application		
F.YBCA SEM I		
Subject Code	Subject Name	Outcome
CA – 101 – T	Problem Solving and Programming in C	At the end of the course, students will be able to 1. Define algorithms and explain their characteristics 2. Formulate algorithm and draw flow chart to solve a given problem 3. Explain use of appropriate data types, control statements 4. Demonstrate ability to use top-down program design
CA – 102 – P	Lab Course on CA – 101 - T	At the end of the course, students will be able to 1.Define algorithms and explain their characteristics 2. Formulate algorithm and draw flow chart to solve a given problem 3.Explain use of appropriate data types, control statements 4. Demonstrate ability to use top-down program design
CA – 103 – T	Computer Organization and Architecture	On completion of the course, student will be able to– 1. Design of combinational circuits 2. Design of sequential circuits 3. Describe block diagram of CPU,Memory and types of I/O transfers
CA-104-P	Lab Course on CA-103-T	On completion of the course, student will be able to– 1. Design of combinational circuits 2. Design of sequential circuits 3. Describe block diagram of CPU, Memory and types of I/O transfers
CA – 105 – T	Discrete Mathematics and Statistics	On completion of the course, students will be able to– 1. Relate and apply techniques for constructing mathematical proofs and make use of appropriate set operations, propositional logic to solve problems 2. Use function or relation models to interpret associated relationships 3. Apply basic counting techniques and use principles of probability 4. Given a data, compute various statistical measures of central tendency 5. Use appropriate Sampling techniques

CA-106 - P	Laboratory Course Based on CA-105 - T	On completion of the course, student will be able to 1.Demonstrate understanding of fundamental mathematical concepts. 2 . Apply mathematical and statistical concepts to solve problems. 3.Use R software to perform statistical operations and data visualization.
VSEC-101-CA	HTML and Webpage Designing	After successful completion of this course, learner will be able to 1. Enlist various HTML elements and tags 2. Use HTML elements and tags 3. Apply CSS and Java script features. 4. Design a website using HTML, CSS and JavaScript

Course Outcome		
Computer Application		
F.YBCA SEM II		
Subject Code	Subject Name	Outcome
CA – 151 - T	Advanced C Programming	On completion of the course, student will be able to– 1) Write programs using pointers and structures 2) Use Pre-processor directives 3) Manipulate strings using library functions 4) Write programs to perform operations on Files
CA – 152 – P	Lab Course on CA – 151 - T	On completion of the course, student will be able to– Write programs using pointers and structures 1. Use Pre-processor directives 2. Manipulate strings using library functions 3. Write programs to perform operations on Files
CA – 153 – T	Introduction to Microcontrollers	On completion of the course, student will be able to– 1. Write programs using instruction set of 8051 microcontroller. 2. Interface I/O peripherals to 8051 microcontroller. 3. Design simple microcontroller-based applications.
CA-154-P	Lab Course on CA-153-T	On completion of the course, student will be able to– 1. Write programs using instruction set of 8051 microcontroller. 2. Interface I/O peripherals to 8051 microcontroller. 3. Design simple microcontroller-based applications.
CA – 155 – T	Linear Algebra	On completion of the course, students will be able to– 1. Appreciate the relevance and applications of Linear Algebra in the field of Computer Science. 2. Instill a computational thinking while learning linear algebra. 3. Express clear understanding of the concept of a solution to a system of equations. 4. Find eigenvalues and corresponding eigenvectors for a square matrix.

		5. Represent linear transformations using matrices.
CA-156 - P	Laboratory Course Based on CA-155 - T	On completion of the course, student will be able to 1. Demonstrate understanding of fundamental mathematical concepts. 2. Apply mathematical and statistical concepts to solve problems. 3. Use R software to perform statistical operations and data visualization.
VSEC-151	Software Tools for Business Communication	At the end of the course, students will be able to 1. Perform various word processing tasks 2. Prepare spreadsheets and presentations 3. Collect feedbacks and make surveys 4. Communicate and collaborate through electronic communications

Course Outcome		
Computer Application		
S.YBCA SEM III		
Subject Code	Subject Name	Outcome
CA – 201 - MJ	Data Structures	After successful completion of this course, the learners will be able to CO1: Define various data structures and notations for algorithm analysis CO2: Design algorithms using suitable data structure(s) CO3: Compare various representations of a stack, queue, tree and graph CO4: List real world applications of stacks, queues, trees and graphs CO5: Apply appropriate data structure(s) to solve a given problem CO6: Evaluate the time and space complexity of the given algorithm/program
CA - 202 - MJP	Lab course on CA – 201 - MJ	After successful completion of this course, learner will be able to CO1: Apply appropriate data structures to solve the given problem CO2: Design an efficient algorithm for the given problem and implement CO3: Determine the time and space complexity of a given algorithm
CA - 221 - VSC	C++ Programing	After successful completion of this course, the learners will be able to, CO1: Compare the procedural and object-oriented paradigms CO2: Use Classes, Objects, constructors, destructors etc. CO3: Illustrate the concept of function overloading, operator overloading, inheritance, virtual functions and polymorphism. CO4: Apply exception handling CO5: Demonstrate use of various OOPs concepts with the help of programs

CA - 231 - FP	Field work	After successful completion of this course, the learners will be able to CO1: Apply methodology to perform field work CO2: Identify and define real-world issues or problems CO3: Analyze the data collected and propose solution to solve real-world problem
CA – 200 – IKS	Indian Knowledge System for Computing	After successful completion of this course, the learners will be able to CO1: List India's contributions to Computing CO2: Apply Ancient Indian Mathematical concepts in Computing CO3: Utilize Linguistic and Computational aspects of Sanskrit from IKS in Modern Computing CO4: Describe Cryptographic techniques from IKS CO5: Make use of Cybersecurity techniques from IKS CO6: Illustrate the Role of IKS in Emerging Technologies
CA – 241 – MN	Programming with Python	After successful completion of this course, the learners will be able to: CO1: Write Python programs to solve the given problem CO2: Utilize the data structures such as lists, dictionaries, tuples and sets. CO3: Use built-in and user defined modules and packages. CO4: Apply operations involving file systems and data handling
CA – 242 - MNP	Lab Course on CA – 241 - MN	After successful completion of this course, the learners will be able to: CO1: Write Python programs to solve the given problem CO2: Utilize the data structures such as lists, dictionaries, tuples and sets. CO3: Use built-in and user defined modules and packages. CO4: Apply operations involving file systems and data handling.

Course Outcome		
Computer Application		
S.YBCA SEM IV		
Subject Code	Subject Name	Outcome
CA - 251- MJ	Database Management Systems	After successful completion of this course, learner will be able to CO1: Solve real world problems using appropriate relational data model. CO2: Construct E-R Model for given requirements and convert it into database tables. CO3: Write efficient SQL queries and use PL/SQL CO4: Apply database management operations CO5: Describe mechanisms for transaction management CO6: Demonstrate understanding of database security

CA – 252 - MJP	Lab course on CA - 251 - MJ	After successful completion of this course, learner will be able to CO1: Design E-R Model for given requirements and convert the same into database tables. CO2: Design and create relational database systems. CO3: Use SQL DDL and DML commands CO4: Apply constructs in PL/PGSQL
CA – 271 - VSC	Python Programming	After successful completion of this course, the learners will be able to CO1: Write Python programs to solve a given problem CO2: Choose appropriate data structures such as lists, dictionaries, tuples, and sets. CO3: Develop Python programs to implement the given small applications.
CA – 271 - CEP	Community services	After successful completion of this course, the learners will be able to CO1: Identify and define community engagement service to address community problem CO2: Choose appropriate community engagement level to solve the problem CO3: Analyze and propose possible solution to solve community problem
CA – 251 - SEC	Spreadsheet Applications	After successful completion of this course, the learners will be able to - CO1: Navigate and utilize spreadsheet applications effectively for data organization and management CO2: Apply formulas, functions and logical operations to automate tasks. CO3: Analyze and visualize data using charts, pivot tables and conditional formatting CO4: Implement data validation, sorting and filtering for efficient data handling CO5: Develop practical spreadsheet solutions for business scenarios like financial planning, inventory management and project management.
CA - 291- MN	Introduction of Artificial Intelligence and Machine Learning	After successful completion of this course, the learners will be able to CO1: Describe basic concepts in AI CO2: Compare different search algorithms used in AI CO3: Demonstrate understanding of knowledge representation and logic CO4: apply key machine learning concepts such as supervised, unsupervised, and reinforcement learning. CO5: Develop the ability to use machine learning algorithms such as linear regression, logistic regression, decision trees.
CA – 292 – MNP	Lab Course on CA - 291 - MN	After successful completion of this course, the learners will be able to CO1: Apply the suitable AI algorithms to solve a given problem CO2: preprocess real-world data, including handling missing values, outliers, and scaling

		CO3: Use appropriate machine-learning libraries and tools CO4: solve problems using machine learning techniques.

Course Outcome		
Computer Application		
T.YBCA SEM V		
Subject Code	Subject Name	Outcome
CA-301-PCC– T	Software Engineering and Testing	At the end of the course, students will be able to: CO1: Define system and software engineering and process of development life cycle. CO2: Compare different SDLC models and select suitable models for given problem scenario. CO3: Analyze, and document software requirements using requirement engineering techniques. CO4: Apply techniques and tools for system analysis and design and software testing. CO5: Describe software quality factors, and software testing life cycle
CA-302-PCC	Fundamentals of Artificial Intelligence	At the end of the course, students will be able to: CO1: Demonstrate understanding of the fundamentals of Artificial Intelligence, including its history, types, applications, intelligent agents, system structure, and ethical considerations. CO2: Apply problem-solving techniques in AI using state-space search, knowledge representation, and reasoning methods. CO3: Identify, analyze, and apply appropriate uninformed and informed search strategies, including constraint satisfaction techniques, for solving AI problems. CO4: Use game theory concepts and game search algorithms, and evaluate their effectiveness and limitations under conditions of uncertainty, incomplete information, and computational complexity. CO5: Describe the core concepts of Machine Learning and Deep Learning
CA-303-PCCP	Lab course on CA-302-PCC	Course Objectives: 1. To understand the basic concepts and foundations of Artificial Intelligence using Python. 2. To study different problem-solving methods, problem spaces and search techniques used in Artificial Intelligence. 3. To learn the principles of Game Theory and decision-making strategies in intelligent systems. 4. To understand Machine Learning fundamentals and data preprocessing techniques. 5. To implement supervised learning algorithms for solving real-world problems.

CA-304-PCC–T	Fundamentals of Data Science	At the end of the course, students will be able to: CO1: Explain the core concepts, scope, and lifecycle of Data Science CO2: Identify and classify various types of data, data sources, and data formats CO3: Apply descriptive and inferential statistical techniques to analyze datasets CO4: Perform data preprocessing, wrangling, and data transformation tasks CO5: Design and interpret effective data visualizations using appropriate tools CO6: Recognize ethical, privacy, and security issues in Data Science applications
CA-305-PCCP	Lab course on CA-304-PCC	At the end of the course, students will be able to: CO1: Use data science environment using Python and relevant libraries. CO2: Apply statistical methods to analyze and interpret datasets. CO3: Perform data preprocessing including cleaning, transformation, and handling missing data. CO4: Create and interpret various data visualizations for decision-making. CO5: Demonstrate the ability to work with real-world datasets and derive meaningful insights.
CA-310-PEC	User Interface and User Experience (UI-UX) Design	At the end of the course, students will be able to: CO1: Explain core concepts and principles of UI and UX design. CO2: Enumerate user-centered design approaches and basic user research techniques. CO3: Illustrate interaction design, wireframes, and user flow concepts. CO4: List visual design principles and responsive interface. CO5: Describe prototyping approaches and usability testing methods.
CA-311-PECP	Lab course on CA - 310-PEC	At the end of the course, students will be able to: CO1: Apply user research techniques to identify user needs and requirements. CO2: Design wireframes and user flows for digital products. CO3: Create visually effective and responsive user interfaces. CO4: Develop interactive prototypes using appropriate UI/UX tools. CO5: Evaluate and improve UI/UX designs using usability testing methods.
CA-312-PEC–T	Cloud Computing	At the end of the course, students will be able to: CO1: Explain the basic concepts, characteristics, and architecture of cloud computing CO2: Identify and differentiate between cloud deployment models and service models (IaaS, PaaS, SaaS)

		CO3: Demonstrate understanding of virtualization techniques and resource management in cloud environments CO4: Describe cloud security issues, data privacy concerns, and risk management techniques.
CA-313-PECP	Lab course on CA - 312-PEC	At the end of the course, students will be able to: CO1: Implement the cloud service Models. CO2: Use Virtualization using Virtual Box. CO3: Deploy the application on PaaS using Google App Engine. CO4: Manage Cloud Infrastructure on AWS and Azure. CO5: Apply Docker and Containerization.
CA-314-PEC	Cyber Security	At the end of the course, students will be able to: CO1: Explain basic concepts of cyber security, cybercrimes, CIA triad, and cyber threats. CO2: Classify cyber offenses and cyber stalking and analyze their impact. CO3: Enumerate cybercrime tools and techniques including malware, phishing, and network attacks. CO4: Apply basic cryptographic concepts and encryption techniques for secure communication. CO5: Describe fundamentals of cyber forensics, digital evidence, and investigation tools.
CA-315-PECP	Lab course on CA-314-PEC	At the end of the course, students will be able to: CO1: Describe basics of digital forensics, legal issues, and chain of custody. CO2: Use forensic tools like Autopsy and FTK Imager to collect and analyze evidence. CO3: Evaluate anonymity tools and steganography for data hiding and security. CO4: Identify and prevent phishing, social engineering, and password attacks. CO5: Apply security practices to protect against cyber threats.
CA-321-VSEC	Core Java Programming	At the end of the course, students will be able to: CO1: Identify classes, objects, class members and relationships for a given problem. CO2: Design end to end applications using object oriented constructs. CO3: Apply collection classes for storing java objects. CO4: Use Java APIs for program development. CO5: Handle abnormal termination of a program using exception handling.
CA-331-FP	Field Project	At the end of the course, students will be able to: CO1: Identify and define real-world problems in community, organizational, or industrial settings using systematic field investigation methods. CO2: Design and implement appropriate fieldwork methodology including survey design, data collection techniques, documentation, and use of analytical tools. CO3: Analyze and interpret collected data using suitable IT tools and techniques to derive meaningful insights. CO4: Develop and propose feasible technology-based

		solutions (software prototype, database system, web/mobile application, automation model, etc.) to address the identified problem. CO5: Communicate findings effectively through structured documentation, presentation, and professional reporting practices.

Course Outcome		
Computer Application		
T.YBCA SEM VI		
Subject Code	Subject Name	Outcome
CA-351-PCC	Software Project Management	At the end of the course, students will be able to: CO1: Comprehend Software Project Management Concepts CO2: Use tools for Software Project Management CO3: Track a project and manage changes CO4: Apply Agile Project Management concepts
CA-352-PCC	Web Programming	At the end of the course, students will be able to: CO1: Describe the role of Java Script in web programming. CO2: Build Dynamic web pages. CO3: Write PHP scripts to interact with users and handle form data. CO4: Develop simple data-driven web applications.
CA-353-PCCP	Lab course on CA-352-PCC	At the end of the course, students will be able to: CO1: Design and implement static and dynamic web sites using appropriate client side and server-side technologies CO2: Build Dynamic web site using PHP Programming and Database connectivity. CO3: Create applications using XML and web services.
CA-354-PCC	Operating system Design	At the end of the course, students will be able to: CO1: Apply algorithms for Processes, CPUandDiskscheduling CO2: Describe process synchronization and deadlocks CO3: Compare and contrast techniques for memory management. CO4: Define operating system services
CA-355-PCCP	Lab course on CA-354-PCC	At the end of the course, students will be able to: CO1: System calls on Operating System. CO2: Process and Scheduling algorithms. CO3: Deadlock and Bankers algorithm. CO4: To Know the details of Memory Management. CO5: Disk Scheduling Algorithms.
CA-360-PEC	Prompt and Generative AI	At the end of the course, students will be able to: CO1: Use prompt engineering on large language models. CO2: Describe concepts of Generative AI and Large Language Models CO3: Evaluate AI-generated responses for clarity, correctness, bias, and usefulness. CO4: Create small AI-assisted applications/projects

		CO5: Apply generative AI techniques for idea generation, documentation, summarization etc
CA-361-PECP	Lab course on CA-360-PEC	At the end of the course, students will be able to: CO1: Use Generative AI tools for basic text generation tasks. CO2: Design effective prompts forstructured and role-based outputs. CO3: Apply zero-shot, one-shot, and few-shot prompting techniques. CO4: Perform summarization, paraphrasing, and reasoning-based tasks using AI tools. CO5: Generate and debug simple programs using prompt engineering techniques.
CA-362-PEC	Big Data and Analytic	At the end of the course, students will be able to: CO1: Demonstrate understanding of Big Data and its challenges, opportunities, and applications CO2: Comprehend concepts of MapReduce and functional programming CO3: Describe architecture and modelling techniques.
CA-363-PECP	Lab course on CA-362-PEC	At the end of the course, students will be able to: CO1: Understand R programming basics. CO2: Apply data structures in R. CO3: Perform data visualization. CO4: Install and use Hadoop.
CA-364-PEC	Mobile Application Development	At the end of the course, students will be able to: CO1: Comprehend the fundamentals of mobile technology, tools and Android programming CO2: Use appropriate techniques and modern Android development tools CO3: Design and create visually appealing and user-friendly Android application interfaces using UI components, layouts, and Android design principles. CO4: Develop Android applications with data storage and management capabilities using SQLite and analyze data handling requirements. CO5: Design, develop, and deploy advanced Android applications incorporating location-based services and phone features such as calls, SMS, and email.
CA-365-PECP	Lab course on CA-364 - PEC	At the end of the course, students will be able to: CO1: Apply modern tools and techniques for mobile application development. CO2: Design and deploy mobile applications. CO3: Develop mobile apps using UI/ UX principles. CO4: Use SQLite database for data storage in mobile applications. CO5: Make use of Phone services and location-based services while developing applications
CA-371-VSEC	Advanced JAVA Programming	At the end of the course, students will be able to: CO1: Design and develop GUI based applications using Swing components and event handling. CO2: Develop database applications using JDBC to perform CRUD operations (Create, Read, Update, Delete).

		CO3: Apply server-side programming using Servlets to handle client requests and responses. CO4: Use JSP for developing dynamic web applications with scripting elements and implicit objects. CO5: Describe deploying and managing web applications on web servers like Apache Tomcat.
CA-381-OJT	On-Job Training/ Internship	At the end of the course, students will be able to: CO1: Apply theoretical knowledge to solve real-world engineering problems. CO2: Demonstrate technical competency in tools/technologies used in industry. CO3: Exhibit professional ethics and team spirit. CO4: Prepare technical reports and deliver effective presentations based on industry experience gained during OJT/Internship