# Savitribai Phule Pune University, Pune

## Faculty of Commerce and Management

### Bachelor of Business Administration in Computer Application

**(BBA - CA)**

### Revised Curriculum (2024 Pattern as per NEP-2020)

**w.e.f. Academic Year: 2024-2025**

| PO No. | Programme Outcomes<br><br>Upon completion of the B.B.A(CA)Degree Programme the graduate will be able to |
|---|---|
| PO-1 | To provide sound academic base from which an advanced career in Computer Application can be developed. Conceptual grounding in computer usage as well as its practical business application will be provided. |
| PO-2 | To produce skill oriented human resource. |
| PO-3 | To import practical skills among students. |
| PO-4 | To make industry ready resource. |
| PO-5 | To bring the spirit of entrepreneurship. |

| PSO No. | Programme Specific Outcomes<br><br>Upon completion of these courses the student would |
|---|---|
| PSO-1 | Students should be able to apply modern practices and strategies in software project development using open-ended programming environments to deliver quality product for business success in context with societal needs. |
| PSO-2 | An ability to gain knowledge on design and control strategy; techniques to secure information and adapt to the fast changing world of information technology needs. |
| PSO-3 | Design and develop Web and Mobile based computer applications |
| PSO-4 | An ability to use and develop cloud software, administrative features, infrastructure services and architectural patterns; ethical hacking and forensic security technologies. |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| I | BBACA101T | Major Mandatory | Problem Solving Using C | 02 | 03 |

**Course Objectives:**

1. To introduce the foundations of computing, programming and problem- solving using computers.
2. To develop the ability to analyze a problem and devise an algorithm to solve it.
3. To formulate algorithms, pseudocodes and flowcharts for arithmetic and logical problems
4. To understand structured programming approach.
5. To develop the basic concepts and terminology of programming in general.
6. To implement algorithms in the 'C' language.
7. To test, debug and execute programs.

**Course Outcome:**

At the end of the course, students will be able to

| | |
|---|---|
| **CO1** | 1. Define algorithms and explain their characteristics |
| **CO2** | 2. Formulate algorithm and draw flow chart to solve a given problem |
| **CO3** | 3. Explain use of appropriate data types, control statements |
| **CO4** | 4. Demonstrate ability to use top-down program design |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| I | BBACA102T | Major Mandatory | Database Management System | 02 | 03 |

**Course Objectives:**

1. To make students understand the concept of Database Management System
2. To develop Database application

**Course Outcome:**

| | |
|---|---|
| **CO1** | To understand the basic concepts and the applications of database systems. |
| **CO2** | To formulate Queries using SQL and Relational Formal Query Languages |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lecture Hours/Week |
|---|---|---|---|---|---|
| I | OE-103-MTS | Open Elective | Business Mathematics – I | 2 | 3 |

**Note: This course is taken from OE basket of Faculty of Science and Technology.**

| Course Objectives | |
|---|---|
| 1. | To provide solid Mathematical Foundation for BBA Students in Business and Finance. |
| 2. | To help the students for various mathematical topics with Practical Business Application. |
| 3. | To enhance problem – solving Skills and ability for Academic and Professional Success. |
| 4. | To make students understands mathematics behind commerce and Management. |
| 5. | To foster conceptual Clarity and Confidence in Mathematical Competence. |

| Course Outcome<br>The student will be able to | |
|---|---|
| CO1 | understand the Concepts of Ratio, Proportion, Percentage and Partnership. |
| CO2 | apply the mathematical concepts to solve real-world financial problems. |
| CO3 | understand the equated monthly instalments (EMI) for loans and mortgages. |
| CO4 | apply the simple and compound interest for various financial instruments. |
| CO5 | analyze models related to Finance and can solve them. |
| CO6 | remember the computation of Dividend and Return on Investment in shares. |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lecture Hours/Week |
|---|---|---|---|---|---|
| I | OE-103-STS | Open Elective | Business Statistics – I | 2 | 3 |

**Note: This course is taken from OE basket of Faculty of Science and Technology**

| Course Objectives | |
|---|---|
| **1.** | To understand role and importance of statistics in various business situations |
| **2.** | To develop skills related with basic statistical technique |
| **3.** | To learn some elementary statistical methods for data collection, presentation and analysis of data. |
| 4. | To develop right understanding regarding data interpretation |
| **5.** | To familiarize the students with applications of Statistics in Business and Management |

| Course Outcome | |
|---|---|
| **CO1** | understand basic concepts in statistics |
| **CO2** | collect, present, analyze and interpret the data and graphs |
| **CO3** | deal data in business problems |
| **CO4** | evaluate feasibility business problems using statistical techniques |
| **CO5** | prepare business report using various statistical techniques |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures Hours per week |
|---|---|---|---|---|---|
| I | BBACA101VSC | Vocational Skill Development Course (VSC) | Office Automation tools | 02 | 03 |

**Course Objective:**

To make students understand and learn various Office Automation Tools like MSWord, MS Excel & MS PowerPoint.

**Course outcome:**

| | |
|---|---|
| **CO1** | The students will be able to apply various Office Automation Tools - MSWord, MS Excel & MS PowerPoint |
| **CO2** | Use of modern office equipment in business |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures Hours per week |
|---|---|---|---|---|---|
| I | BBACA101SEC | Skill Enhancement Course (SEC) | Programming Principles and Algorithm | 02 | 03 |

**Course Objectives:**

1. To make students understand the concept of Algorithm and Flowchart.
2. To develop Analytical / Logical Thinking and Problem-Solving capabilities
3. To Know the Basics of Programming.

**Course Outcome:**

| | |
|---|---|
| CO1 | To understand how to use programming in day-to-day Applications |
| CO2 | To apply skills of algorithm and flowchart to solve the businesses problem |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| I | BBACA101AEC | Ability Enhancement Course (AEC) | Business Communication Skills-I | 02 | 03 |

**Course Objectives:**

1. To understand what the Need and Significance of communication in personal and business world
2. To understand system of communication and their utility 3.

**Course Outcome:**

**Student will able**

| | |
|---|---|
| CO1 | To understand the concept, process, and importance of communication |
| CO2 | To apply gain knowledge of media of communication in businesses |
| CO3 | To develop skills of effective communication - both written and oral |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| I | BBACA101VEC | Value Education Course (VEC) | Environmental Awareness | 02 | 03 |

**Course Objectives:**

1) To provide an opportunity to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment
2) To develop conscious towards a cleaner and better managed environment

**Course Outcome:**

**Student will able**

| | |
|---|---|
| CO1 | To understand Environmental pollution. |
| CO2 | To apply and promote green practices at home and at work |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| II | BBACA201T | Major Mandatory | Advance C Programming | 02 | 03 |

**Course Objectives:**

1. To provide advanced features in C Programming in problem solving.
2. To learn advanced data types in C programming to solve problems.
3. To understand built-in library functions

**Course Outcome:**

At the end of the course, students will be able to

| | |
|---|---|
| **CO1** | **write C programs using pointers, structures and unions** |
| **CO2** | **create Pre-processor directives.** |
| **CO3** | **perform strings using library functions** |
| **CO4** | **write C programs using pointers, structures and unions** |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| **II** | **BBACA202T** | **Major Mandatory** | **Relational Database Management System** | **02** | **03** |

**Course Objectives:**

1. To understand the basic concepts and the applications of RDBMS.
2. Enables student to write PL/SQL programs that use procedure, function, package, cursor and trigger

**Course Outcome:**

**Student will be able to**

| | |
|---|---|
| CO1 | understand the concept of Relational Database Management System. |
| CO2 | develop PL/SQL programs, functions, procedures, triggers, cursors, packages etc. |
| CO3 | understand Transaction management and concurrency control. |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| II | BBACA201P | Major Mandatory | Computer Laboratory based on Advance C and RDBMS | 02 | 05 |

This course is a Practical Course based on Advance C and RDBMS. The college/institute has given an autonomy to design assignments based on following guidelines

1. Practical Assignments based on Arrays, Strings and Pointers – 10
2. Practical Assignments based on Structures – 5
3. Practical Assignments based on basic PL/SQL commands – 10
4. Practical Assignments based on advanced PL/SQL commands - 5

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lecture Hours/ Week |
|---|---|---|---|---|---|
| **II** | **BBACA201MI** | **Minor** | **Principle and Practices of Management** | **2** | **3** |

**Course Objectives:**

1. To understand basic concepts regarding org. Business Administration
2. To examine various management principles
3. To develop managerial skills among the students

**Course Outcome:**

At the end of the course, students will be able to

| | |
|---|---|
| **CO1** | **use of available resources so as to achieve productive results at minimum cost and maximum profits** |
| **CO2** | **use effectively all the concepts in business** |
| **CO3** | **effective administration by channelizing resources (human and material)** |

| | |
|---|---|
| **CO4** | **manage crucial situations** |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| II | OE-101-CA | Open Elective | Introduction to Data Science | 02 | 03 |

**Note: This course is for FYBBA-CA students and taken from OE basket of Faculty of Science and Technology**

| Course Objectives | |
|---|---|
| **1.** | To understand need of Data Science |
| **2.** | To Know role of Statistics in Data Science |
| **3.** | To know Data Science Models and Tasks |

| Course Outcome<br>Student will be able to | |
|---|---|
| **CO1** | define Data Science Tasks and Models and Lifecycle |
| **CO2** | apply Prep-processing and visualization Techniques |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| II | OE-102-IT | Open Elective | Tally Prime | 02 | 03 |

**Note: This course is for FYBBA-CA students and taken from OE basket of Faculty of Science and Technology**

| Course Objectives | |
|---|---|
| **1.** | To understand Fundamentals of Accounts |

| | |
|---|---|
| **2.** | To study Basic Principles of Accounts (Golden Principles of Accountancy) |
| **3.** | To study Ledger, Transaction Entries. |
| 4. | To understand the final effect of each transaction in Balance Sheet and Profit & Loss Accounts. |

| **Course Outcome** | |
|---|---|
| **CO1** | Create Ledgers in Tally Prime |
| **CO2** | Pass the transaction Entries of Payment, Receipt, Contra, Sales, Purchase |
| **CO3** | Pass the entries with automatic calculation of GST. |
| **CO4** | Maintain Accounts only and Accounts with Inventory |

| **Semester No.** | **Course Code** | **Type of Course** | **Course Title** | **Credits** | **Lab Hrs. per week** |
|---|---|---|---|---|---|
| II | BBACA201VSC | VSC | Web Technology | 02 | 05 |

**Course Objective:**

1. To know and understand the concept of web designing.
2. To understand how to develop web-based applications using HTML and CSS

**Course outcome:**

**Student will be able to**

| | |
|---|---|
| **CO1** | get acquainted with website designing. |
| **CO2** | develop static web site using HTML and CSS. |

| **Semester No.** | **Course Code** | **Type of Course** | **Course Title** | **Credits** | **Lectures per week** |
|---|---|---|---|---|---|
| II | BBACA201SEC | SEC | E-Commerce | 02 | 03 |

**Course Objectives:**

1. To acquaint the learner with knowledge on the basics of E-commerce.

2. To develop knowledge on various types of E-commerce business.
3. To Develop knowledge on various modes of online transaction for crating convenience in day-to-day financial transactions and promoting cashless economy.
4. To introduce the learner to the concept of Electronic Data Inter exchange and its significance.

**Course Outcome:**

**Student will be able to**

| | |
|---|---|
| CO1 | develop knowledge on various types of E-commerce business. |
| CO2 | develop knowledge on various modes of online transaction for crating convenience in day-to-day financial transactions and promoting cashless economy. |
| CO3 | Understand the various forms of ecommerce |

| Semester No. | Subject Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| II | BBACA201AEC | AEC | Business Communication Skills-II | 02 | 03 |

**Course Objectives:**

1. Develop the skills needed for approaching different types of interviews.
2. Help the students in developing effective presentation skills.
3. Enhance the skills of public speaking amongst students.
4. Enable students to understand their own strengths and weaknesses, opportunities, and challenges.

**Course Outcome:**

**Student will be able to**

| | |
|---|---|
| CO1 | Improve oral communication and presentation skills. |
| CO2 | Understand and deal with different types of interviews. |
| CO3 | Students can learn how to identify their strengths and weaknesses, and how to focus on improving those areas. |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| II | BBACA201VEC | VEC | Democracy Awareness and Gender Sensitisation | 02 | 03 |

**Course Objectives:**

1. To make students understand the fundamental principles of democracy and their relationship with gender.
2. To foster democratic values like tolerance and empathy in students to tackle gender-based issues and become active, informed citizens.
3. To encourage critical thinking by making students aware of their biases and create readiness for diversity and inclusion.

**Course Outcome:**

**Student will be able to**

| | |
|---|---|
| CO1 | Students will understand the fundamentals of democracy, including equality, justice and human rights and will be able to challenge negative attitudes and stereotypes about all genders (various gender identities identified in contemporary society). |
| CO2 | Students will develop empathy and understanding democratic values and can develop a sense of responsible citizenship and healthy relations. |
| CO3 | Students will develop critical thinking and analytical skills, fostering them to evaluate democratic issues and can create increased readiness for diversity and inclusion. |
| CO4 | Students will be inspired to become active citizens, by engaging in democratic processes. |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lectures per week |
|---|---|---|---|---|---|
| II | BBACA201CC | Co-Curricular (CC) | Physical Education - II | 02 | 03 |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Hours/Week |
|---|---|---|---|---|---|
| III | | Major Mandatory | Data Structure | 4 | 4 |

| Course Objectives | |
|---|---|
| 1 | To introduce the fundamental concepts and classifications of data structures. |
| 2 | To develop an understanding of linear and non-linear data structures such as arrays, linked lists, stacks, queues, trees, and graphs. |
| 3 | To enable students to analyze the time and space complexity of algorithms using asymptotic notations. |
| 4 | To develop the ability to implement various sorting and searching algorithms. |
| 5 | To apply data structure concepts to solve real-world problems through structured programming. |

| Course Outcomes<br>On successful completion of the course, the student will be able to: | |
|---|---|
| 1 | Explain and differentiate between various data structures and their real-life applications. |
| 2 | Analyze and evaluate the efficiency of different algorithms using Big O and other notations. |
| 3 | Implement linear data structures like arrays, stacks, and queues using static and dynamic memory allocation. |
| 4 | Design and implement linked lists and perform various operations on them. |
| 5 | Apply tree and graph structures for problem-solving and implement traversal and search algorithms. |

| Semester III | | | | | |
|---|---|---|---|---|---|
| **Semester No.** | **Course Code** | **Type of Course** | **Course Title** | **Credits** | **Hours/Week** |
| III | | Major Mandatory | PHP | 4 | 4 |

| **Course Objectives** | |
|---|---|
| **1** | Understand how server-side programming works on the web. |
| **2** | Using PHP built-in functions and creating custom functions |
| **3** | Understanding POST and GET in form submission. |
| **4** | How to receive and process form submission data. |
| **5** | Read and process data in a MySQL database. |

| **Course Outcome** | |
|---|---|
| **1** | Understand the basics of server-side scripting using PHP. |
| **2** | Develop dynamic web pages using PHP. |
| **3** | Work with PHP functions, arrays, and strings effectively. |
| **4** | Implement file handling and session management. |
| **5** | Connect and interact with databases using PHP and MySQL. |

| **Semester No.** | **Course Code** | **Type of Course** | **Course Title** | **Credits** | **Hours/Week** |
|---|---|---|---|---|---|
| **III** | | Minor | Computer Laboratory based on DS, PHP(Practical) | 4 | 8 |

## Lab Book:

The lab book is to be used as a hands-on resource, reference and record of assignment submission and completion by the student. The lab book contains the set of assignments which the student must complete as a part of this course.

| Semester III | | | | | |
|---|---|---|---|---|---|
| **Semester No.** | **Course Code** | **Type of Course** | **Course Title** | **Credits** | **Hours/Week** |
| **III** | | OE (Open Elective) | Introduction to Cyber Security | 2 | 2 |

**Note: This course is taken from OE basket of Faculty of Science and Technology – BoS in Computer Science. This course is mandatory for SYBBA-CA Semester III students**

| **Course Objectives** | |
|---|---|
| 1 | Understand basic concepts and terms in cyber security. |
| 2 | Learn about privacy and related legal protections. |
| 3 | Grasp fundamental encryption principles. |
| 4 | Understand basics of Cyber laws and Indian IT Act. |

| **Course Outcome** | |
|---|---|
| CO1 | Define and explain essential cybersecurity concepts, threats, and preventive strategies. |
| CO2 | Interpret privacy principles and identify relevant laws and regulations protecting digital data. |
| CO3 | Apply basic encryption methods to secure data and understand their role in cybersecurity. |
| CO4 | Good understanding of cyberlaws, cybercrime and punishments in Indian Scenario. |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Hours/Week |
|---|---|---|---|---|---|
| **III** | | **VSC (Practical)** | **Web development tools** | **2** | **4** |

| **Course Objectives** | |
|---|---|
| 1 | To Understand the Fundamentals of WordPress |
| 2 | To Create and Manage Website Content through WordPress |
| 3 | To make students learn about how to set up and configure a WordPress Website |

| **Course Outcome**<br>At the end of the course, students will be able to | |
|---|---|
| 1 | Explain the purpose, features, and evolution of WordPress |
| 2 | Create, format, and manage content using posts, pages, categories, and tags in WordPress. |
| 3 | Publish and manage a responsive, user-friendly, and content-rich website suitable for business, blogging, or personal use |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Hours/Week |
|---|---|---|---|---|---|
| III | | Field Projects (FP) | Project based on Web Applications | 2 | 4 |

| Course Objectives | |
|---|---|
| **1.** | Learn core web technologies and client-server basics. |
| **2.** | Build web applications using front-end Tools. |
| **3.** | Develop teamwork and problem-solving skills through real-world projects. |

| Course Outcome | |
|---|---|
| **CO1** | Develop responsive web pages using Web Applications. |
| **CO2** | Build web applications with front-end Validations. |
| **CO3** | Use of APIs for dynamic content handling. |
| **CO4** | Collaborate on and deploy real-world web projects. |

| Semester IV | | | | | |
|---|---|---|---|---|---|
| **Semester No.** | **Course Code** | **Type of Course** | **Course Title** | **Credits** | **Lecture Hours/Week** |
| IV | MJ-251-OOPC | Major Mandatory | Object Oriented Programming using C++ | 04 | 04 |

| Course Objectives | |
|---|---|
| 1 | To acquire an understanding of basic object-oriented concepts and the issues involved in effective class design. |
| 2 | To enable students for writing programs using C++ features |
| 3 | To provide understanding of inheritance and polymorphism, virtual functions, pointers to objects, and dynamic binding. |
| 4 | Train students in file handling and templates, covering file operations, error handling, class/function templates, and exception handling in C++. |

| **Course Outcome:** After completing the course students will be able to | |
|---|---|
| 1 | Explain the fundamental concepts, features, and advantages of Object-Oriented Programming and describe the structure, features, and basic I/O operations of C++. |
| 2 | Write simple C++ programs using appropriate data types, variables, operators, manipulators, and functions |
| 3 | Apply different types of inheritance, operator overloading, function overloading, and runtime polymorphism to create flexible and extensible C++ programs. |
| 4 | create, open, read, write, and close files using C++ standard library functions and implement function templates to create reusable, type-independent code. |

| **Semester No.** | **Course Code** | **Type of Course** | **Course Title** | **Credits** | **Lecture Hours/Week** |
|---|---|---|---|---|---|
| **IV** | **MJ-252-PHP** | **Theory** | **Advance PHP** | **4** | **4** |

| **Course Objectives** | |
|---|---|
| **1** | To know & understand concepts of internet programming**.** |
| **2** | Understand namespaces, traits, generators, late static binding, and advanced OOP concepts. |
| **3** | Work with MVC architecture, routing systems, templating engines, and modern PHP frameworks (e.g., Laravel). |

| **Course Outcome:** After completing the course students will be able to | |
|---|---|
| **1** | Apply advanced PHP language features—including namespaces, traits, exceptions, and OOP principles—to build modular and reusable applications. |
| **2** | Develop secure, database-driven web applications using PDO, prepared statements, transactions, and ORM tools. |
| **3** | Use MVC architecture and modern PHP frameworks (e.g., Laravel ) to create scalable and maintainable projects. |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Hours/ Week |
|---|---|---|---|---|---|
| **IV** | **MNP-251-LAB** | **Minor** | **Computer Laboratory based on CPP, Adv. PHP** | **4** | 8 |

| Semester No. | Course Code | Type of Course | Course Title | Credits | Lecture Hours/Week |
|---|---|---|---|---|---|
| IV | VSC-251-CN | VSC | Computer Network | 2 | 2 |

| **Course Objectives** | |
|---|---|
| **1** | To gain knowledge about Computer Networks concepts. |
| **2** | To know about working of networking models, addresses and connectivity devices. |
| **3** | To acquire information about network security and cryptography. |

| **Course Outcomes: On successful completion of the course, the student will be able to:** | |
|---|---|
| **1** | Student will have knowledge of networking devices, types of addresses |
| **2** | Student will understand types of network and its uses |
| **3** | Student will gain knowledge on cryptography and its types and understand security mechanism |

| Course Title | Cyber Security |
|---|---|
| CODE | CA-501 |
| CO No. | Course Outcomes |
| CO-1 | To understand the fundamentals of cyber security. |
| CO-2 | To understand various categories of Cybercrime, Cyber-attacks on mobile, tools and techniques used in Cybercrime and case studies. |
| CO-3 | To have an overview of the Cyber laws and concepts of Cyber forensics. |

| Course Title | Object Oriented Software Engineering |
|---|---|
| CODE | CA-502 |
| CO No. | Course Outcomes |
| CO-1 | To understand the fundamentals of object modeling |
| CO-2 | To understand and differentiate Unified Process from other approaches. |
| CO-3 | To design with static UML diagrams. |
| CO-4 | To design with the UML dynamic and implementation diagrams. |
| CO-5 | To improve the software design with design patterns. |
| CO-6 | To test the software against its requirements specification. |

| Course Title | Core Java |
|---|---|
| CODE | CA-503 |
| CO No. | Course Outcomes |
| CO-1 | To introduce the object oriented programming concepts. |
| CO-2 | To understand object oriented programming concepts, and apply them in solving problems. |
| CO-3 | To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes |
| CO-4 | To introduce the implementation of packages and interfaces |
| CO-5 | To introduce the concepts of exception handling and multithreading. |
| CO-6 | To introduce the design of Graphical User Interface using applets and swing controls. |

| Course Title | Python |
|---|---|
| CODE | CA-504 |
| CO No. | Course Outcomes |
| CO-1 | Define and demonstrate the use of built-in data structures “lists” and “dictionary”. |
| CO-2 | Design and implement a program to solve a real world problem. |
| CO-3 | Design and implement GUI application and how to handle exceptions and files. |

| Course Title | Project |
|---|---|
| CODE | CA-505 |
| CO No. | Course Outcomes |
| CO-1 | Students can express their ideas clearly and effectively, both verbally and in written form. |
| CO-2 | Students can work as a team to achieve common goals. |
| CO-3 | Students are able to make links across different areas of knowledge and to generate, develop and evaluate ideas and information related to the project. |
| CO-4 | Students are able to learn on their own, reflect on their learning and improve upon it. |

| Course Title | Computer Laboratory Based on 502 and 503 |
|---|---|
| CODE | 506 |
| CO No. | Course Outcomes |
| CO-1 | To assess the knowledge of student in Java Programming, Python |
| CO-2 | To acquire knowledge on writing computer programs using concept of Java Programming, Python |
| CO-3 | To create and manage Applications using Java Programming, Python |

| Course Title | Ad-on Internet of Things (IoT) |
|---|---|
| CODE | CA-507 |
| CO No. | Course Outcomes |
| CO-1 | To understand Technical aspects of Internet of things. |
| CO-2 | To describe smart objects and IoT Architecture. |
| CO-3 | To study and compare different Application protocols of IoT. |
| CO-4 | To understand IoT platform using Arduino Uno. |

| Course Title | Recent Trends in IT |
|---|---|
| CODE | CA-601 |
| CO No. | Course Outcomes |
| CO-1 | To discuss the basic concepts AI. |
| CO-2 | To apply basic, intermediate and advanced techniques to mine the data. |
| CO-3 | To provide an overview of the concept of Spark programming. |

| Course Title | Software Testing |
|---|---|
| CODE | CA-602 |
| CO No. | Course Outcomes |
| CO-1 | Students will be introduced to testing tools. |
| CO-2 | Students will acquire Knowledge of Basic SQA. |
| CO-3 | Students will be able to design basic Test Cases. |

| Course Title | Advanced Java |
|---|---|
| CODE | CA-603 |
| CO No. | Course Outcomes |
| CO-1 | Students will know the concepts of JDBC Programming. |
| CO-2 | Students will know the concepts of Multithreading and Socket Programming. |
| CO-3 | Students will know the concepts of Spring and Hibernate. |
| CO-4 | Students will develop the project by using JSP and JDBC. |
| CO-5 | Students will develop applications in Spring and hibernate |

| Course Title | Dot Net Framework |
|---|---|
| CODE | CA-604 |
| CO No. | Course Outcomes |
| CO-1 | To know the concept of software testing. |
| CO-2 | To understand how to test bugs in software. |
| CO-3 | To develop programming logic. |

| Course Title | Project |
|---|---|
| CODE | 605 |
| CO No. | Course Outcomes |
| CO-1 | Students can express their ideas clearly and effectively, both verbally and in written form. |
| CO-2 | Students can work as a team to achieve common goals. |
| CO-3 | Students are able to make links across different areas of knowledge and to generate, develop and evaluate ideas and information related to the project. |
| CO-4 | Students are able to learn on their own, reflect on their learning and improve upon it. |

| Course Title | Computer Laboratory Based on 601 and 602 |
|---|---|
| CODE | 606 |
| CO No. | Course Outcomes |
| CO-1 | To assess the knowledge of student in Advanced Web Technologies and Advance Java |
| CO-2 | To acquire knowledge on writing computer programs using concept of Advanced Web Technologies and Advance Java |
| CO-3 | To create and manage Applications using Advanced Web Technologies and Advance Java |

BBA (CA) Dept.