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

Preamble:

In the rapidly evolving landscape of the digital age, the BBA program is meticulously designed to bridge the gap between commerce and technology. This program aims to equip students with a comprehensive understanding of both domains, fostering a unique blend of skills that are highly sought after in today's competitive job market. The program focuses on providing students with in-depth knowledge of computer applications, programming, and software development while integrating essential commerce subjects such as business mathematics, financial accounting, and management principles. This interdisciplinary approach ensures that graduates are not only proficient in technical skills but also possess a solid foundation in business operations and management. A key feature of this program is its emphasis on practical and project-based learning. Students engage in hands-on lab work, field projects, and internships that allow them to apply theoretical knowledge to real-world scenarios. This experiential learning approach prepares students to tackle complex business problems with innovative technological solutions. Moreover, the program fosters the development of essential soft skills such as effective communication, teamwork, leadership, and ethical decision-making. These skills are critical for personal and professional growth, enabling graduates to navigate the dynamic and often challenging business environments with confidence and integrity. The BBA - Computer Application program also promotes lifelong learning and adaptability, encouraging students to stay abreast of technological advancements and industry trends. By instilling a habit of continuous learning, the program prepares students to adapt to new tools, technologies, and methodologies throughout their careers. In essence, the BBA - Computer Application program aims to create well-rounded professionals who are equipped with the technical expertise, business acumen, and soft skills necessary to excel in the ever-changing landscape of commerce and technology. Graduates of this program will be poised to contribute effectively to their organizations and society, driving innovation and growth in their respective fields.

Following aspects highlight the importance of commercial education:

1. Academic Rigor and Excellence: Commercial education provides a rigorous academic curriculum that equips students with a comprehensive understanding of business theories, principles, and practices. Through innovative teaching methods and experiential learning opportunities students excel in dynamic and competitive global business environments.

2. Ethical Leadership and Social Responsibility: Students are instilled in the importance of ethical decision-making, integrity, and corporate social responsibility. Our program emphasizes the significance of ethical leadership and the impact of business practices on society and the environment.

3. Critical Thinking and Problem-Solving Skills: We foster the development of critical thinking, analytical reasoning, and problem-solving skills essential for effective decision-making in complex

business situations. Students learn to evaluate information, analyze data, and formulate strategic solutions to real-world challenges.

4. Global Perspective and Cultural Awareness: Recognizing the interconnectedness of the global economy, we emphasize the development of a global mindset and cultural competence among the students. Our curriculum integrates international business concepts and opportunities for cross-cultural learning experiences.

5. Professional Development and Career Readiness: Through internships, professional development workshops, and networking opportunities, students are facilitated the acquisition of practical skills and industry-specific knowledge necessary for professional growth and advancement.

6. Innovation and Entrepreneurship: Encouraging creativity and innovation, we inspire entrepreneurial thinking and the ability to identify and seize opportunities in the marketplace. Our program supports aspiring entrepreneurs in developing business plans and launching ventures that contribute to economic growth and innovation.

7. Continuous Learning and Adaptation: Committed to continuous improvement and adaptation to meet the evolving demands of the business world. Our faculty engage in scholarly research and professional development to ensure that our curriculum remains relevant and responsive to industry trends and technological advancements.

8. Constant Learning: Commerce is a field that requires continuous learning and adaptation to stay competitive. Business education instills a mindset of lifelong learning, encouraging individuals to stay updated about industry trends, new technologies, and evolving business practices.

Objectives of the Programme:

1. To equip students with comprehensive knowledge in computer applications, including programming languages such as C, C++, Java, and Python.
2. To provide hands-on experience with database management systems, web development tools, and software engineering.
3. To foster the ability to solve complex problems using structured programming and algorithmic approaches.
4. To enable students to analyze and develop efficient solutions in business and IT environments.
5. To blend core commerce subjects like business mathematics, financial accounting, and management principles with IT skills.
6. To prepare students to leverage technology in managing and analyzing business operations.
7. To incorporate practical sessions and lab work to apply theoretical concepts in real-world scenarios.
8. To encourage project-based learning through field projects and internships, focusing on web applications, mobile app development, and digital marketing.
9. To improve business communication skills through courses designed to enhance written and verbal communication.
10. To instill an understanding of business ethics, environmental awareness, and gender sensitization.
11. To offer a variety of elective courses and open electives to allow students to explore interdisciplinary areas.
12. To provide exposure to vocational skills, such as office automation tools, web technology, and .NET programming.
13. To lay a strong foundation for students aiming to pursue higher studies in commerce and computer applications.

14. To equip students with the necessary skills to excel in professional careers in IT, software development, data analysis, and business management.
15. To instill a habit of continuous learning to keep pace with technological advancements and evolving industry standards.
16. To prepare students to adapt to new tools, technologies, and methodologies in the field of commerce and IT.

Program Outcomes:

1. Graduates will demonstrate a thorough understanding and ability to apply core concepts in programming languages, database management systems, and software development.
2. Graduates will be able to analyze business problems, develop efficient algorithms, and implement solutions using appropriate programming techniques.
3. Graduates will effectively combine principles of commerce with modern IT practices to enhance business processes and decision-making.
4. Graduates will have practical experience in handling projects related to web development, mobile applications, and digital marketing, with a capability to manage and execute projects efficiently.
5. Graduates will possess strong written and verbal communication skills, essential for professional business environments, including report writing, presentations, and interpersonal communication.
6. Graduates will understand and adhere to ethical practices in business and IT, with a keen awareness of environmental issues and gender sensitivity.
7. Graduates will have exposure to a range of subjects and elective courses, providing a broad perspective and the ability to approach problems from various disciplinary angles.
8. Graduates will be prepared for employment in IT, software development, data analysis, business management, and related fields, with the skills to thrive in a professional environment.
9. Graduates will be committed to lifelong learning, staying current with technological advancements and adapting to new tools and methodologies.
10. Graduates will have the ability to work effectively in teams, exhibiting leadership skills and contributing to collaborative projects.
11. Graduates will be adept at applying theoretical knowledge in practical settings, utilizing hands-on experience gained through lab work, projects, and internships.
12. Graduates will exhibit critical thinking skills and a creative approach to problem-solving, fostering innovation in their work.
13. Graduates will have a solid foundation in business operations, financial accounting, and management principles, enabling them to contribute to organizational success.

Introduction

The BBA - CA Degree Program (2024 Pattern) will be introduced in the following order:

Sr. No.	BBA - CA Degree Program	Academic Year
A	First Year BBA - CA	2024-2025
B	Second Year BBA - CA	2025-2026
C	Third Year BBA - CA	2026-2027
D	Fourth Year BBA - CA	2027-2028

Eligibility

a) No Candidates shall be admitted to the First Year of the BBA - CA Degree Program (2024 Pattern) unless he / she has passed the Higher Secondary School Certificate Examination of the Maharashtra State Board or equivalent or University with English as a passing Course.
b) No candidate shall be admitted to the Third Semester Examination of the Second Year unless he / she has cleared First Two Semesters satisfactorily for the course at the college affiliated to this University.
c) No student shall be admitted to the Third Year BBA – CA (Fifth Semester) Degree Program (2024 Pattern) unless he / she has cleared all the papers of First and Second Semester Examination of F.Y. BBA - CA
d) No candidate shall be admitted to the Fifth Semester Examination of the Third Year unless he / she has cleared the first Two Semesters satisfactorily of Second Year for the Program at the college affiliated to this University.
e) No candidate shall be admitted to the Fourth Year BBA - CA (Seventh Semester) Degree Program (2024 pattern) unless he / she has cleared all the papers of Third and Fourth Semester Examination of S.Y. BBA- CA

Teaching Methodology

The Teacher can use the following Methods as Teaching Methodology:

- Class Room Lectures
- Demonstration for programming course
- Guest Lectures of Professionals, Industry Experts etc.
- Teaching with the help of ICT tools
- Visits to various Professionals Units, Companies and Business / Industry Units
- Group Discussion / Debates
- Assignments, Tutorials, Presentations, Role Play etc.
- YouTube Lectures developed by MHRD, UGC, Government of Maharashtra, University etc.
- Analysis of Case Studies

Examination

1) A student cannot appear for the Semester End Examination unless he / she has maintained at least 75% attendance during the teaching period of that course. If a student fails to maintain attendance up to 75%, at the time of filling of Examination Forms, an undertaking from the student should be taken stating that he / she will be allowed to appear for Examination subject to fulfillment of required attendance criteria during the remaining period of teaching of the course.
2) Each credit will be evaluated for 25 Marks.
3) Each course will have a distribution of 30:70 for CIE and SEE.
4) To pass a course, the student must obtain at least 40% Percent marks in the CIE and SEE separately.
5) If a student misses CIE examination, he / she will have a Second Chance with the permission of the teacher concerned only. Such a Second Chance shall not be the right of the student; it will be the discretion of the teacher concerned only rather than the Head of the Department or Principal to give or not to give Second Chance to a student to appear for Internal Assessment.
6) A student cannot register for the Third, Fifth and Seventh Semester, if he / she fails to complete 50% credits of the total credits expected to be ordinarily completed within Two Semesters.
7) No student shall be admitted to the Fifth Semester Examination of the Third Year unless he / she has cleared First Two Semesters.

8) No student shall be admitted to the Fourth Year BBA - CA (Seventh Semester) Degree Program (2024 Pattern) unless he / she has cleared all the papers of Third and Fourth Semester Examination of S.Y. BBA - CA and has satisfactorily kept terms for the Third Year (Fifth and Sixth Semester).
9) There shall be revaluation of the Answer Scripts of Semester-End Examination but not of Answer Scripts of Internal Assessment Papers as per Ordinance No. 134 A and B.

A.T.K.T. Rules

The present relevant ordinances issued by the SPPU pertaining to ATKT are applicable.

University Terms:

The dates for the commencement and conclusion of the First and the Second Terms shall be as determined by the University Authorities. Only duly admitted students can keep to the terms. The present relevant ordinances pertaining to the grant of terms will be applicable.

Verification and Revaluation

The candidate may apply for verification and revaluation or result through Principal of the College which will be done by the University as per ordinance framed in that behalf.

Restructuring of Courses

This revised course structure shall be made applicable to the colleges implementing 'Restructured Programme at the Undergraduate Level from June 2024. The Colleges under the Restructured Programme which have revised their structure in the light of the "2024 Pattern" shall be introduced with effect from Academic Year 2024-25.

Standard of Passing

- A candidate is required to obtain 40% Marks in Internal Assessment, Practical Examination and Semester End University Examination.
- It means that passing separately at Internal Assessment, Practical Examination and Semester End University Examination is compulsory.

Methods of Evaluation, Passing, and Evaluation Criteria

The evaluation of students will be done on Three Times during each Semester:

- Internal Assessment (Internal)
- Practical Examination (If applicable)
- Semester End University Examination (External)

For Semester End University Examination, question papers will be set for Seventy Percent of the Total Marks allotted for the course.

Evaluation will be done on a continuous basis Three Times during each Semester. Internal Assessment will be of Thirty Percent of the Total Marks allotted for the subject. The colleges need to adopt any Two Methods out of the following Methods for Internal Assessment:

- Offline Written Examination
- Power Point Presentations
- Assignments / Tutorials
- Oral Examination
- Open Book Test
- Offline MCQ Test
- Group Discussion
- Analysis of Case Studies

Programme Structure

FYBBA-CA Semester I							
Course Type	Course	Paper Title	Hours / Week	Credits	Internal	External	Total
Major Mandatory (06)	Major Mandatory 1	Problem solving using C	3	2	15	35	50
	Major Mandatory 2	Data Base Management System	3	2	15	35	50
	Major Mandatory 3 (Practical)	Computer Laboratory based on C Programming and Data Base Management System (DBMS)	5	2	15	35	50
Open Elective (OE)	Open Elective 1	Business Mathematics	3	2	15	35	50
	Open Elective 2	Business Statistics	3	2	15	35	50
Vocational Skill Development Course (VSC)	Vocational Skill Development Course	Office Automation tools	5	2	15	35	50
Skill Enhancement Course (SEC)	Skill Enhancement Course (SEC)	Programming Principles and algorithm	3	2	15	35	50
Ability Enhancement Course (AEC)	Ability Enhancement Course (AEC)	Business Communication Skills-I	3	2	15	35	50
Value Education Course (VEC)	Value Education Course (VEC)	Environmental Awareness	3	2	50	0	50
Indian Knowledge System (IKS)	Indian Knowledge System (IKS)	Generic IKS	3	2	50	0	50
Co-Curricular Courses (CC)	Co-Curricular Courses (CC)	Physical Education – I	@ Department	2	50	0	50
		Total	-	22	270	280	550

FYBBBA-CA Semester II							
Course Type	Course	Paper Title	Hours / Week	Credits	Internal	External	Total
Major Mandatory (06)	Major Mandatory 4	Advance C Programming	3	2	15	35	50
	Major Mandatory 5	Relational Database Management System (RDBMS)	3	2	15	35	50

	Major Mandatory 6 (Practical)	Computer Laboratory based on Advance C and RDBMS	5	2	15	35	50
Minor	Minor 1	Principle and Practices of Management	3	2	15	35	50
Open Elective (OE)	Open Elective 3	Introduction to Data Science	3	2	15	35	50
	Open Elective 4	Tally Prime	3	2	50	0	50
Vocational Skill Development Course (VSC)	Vocational Skill Development Course (VSC) (Practical)	Web Technology	5	2	15	35	50
Skill Enhancement Course (SEC)	Skill Enhancement Course (SEC)	E-Commerce	3	2	15	35	50
Ability Enhancement Course (AEC)	Ability Enhancement Course (AEC)	Business Communication Skills-II	3	2	15	35	50
Value Education Course (VEC)	Value Education Course (VEC)	Democracy Awareness & Gender Sensitization	3	2	50	0	50
Co-Curricular Courses (CC)	Co-Curricular Courses (CC)	Physical Education – II	@ Depar tment	2	50	0	50
		Total	-	22	270	280	550

SYBBBA-CA Semester III

Course Type	Course	Paper Title	Hours / Week	Credits
Major Mandatory (08)	Major Mandatory 7	Data Structure	**5**	4
	Major Mandatory 8	PHP	**5**	4
Minor	Minor 2 (Practical)	Computer Laboratory based on DS, PHP	**5**	4
Open Elective (OE)	Open Elective 5	To be selected from the basket of the other faculty	**3**	2
Vocational Skill Development Course (VSC)	Vocational Skill Development Course (VSC) (Practical)	Web development tools	**5**	2
Ability Enhancement Course (AEC)	Ability Enhancement Course (AEC)	Modern Indian Languages 1	**3**	2
Field Projects (FP)	Project	Project based on Web Applications	**5**	2
Co-Curricular Courses (CC)	Co-Curricular Courses (CC)	NSS/NCC/Yoga Education/Health and Wellness/Fine Arts-I	@ Depar tment	2
		Total	-	22

SYBBBA-CA Semester IV

Course Type	Course	Paper Title	Hours / Week	Credits
Major Mandatory (08)	Major Mandatory 9	Object Oriented Programming using C++	5	4
	Major Mandatory 10	Advance PHP	5	4

Minor	Minor 3 (Practical)	Computer Laboratory based on CPP, Adv PHP	5	4
Open Elective (OE)	Open Elective 6	Digital Marketing	5	2
Skill Enhancement Course (SEC)	Skill Enhancement Course (SEC)	Computer Network	3	2
Ability Enhancement Course (AEC)	Ability Enhancement Course (AEC)	Modern Indian Languages 2	3	2
Field Projects	Project	Project based on Digital Marketing	5	2
Co-Curricular Courses (CC)	Co-Curricular Courses (CC)	NSS/NCC/Yoga Education/Health and Wellness/Fine Arts-II	@ Depar tment	2
		Total	-	22

TYBBBA-CA Semester V

Course Type	Course	Paper Title	Hours / Week	Cred its
Major Mandatory (10)	Major Mandatory 11	Java Programming	5	4
	Major Mandatory 12	Mobile Application Development	5	4
	Major Mandatory 13 (Practical)	Computer Laboratory based on Java and Mobile Application Development	3	2
Major Elective	Major Elective 1	Linux Operating System	5	4
Minor	Minor 4	Software Engineering	5	4
Vocational Skill Development Course (VSC)	Vocational Skill Development Course (VSC) (Practical)	Dot Net Programming	5	2
Field Projects (FP)/ Community Engagement and Service corresponding to the Major (CEP)	Project	Project based on Mobile Application Development	5	2
		Total	-	22

TYBBBA-CA Semester VI

Course Type	Course	Paper Title	Hours / Week	Cred its
Major Mandatory (10)	Major Mandatory 14	Recent Trends in IT	5	4
	Major Mandatory 15	Python	5	4
	Major Mandatory 16 (Practical)	Computer Laboratory based on Python	5	2
Major Elective	Major Elective 2	Internet of Things	3	2
	Major Elective 3	Software Testing	3	2
Minor	Minor 5	Management Information Systems	5	4

On Job Training (OJT)	On Jot Training	Internship + Project	After the final exams of Sem V	4
		Total	-	22

Detail Syllabus

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

Syllabus

Unit	Title and Contents	No. of Lectures
1	**'C' Fundamentals** History of 'C' language. Application areas. Structure of a 'C' program. 'C' Program development life cycle. Function as building blocks. 'C' tokens Character set, Keywords, Identifiers Variables, Constants (character, integer, float, string, escape sequences, enumeration constant). Data Types (Built-in and user defined data types). Operators, Expressions, types of operators, Operator precedence and Order of evaluation. Character input and output. String input and output. Formatted input and output **Control Structures**	**15**

	Decision making structures: - if, if-else, switch and conditional operator. Loop control structures: - while do while, for. Use of break and continue. Nested structures. Unconditional branching (goto statement)	
2	**Functions** Concept of function, Advantages of Modular design. Standard library functions. User defined functions: - declaration, definition, function call, parameter passing (by value), return statement. Recursive functions. Scope of variables and Storage classes. **Arrays** Concept of array. Types of Arrays – One, Two and Multidimensional array. Array Operations - declaration, initialization, accessing array elements.	**15**

Reference Books

1. How to Solve it by Computer, R.G. Dromey, Pearson Education.
2. Problem Solving and Programming Concept, Maureen Sprankle,7th Edition, Pearson Publication.
3. 3C: the Complete Reference, Schildt Herbert, 4 th edition, McGraw Hill
4. A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard F. Gilberg, Cengage Learning India
5. The ‘C’ programming language, Brian Kernighan, Dennis Ritchie, PHI
6. Programming in C, A Practical Approach, Ajay Mittal, Pearson
7. Programming with C, B. Gottfried, 3rd edition, Schaum’s outline Series, Tata McGraw Hill.
8. Programming in ANSI C, E. Balagurusamy, 7th Edition, McGraw Hill.

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

Unit	Title and Contents	No. of Lectures
1	**Introduction to Databases Management and Data Models** 1.1 Introduction 1.2 Application Of DBMS 1.3 Advantages of DBMS 1.4 Users of DBMS 1.4.1 Database Designers 1.4.2 Application Programmer 1.4.3 Sophisticated Users 1.4.5 End Users 1.5 Views of Data 1.6 Data Models 1.6.1 Relational Model 1.6.2 Network Model 1.6.3. Hierarchical Model 1.7 Entity Relationship Diagram (ERD) 1.8 Features of ERD 1.9 Cases Studies on ER Model 1.10 Introduction to Relational Model 1.11 Basic Concepts: Relation, tuple, attribute 1.12 Key: Super Key, Candidate Key, Primary Key, Foreign Key	15
2	**SQL (Structured Query Language)**	15

	2.1 Introduction 2.2 Normalization 2.2.1 First Normal Form0 2.2.2 Second Normal Form 2.2.3 Third Normal Form 2.2.4 Boyce - Codd Normal Form 2.2 Basic Structure 2.3 DDL Commands 2.4 DML Commands 2.5 Simple Queries 2.6 Constraint (Not NULL, Check, Unique, Default) 2.7 Aggregate function (Min, Max, Avg, Count, Sum) 2.8 Clause (Group By, Order By, Having) 2.9 Nested Queries 2.10 Case Study on SQL	

Reference Books:

1. Database System Concepts by Henry Korth and A. Silberschatz
2. SQL, PL/SQL The Programming Language Oracle: - Ivan Bayross, BPB Publication.
3. Database Systems Concepts, Designs and Application by Shio Kumar Singh, Pearson
4. Introduction to SQL by Reck F. van der Lans by Pearson
5. Modern Database Management by Jeffery A Hoffer, V. Ramesh, Heikki Topi, Pearson
6. Database Management Systems by Debabrata Sahoo, Tata McGraw Hill

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 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.

Unit	Title and Contents	No. of Lecture Hours
1	Ratio, Proportion, Percentage 1.1 Introduction to Ratios and Proportions, Applications of Ratios and Proportions, Percent- ages and its applications. 1.2 Concept of Commission and Brokerage, Types of Commission, Partnership, Practical applications.	**15**
2	Interest and Dividend 2.1 Simple interest and compound Interest. 2.2 Equated Monthly Instalments (EMI), EMI on reducing balance, EMI on at and floating rate of interest. 2.3 Concept of shares and dividends, Types of Shares, Problems on dividend and return on investment on shares.	**15**

References

1. Practical Business Mathematics by S. A. Bari, New Literature Publishing Company, New Delhi, India.
2. Mathematics for Commerce by K. Selvakumar, Notion Press, Chennai, India.
3. Business Mathematics with Applications by Dinesh Khattar and S. R. Arora, S. Chand Publishing, New Delhi, India.
4. Fundamentals of Business Mathematics by M. K. Bhowal, Asian Books Pvt. Ltd, New Delhi.
5. Business Mathematics by D.C. Sancheti and V. K. Kapoor, Sultan Chand and Sons. 6. Business Mathematics by J. K. Singh, Himalaya Publishing House.

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

Unit	Title and Contents	No. of Lecture Hours
1	Frequency Distribution 1.1 Raw data, variable, discrete variable, continuous variable, constant, attribute with illustration. 1.2 Classification- Concept and definition of classification, objectives of classification, types of classification. 1.3 Frequency Distribution- Discrete and Continuous frequency distribution, Cumulative frequency and Cumulative frequency distribution.	10

	1.4 Graphs & Diagram- Histogram, Ogive curve, Pie-Diagram, Bar Diagram, Multiple bar Diagram, Sub-divided bar diagram	
2	Measure of Central Tendency 2.1 Concept and meaning of Measure of Central Tendency, Objectives of Measure of Central Tendency, Requirements of good Measure of Central Tendency. 2.2 Types of Measure of Central Tendency, Arithmetic Mean (A.M), Median, Mode for discrete and Continuous frequency distribution, Merits & Demerits of A.M., Median, Mode, Numerical Problem. 2.3 Determination of Mode and Median graphically. 2.4 Empirical relation between mean, median and mode. 2.5. Combined Mean 2.6. Numerical Problems	**10**
3	Measure Dispersion Concept of Dispersion, Measures of Dispersion - Range, Variance and Standard Deviation (S.D.) for Grouped and ungrouped data, Measures of relative dispersion- Coefficient of range and coefficient of Variation, Examples.	**10**

Sr. No	Title of the Book	Author/s	Publication	Place
1.	Business Mathematics and Statistics -I	Dr. M. P. Waghmare	Thakur Publication	Pune
2.	Business Statistics	Girish Phatak	Tech – Max	Pune
3.	Statistics for Business	Dr. S. K. Khandelwal	International Book House	New Delhi
4.	Fundamentals of Business Statistics	J.K. Sharma	Pearson	New Delhi
5.	Business Statistics	G.C. Beri	The McGraw-Hill companies	New Delhi

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

Unit	Title and Contents	No. of Lectures
1.	**Introduction** Concept of Windows, Icon, Menu Desktop Creating Folders and Shortcuts Finding Files& Folders Creating, Copying, Moving and Deleting files Windows Explorer Basic DOS Commands **Word Processing Package** Typing, Editing, Proofing &reviewing Formatting text &Paragraph Automatics Formatting and Styles Working with Tables Graphics and Frames Mail Merge	15
2.	**Spread sheet package** Concept of worksheet Working& Editing in Workbooks Creating Formats & Links Protecting and Hiding data Built in Functions (Mathematical, Statistical, String &Date) Formatting a Worksheet & Creating graphics objects Creating Charts (Graphics), Formatting and analyzing data Organizing Data in a List (Data Management) Sharing & Importing Data Printing **Presentation Package** Creating and Editing Slides Creating and Editing objects in the slide Animation Creating and Running Slideshow Templates	15

Reference Books:

1. EXCEL2007 Made Simple by Satish Jain, BPB
2. Word2007 by Rutkosky, BPB
3. PowerPoint2007 Made Simple by Satish Jain, BPB
4. MasteringEXCEL4forWindows-Chester–BPB
5. MicrosoftOfficeWord2007 Plain & Simple, Joyce & Moon, PHI
6. MicrosoftOfficeExcel2007Plain&Simple, Frye, PHI
7. MicrosoftOfficePowerPoint2007Plain&Simple, Muir, PHI
8. 2007MicrosoftOfficeSystemPlain&Simple, Joyce Moon, PHI
9. EXCEL5forWindowsQuick&Easy-JonesTECH
10. Excel Functions & formulas by Bernd Held, BPB
11. MasteringWindows2000Cowat-BPB
12. MSOFFICE2007-TRAININGGUIDEbySatishJain, BPB
13. Internet: An Introduction Cisiems–Tata Mac, D. Boody–BPB
14. Internet 6 in 1–Joe Krayuak & Harbraken, PHI
15. Internet access essential–Tittle & M. Robbins, AP professional PCSoftwareforWindows2003 Made Simple, RKTaxali, TMH

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

Unit	Title and Contents	No. of Lectures
1	**Introduction** 1 Concept: Problem solving, Program development cycle 2 Algorithm, Characteristics of an algorithm 3 Flowcharts 4 Simple Examples: Algorithms and flowcharts 4.1 Addition / Multiplication of integers 4.2 Determining if a number is +ve / -ve / even / odd 4.3 Maximum of 2 numbers, 3 numbers 4.4 Sum of first n numbers, given n numbers, Digit reversing, Palindrome number, Armstrong number 4.5 Table generation for n, Factorial, Prime number, Factors of a number etc. (Write algorithms and draw flowcharts)	**15**
2	**Recursion** 1.1 Concept: Multiplication, Factorial, Fibonacci series, Permutation Generation 1.2 Algorithms using arrays Maximum and minimum of array, reversing elements of an array. 1.3 Mean and Median of n numbers 1.4 Row major and Column major form of array representation 1.5 Matrices: Addition, Multiplication, Transpose, upper/lower triangular	**15**

Reference Books:

1. Let us C-Yashwant Kanetkar.
2. Programming in C- Balagurusamy
3. How to solve it by Computer – R. G. Dromy
4. Introduction to algorithms – Cormen, Leiserson, Rivest, Stein

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

Unit	Title and Contents	No. of Lectures
1	**Introduction** 1.1Meaning, Definition of Communication 1.2 Need for effective communication 1.3 Process of Communication 1.3 C's of effective communication, 1.4 Types of Communication- 1.4.1 Verbal communication- Formal and Grapevine, 1.4.2 Nonverbal communication: -Gestures, Postures, Facial Expression, Eye Contacts, Body Language (Kinesics), Silence, Tips for Improving Non-Verbal Communication 1.5 Barriers to communication 1.6 over comings barriers to communication 1.7 Listening Skills- Types of Listeners, Tips to be good listener. 1.8 Different Media of Communication- E-mails, social media, Fax communication, Video Conferencing, Blogs	15
2	**Writing Skills** 2.1Written Communication-Merits and Merits 2.2. Report Writing- Meaning Definition of Report Importance of good report, Qualities of a good report, Tips for writing good report 2.3 Email Correspondence - Writing effective emails 2.4 Appropriate email subject lines 2.5 Email etiquette and conventions 2.6 Practice writing and receiving emails 2.7 Business Letters – Structure and Components of Business letters, Drafting Business letters	15

References

1. Business Communication, R.K. Madhukar, Vikas Publishing House
2. Business Communication, Homai Pradhan, N.S. Pradhan, Himalaya Publishing House
3. Business Communication, K.K. Sinha, Taxman Publications

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

Unit	Title and Contents	No. of Lectures
1	Introduction - Environmental studies Definition, scope importance and need for public awareness. (Multidisciplinary nature of environmental studies) 2 Environmental Pollution -Definition, Causes, effects on human, water, soil, air (Mother Earth) Air pollution, Water pollution, Soil pollution Marine pollution, Noise pollution, Thermal pollution, nuclear hazards	15
2	Various Government initiatives for conservation of Environment. Controlling measures), Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquakes, cyclone and landslides.	15

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

Programme Structure

FYBBA-CA Semester II								
Course Type	Course		Paper Title	Hours / Week	Credits	Internal	External	Total
Major Mandatory (06)	Major Mandatory 4	BBACA201T	Advance C Programming	3	2	15	35	50
	Major Mandatory 5	BBACA202T	Relational Database Management System (RDBMS)	3	2	15	35	50
	Major Mandatory 6 (Practical)	BBACA201P	Computer Laboratory based on Advance C and RDBMS	5	2	15	35	50
Minor	Minor 1	BBACA201MI	Principle and Practices of Management	3	2	15	35	50
Open Elective (OE)	Open Elective 3	OE-101-CA	Introduction to Data Science	3	2	15	35	50
	Open Elective 4	OE-102-IT	Tally Prime	3	2	15	35	50
Vocational Skill Development Course (VSC)	Vocational Skill Development Course (VSC) (Practical)	BBACA201VSC	Web Technology	5	2	15	35	50
Skill Enhancement Course (SEC)	Skill Enhancement Course (SEC)	BBACA201SEC	E-Commerce	3	2	15	35	50
Ability Enhancement Course (AEC)	Ability Enhancement Course (AEC)	BBACA201AEC	Business Communication Skills-II	3	2	15	35	50
Value Education Course (VEC)	Value Education Course (VEC)	BBACA201VEC	Democracy Awareness & Gender Sensitization	3	2	15	35	50
Co-Curricular Courses (CC)	Co-Curricular Courses (CC)	BBACA201CC	Physical Education – II	@ Department	2	15	35	50
			Total	-	22	165	385	550

Detail Syllabus

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**

Unit	Title and Contents	No. of Lectures
1	Arrays, Strings, and Pointers 1.1 Arrays and Functions 1.1.1 Passing Arrays to Functions 1.2 Introduction to Strings 1.2.1 Declaration 1.2.2 Definition 1.2.3 Initialization 1.2.4 Format Specifiers 1.2.5 Reading and Writing from Console 1.3 String Manipulation 1.3.1 Predefined String Functions 1.3.2 User-Defined String Functions 1.4 Introduction to Pointers 1.4.1 Declaration 1.4.2 Definition 1.4.3 Initialization and Usage 1.4.4 Types of Pointers 1.4.5 Pointer Arithmetic 1.4.6 Multiple Indirection 1.4.7 Parameter Passing: Call by Value and Call by Reference 1.5 Pointers and Arrays 1.5.1 Pointer to Array 1.5.2 Array of Pointers	**15**

	1.6 Functions and Pointers 1.6.1 Passing Pointers to Functions 1.6.2 Returning Pointers from Functions 1.7 Dynamic Memory Allocation 1.7.1 malloc( ) 1.7.2 calloc( ) 1.7.3 free( ) 1.7.4 realloc( )	
2	**Structures and Basic File Handing** 2.1 Introduction 2.1.1 Declaration 2.1.2 Definition 2.1.3 Initialization 2.2 Accessing structure members (. operator) 2.3 Array of structures 2.4 Pointers to structures 2.4.1 Declaring pointer to structure 2.4.2 Accessing structure members 2.5 Structures & functions 2.6 Passing each member of structure as a separate argument 2.7 Passing structure by value / address Nested structures 2.8 Union 2.8.1 Declaration of union Accessing structure members 2.9 Difference between Structures and Union Preprocessor and File Handling 2.10 Preprocessor Introduction 2.11 Format of preprocessor directives 2.12 File inclusion directives (#include), Macro substitution directives (#define), nested macros, parameterized macros. 2.13 File Handling Concept of streams, need 2.14 Types of files, Operations on text & binary files, Random access file 2.15 library functions for file handling – fopen, fclose, fgetc, fputc, fseek, fgets, fputs	**15**

Reference Books

1. How to Solve it by Computer, R.G. Dromey, Pearson Education.
2. Problem Solving and Programming Concept, Maureen Sprankle,7thEdition, Pearson Publication.
3. C: the Complete Reference, Schildt Herbert, 4 th edition, McGraw Hill
4. A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard F. Gilberg, Cengage Learning India
5. The ‘C’ programming language, Brian Kernighan, Dennis Ritchie, PHI
6. Programming in C ,A Practical Approach, Ajay Mittal , Pearson
7. Programming with C, B. Gottfried, 3rd edition, Schaum’s outline Series, Tata McGraw Hill.
8. Programming in ANSI C, E. Balagurusamy, 7th Edition, McGraw Hill.

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.

Unit	Title and Contents	No. of Lectures
1	**Introduction to RDBMS and PL-SQL** 1.1 Introduction to RDBMS 1.1.1 Difference between DBMS and RDBMS 1.1.2 Advantages and Disadvantages of RDBMS 1.2 Overview of PLSQL 1.2.1 Data Types 1.2.2 PLSQL Block 1.2.3 Variables, Constant 1.2.4 Operator 1.3 Control Statement 1.3.1 Conditional Control 1.3.2 Looping Control 1.3.3 Sequential Control 1.3.4 Case Statement 1.4 Exception Handling 1.4.1 Structure of Exception Handling 1.4.2 Types of Exception 1.4.3 Handling Exception 1.5 Functions 1.5.1 Create a Function 1.5.2 Calling a Function 1.6 Procedures 1.6.1 Creating a Procedure 1.6.2 Executing a Standalone Procedure 1.7 Cursor 1.7.1 Attributes of Cursor 1.7.2 Types of Cursors 1.8 Trigger	10

	1.8.1 Types of Triggers 1.8.2 Different Operation on Triggers 1.9 Package 1.9.1 Characteristics of PL/SQL Package 1.9.2 Advantages of PL/SQL Packages	
2	**Transaction Management** 2.1 Transaction Concept 2.1.1 Transaction Concept 2.1.2 ACID Properties 2.1.3 Transaction State 2.1.4 Transaction Operation 2.2 Schedule 2.2.1 Serial Schedule 2.2.2 Concurrent Schedule 2.3 Serializability 2.3.1 Conflict Serializability 2.3.2 View Serializability 2.3.3 Testing for Serializability 2.4 Recoverability 2.4.1 Recoverable Schedules 2.4.2 Cascade less Schedules	**10**
3	**Concurrency Control & Recovery System** 3.1 Lock Based Protocol 3.1.1 Lock 3.1.2 Locking Protocol 3.1.3 Locking Techniques for Concurrency Control 3.1.4 Granting of Locks 3.1.5 Two-Phase Locking Protocol 3.2 Timestamp Based Protocol 3.3 Deadlock Handling 3.3.1 Deadlock 3.3.2 Techniques of Deadlock Handling 3.3.3 Deadlock Prevention 3.3.4 Deadlock Detection 3.3.5 Deadlock Recovery 3.4 Failure Classification 3.5 Recovery & Atomicity 3.6 Recovery with concurrent transaction	**10**

Reference Books:

1. Database System Concepts by Henry Korth and A. Silberschatz
2. SQL,PL/SQL The Programming Language Oracle:- Ivan Bayross, BPB Publication.
3. Database Systems Concepts, Designs and Application by Shio Kumar Singh, Pearson
4. Introduction to SQL by Reck F. Vander Lans by Pearson
5. Modern Database Management by Jeffery A Hoffer, V. Ramesh, Heikki Topi, Pearson
6. Database Management Systems by Debabrata Sahoo, Tata Mac Graw Hill

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**

Unit	Title and Contents	No. of Lectures
1	**Introduction** Nature of management Meaning, importance, functions, types of Management as an art, science and social system Universality of concept of management and organization Evolution of management thoughts Concept of managerial thoughts Contribution of Taylor, Mayo and Fayol and Drucker and Indian Management Ethos	**15**
2	**Functions of Management** Major managerial Functions Planning, needs types, methods, advantages, merits Forecasting, need types, methods, advantages, merits, Decision Making Process and Techniques, Styles of directing, methods of co-ordination	**15**

References

1. Management Concepts and Strategies J.S. ChandanVikas Publishing House Pvt. Ltd.
2. Principles of Management Harold Koontz , Heinz Weihrich , A. RamachandraArysri McGraw hill companies
3. Management A Global and Entrepreneurial Perspective Heinz Weihrich , Mark V. Cannice , Harold Koontz McGraw hill companies
4. Management – 2008 Edition Robert Kreitner, Mamata Mohapatra Biztantra – Management For Flat World
5. Introduction to Management John R. Schermerhorn Wiley India Pvt. Ltd.

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 Student will be able to	
CO1	define Data Science Tasks and Models and Lifecycle
CO2	apply Prep-processing and visualization Techniques

Unit	Title and Contents	No. of Lecture Hours
1	**Introduction** What and why learn Data Science? Types of Data -structured, semi-structured, unstructured Data Applications of Data Science, The Data Science Lifecycle, Role of Data Scientists Data sources-Open Data, Social Media Data, Multimodal Data, standard datasets	**06**
2	**Statistics for Data Science** Data Objects and Attributes, Attribute Types: Nominal, Binary, Ordinal Attributes, Numeric Attributes, Discrete versus Continuous Attributes, Role of statistics in Data Science Descriptive statistics - Measuring the Frequency, Measuring the Central Tendency: Mean, Median, and Mode, Measuring the Dispersion: Range, Standard deviation, Variance, Inter quartile Range	**06**
3	**Data science Models and Tasks**	**06**

	Predictive and Descriptive Models, Introduction to Data Science Tasks – Classification, Prediction, Association, Clustering, Performing simple Data Science Tasks using WEKA / R	
4	**Data Quality and Pre-processing** Data Quality: Why Preprocess the Data? Data munging/wrangling operations Data Cleaning - Missing Values, Noisy Data Data Transformation – Rescaling, Normalizing, Data reduction and Data discretization	**06**
5	**Data Visualization** Introduction to Exploratory Data Analysis (EDA), Data visualization, Basic data visualization tools –Box Plots, Histograms, Bar charts/graphs, Scatter plots, Line charts, Area plots, Pie charts	**06**

Reference Books:

1. Data Science Fundamentals and Practical Approaches, Gypsy Nandi, Rupam
2. Sharma, BPB Publications, 2020.
3. Data Mining Concepts and Techniques, Third Edition, Jiawei Han, Micheline
4. Kamber, Jian Pei, Morgan Kaufmann, 2012.
5. A Hands-On Introduction to Data Science, Chirag Shah, University of Washington
6. Cambridge University Press

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

Practical Assignments

Assignment 1.

Creation of Company

Set up a new company in Tally Prime.

Assignment 2

Creation of Ledgers under appropriate groups of Tally Prime.

Assignment 3

Pass an entry of Capital brought by cash of Rs. 200000 in Reciept.

Assignment 4

To Create Multiple ledgers under a single group.

Assignment 5

Create necessary ledgers for Purchase Invoice using New Reference Billwise option.. Creation of ledger of Party ,Purchase

Assignment 6

Creation of GST ledgers

Assignment 7

Pass the entry of Purchase in voucher.

Assignment 8

To Pass a payment entry against the Purchase Invoice using against reference option and check the reports of outstandings.

References :

https://www.tallyofficialbooks.com/

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.

Unit	Title and Contents	No. of Lectures
1.	**HTML** 1.1 Introduction to HTML 1.2 Basic HTML Structure 1.3 Common HTML Tags 1.4 Physical and Logical HTML 1.5 Types of Images, client side and server-side Image mapping 1.6 List, Table, Frames 1.7 Embedding Audio, Video 1.8 HTML form and form elements	10
2.	**Style sheets** 2.1 Need for CSS 2.2 Introduction to CSS 2.3 Using CSS background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS 2.5 Overview and features of CSS2 and CSS3	10
3	**JavaScript** 3.1 Introduction to Java Script 3.2 Identifier & operator, control structure, functions 3.3 Predefined functions, math & string functions 3.4 Array in Java scripts	10

Reference Books:

1. Complete HTML-Thomas Powell
2. HTML and Java Script–Ivan Bayross
3. HTML& CSS: The Complete Reference, Fifth Edition
4. Mastering HTML, CSS & Java script Web Publishing

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

Unit	Title and Contents	No. of Lectures
1	**Introduction to Electronic Commerce** 1.1 What is E-Commerce (Introduction and Definition) 1.2 Main activities E-Commerce 1.3 Goals of E-Commerce 1.4 Technical Components of E-commerce 1.5 Functions of E-commerce 1.6 Advantages and Disadvantages of E-commerce 1.7 Scope of E-commerce 1.8 Electronic commerce Applications 1.9 Electronic commerce and Electronic Business 1.10 (C2C)(2G , G2G , B2G , B2P,B2A,P2P, B2A, C2A, B2B,B2C)	**12**
2	Electronic payment System 2.1 Introduction 2.2 Types of Electronic payment system 2.3 Payment types 2.4 Traditional payment 2.5 Value exchange system 2.6 Credit card system 2.7 Electronic funds transfer 2.8 Paperless bill 2.9 Modern payment cash 2.10 Electronic cash	**08**
3	**E-com Security** 3.1 E-commerce security environment 3.2 Security threats in E-com environment 3.3 Malicious code and unwanted programs 3.4 Hacking and cyber vandalism 3.5 Credit card fraud/Theft	**10**

	3.6	Spoofing	
	3.7	Denial of service(DOS)	
	3.8	Distributed denial of service(dDOS)	

Reference Books:

1 Internet marketing and E-commerce-Ward Hanson and Kirthi Kalyanam
2 E-Commerce Concepts , Models , Strategies by -- G.S.V Murthy
2 Electronic Commerce by --Gary P. Schneider
3 E-Commerce- Kenneth C. Laudon and Carol Guercio Traver
4 E-Commerce by --Kamlesh K Bajaj and Debjani Nag

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.

Unit	Title and Contents	No. of Lectures
1	**Oral Communication** 1.1 Definition, merits and demerits. 1.2 Presentation skills: Preparation for self-introduction and effective presentation. Overcoming fear during presentation. 1.3 Interview skills: Interview and types of interviews. Preparation before, during and after an interview . 1.4 Do's and Don'ts in an interview	15
2	**Personality Development and communication skills.** 2.1 The concept of personality - Factors affecting personality development , Importance of Personality Development. 2.2 Self Awareness – Meaning – Benefits of Self – Awareness – Developing Self – Awareness. 2.3 Attitude : meaning and types, Factors affecting attitudes ,Positive attitude – Advantages, Negative attitude- Disadvantages ,Ways to develop positive attitude 2.4 Self SWOC Analysis – Meaning – Importance-Application .	15

References

1. Business Communication, R.K. Madhukar, Vikas Publishing House
2. Business Communication, Homai Pradhan, N.S. Pradhan, Himalaya Publishing House
3. Business Communication, K.K. Sinha, Taxman Publications

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.

Unit	Title and Contents	No. of Lectures
1	**Introduction to Democracy and democratic values and principles** • Types of democracy, Democracy, and constitution, Understanding democratic Values & Principles • Indian political system - legislature, executive, judiciary • Federal structure - central and state government, role of political parties and pressure groups in democracy • Duties of citizens and government & Future of democracy	05
2	**Challenges to Democracy and corrective measures**. • Illiteracy, poverty, gender discrimination, casteism, communalism, corruption, criminalization in politics, violence etc. • Strengthening Democracy- Education and sensitization, Technological innovations- E-governance, digital participation etc.	08

3	**Understanding gender-related concepts, gender-based violence and democracy** • Gender roles, social construction of Gender • Patriarchal family structure and its effects • The democratic deficit in the form of women's participation and governance • Strategies to address deficit – Promoting Gender Equity and Equality	**08**
4	**Addressing challenges** • Breaking gender stereotypes in families • Empowering women's representation in society • Men's participation in advocating gender equality, • Setting the approach of Reciprocity for the betterment of every individual	**09**

Reference Material

1. https://ncert.nic.in/textbook.php?iess4=0-5
2. Democratic Politics – Text book in political science std IX
3. https://nios.ac.in/media/documents/SecSocSciCour/English/Book2.pdf
4. National Institute of Open Schooling – Social Science
5. https://maharashtraboardsolutions.com/maharashtra-state-board-class-11-political-science-solutions/
6. MHBSHC- Standard 11 – Political Science
7. Gramin Vikas Mantralay Bharat Sarkar – Gender module
8. NATIONAL COMMISSION FOR WOMEN NEW DELHI - 'Gender Sensitization and Legal Awareness Programme

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

Details syllabus and execution guidelines for Physical Education will be shared separately

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(BBA-CA)

Revised Curriculum (2024Pattern as per NEP-2020)

w. e. f. Academic Year: 2025-2026

Semester III					
Course Type	**Course**	**Paper Title**	**Hours / Week**	**Credits**	
				Theory	**Practical**
Major Mandatory (08)	Major Mandatory 7	Data Structure	4	4	
	Major Mandatory 8	PHP	4	4	
Minor	Minor 2 (Practical)	Computer Laboratory based on DS, PHP	8		4
Open Elective(OE)	Open Elective 5	Introduction to Cyber Security	2	2	
Vocational Skill Development Course (VSC)	Vocational Skill Development Course (VSC) (Practical)	Web development tools	4		2
Ability Enhancement Course (AEC)	Ability Enhancement Course (AEC)	Modern Indian Languages 1: Marathi/Hindi/Sanskrit	2	2	
Field Projects(FP)	Project	Project based on Web Applications	4		2
Co-Curricular Courses (CC)	Co-Curricular Courses (CC)	NSS/NCC/Yoga Education/Health and Wellness/Fine Arts-I	@ Dept	2	
		Sub Total	-	**14**	**8**
		Total		**22**	

Semester III					
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 **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.

Unit	**Title and Contents**	**No. of Lecture Hours**
1	**<u>Introduction to Data Structures</u>** 1.1 Array, types of array and its representation 1.2 Self referential structure 1.3 Pointer and dynamic memory allocation 1.4 Data types, Data Objects and Abstract Data Type(ADT) 1.5 Data structure and types of data structure 1.6 Algorithm Analysis: Space complexity, time complexity, Asymptotic Notations(Big O, Omega Ω)	**06**

2	**<u>Linear Data Structure</u>** 2.1 Introduction to Linear Data Structure Definition, Characteristics, Types of Linear Data Structure 2.2 Sorting algorithms with time complexity Bubble sort, Insertion sort, Merge sort, Quick Sort, Selection Sort 2.3 Searching techniques Linear Search, Binary search	**10**
3	**<u>Linked List</u>** 3.1 Introduction to Linked List - Definition, Advantages and Disadvantages 3.2 Implementation of Linked List - Static and Dynamic Representation, - Node Structure 3.3 Types of Linked List 3.3.1 Singly Linked list Operations - Create, Printing, Insertion(Begin, Middle, End), Deleting(Begin, Middle, End), Reverse, Searching 3.3.2 Doubly Linked list Operations - Create, Printing, Insertion(Begin, Middle, End), Deleting(Begin, Middle, End) 3.3.3 Circularly Singly Linked list Operations - Create, Printing 3.3.4 Circularly Doubly Linked list Operations - Create, Printing	**12**
4	Stack and Queue 4.1 Introduction - Concept and characteristics (LIFO) Real-world examples: browser history, undo operations 4.2 Stack Implementations - Static representation using arrays Dynamic representation using linked lists 4.3 Stack Operations - Push, Pop, Peek, isEmpty, isFull 4.4 Applications of Stacks 4.5 Conversion of Infix, prefix, postfix , Evaluation of postfix and prefix 4.6 Introduction to Queue - Advantages and Disadvantages of Queue - Application Queue 4.7 Representation - Static & Dynamic - Queue using LinkedList 4.8 Primitive Operations on Queue (Insert, Delete, Display) 4.9 Circular queue(insert, delete ,display)	**20**

5	Tree and Graph 5.1 Tree Concept & Terminologies 5.2 Binary tree, Binary search tree 5.3 Operations on BT and BST – create, Insert, delete 5.4 Tree Traversals (preorder, inorder, postorder) 5.5 Height balanced tree- AVL trees- Rotations, AVL tree examples. 5.6 Introduction of Graph 5.7 Representation of Graph- Adjacency Matrix, Adjacency List 5.8 Graph Traversals- BFS and DFS 5.9 Degree of Graph 5.10 Spanning Tree	**12**

Reference Books

Sr. No.	Title of the Book	Author/s	Publication	Place
1	Data Structure Using 'C'	Shrivastava	BPB Publication	
2	Data Structure Using 'C'	Yashwant Kanetkar	BPB Publication	
3	Data Structures Using C	Horowitz, Sahani, and Freed		
4	Data Structure Through C	G.S. Baluja		
5	Fundamentals of Data Structures in C	Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed	University Press	
6	Data Structures Using C	Reema Thareja	Oxford University Press	
7	Data Structures: A Pseudocode Approach with C	Richard F. Gilberg, Behrouz A. Forouzan	Cengage Learning	

Other Learning Material
E- Resource:
Website: **https://visualgo.net/en/sorting**

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.

Unit	**Title and Contents**	**No. of Lecture Hours**
1	PHP Basics & Control structure and loops 1.1 Setting up a development environment 1.2 Variables, numbers and strings 1.3 Calculations with PHP 1.4 Conditional Statements 1.5 Loops for Repetitive tasks 1.6 Using Arrays 1.7 Combing Loops and Arrays	**15**
2	Functions, Objects and Errors 2.1 PHP's Built-in functions 2.2 Creating Custom functions 2.3 Passing Values by Reference 2.4 Understanding Objects 2.5 Differences between POST and GET 2.6 Preserving User Input 2.7 Working with Forms 2.8 Building a Form 2.9 Processing a Form's Data 2.10 Types of Errors ,Error reporting	**15**

3	More with Forms 3.1 Dealing with checkboxes and radiobuttons 3.2 Retrieving values from lists 3.3 Validating and restricting data 3.4 Sending Email 3.5 Storing and Protecting Data 3.6 Setting and Reading Cookies 3.7 Protecting Online Files 3.8 Understanding Session Variables 3.9 Sticky Forms 3.10 Self processing	**15**
4	MySQL Database Overview 4.1 phpMyAdmin Overview 4.2 Using a MySQL Database 4.3 Executing queries from PHP 4.4 Prepared statements and parameter binding for security 4.5 Reading and writing data	**15**

Reference Material
Reference Books

Sr. No.	Title of the Book	Author/s	Publication	Place
1	Php: A Beginner's Guide	VikramVaswani	1st EditionMcGraw-Hill Osborne Media; 1 edition	
2	Murach's PHP and MySQL (2nd Edition)	Joel Murach and Ray Harris		
3	PHP: The Complete Reference Paperback – 1 Jul 2017	Steven Holzner	McGraw Hill Education	
4	PHP AND MYSQL WEB DEVELOPMENT-5TH EDN	Luke Welling and Laura Thomson	Pearson Education-5th Edition	
5	Beginning PHP 5, Apache MYSQL , Web Development	Naramore Elizabeth	Wiley-dreamtech India Pvt. Ltd.	

Other Learning Material
E- Resource:

1. https://www.w3school.ccom/php/
2. https://www.tutorialspoint.com/php/index.htm
3. e-PGPathshala
4. https://www.geeksforgeeks.org/php/php-tutorial/

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.

Assessment

Continuous assessment of laboratory work is to be done based on overall performance and lab assignments performance of student. Each lab assignment assessment will be assigned grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include-timely completion, performance, innovation, efficient codes and good programming practices

Data Structure Lab Course Contents

Assignment 1 Arrays

1. Dynamic Memory allocation
2. Pointer to structure

Assignment 2 Sorting and Searching

1. Implementation of Selection Sort, Insertion Sort, Quick Sort
2. Implementation of Linear Search
3. Implementation of Binary Search

Assignment 3 Linked List

1. Implementation of Singly Linked List (create ,display,Insert ,delete)
2. Implementation of Doubly Linked List (create , display, Insert ,delete)
3. Implementation of Circular Linked List(create,display)

Assignment 4 Stack and Queues

1. Implementation of Stack (LIFO),push, pop, display
2. Implementation of Dynamic Stack
3. Implementation of Queues(FIFO),insert,delete,display
4. Implementation of Dynamic Queue

Assignment 5 Tree and Graphs

1. Implementation of BT and BST – create, Insert, delete
2. Implementation of tree traversal, preorder, postorder, inorder
3. Implementation of adjacency matrix
4. Implementation graph traversal BFS and DFS

PHP Lab Course Contents

Assignment 1 : PHP Basics & Control structure and loops

1.Programs on arithmetic calculation
2.Area Calculation
3.Total and percentage of marks
4. Programs on if, switch case , while and for loop
5. Operations on indexed array
6. Operations on associative array
7. String handling programs ,Counting Vowels,Occurrence of each vowel, palindrome
8. Using text box (string replacement) by making use of built in functions.
9. Using Form design, arithmetic calculations between two numbers.
10. Bill calculation program using explode function .
11.Program on string manipulation (Compare string ,split string) .
12.Various array handling functions .
13 Sort , Merge ,filter elements from array .

Assignment 2 :- Functions , Objects and errors

1.Area, volume calculation using function
2.Swap two numbers, maximum out of three numbers using function
3.Form designing concept : Calculate bill
4.Program on string manipulation (Compare string ,split string)
5.Various array handling functions Sort , Merge ,filter elements from array .
6. Concept of class and interface calculation of area and volume of cylinder.

Assignment 3 :- More with forms

1. Accept user name and password
2. Email validation
3. Program based on base class and derived class.
4. Write a PHP script to keep track of number of times the web page has been accessed.

Assignment 4 :- MySQL Database review (Sample programs)

1. Emp-Dept are related with one-many relationship. Create a RDB for the above and solve following Using above database.Write a PHP script which will print a salary statement for specified emp_no with his details.
2. Consider the following entities and their relationships Doctor (doc_no, doc_name, address, city, area) Hospital (hosp_no, hosp_name, hosp_city) Doctor and Hospital are related with many-many relationship. Create a RDB in 3 NF for the above and solve following Using above database, write a PHP script which accepts hospital name and print information about doctors visiting / working in that hospital in tabular format.
3. Executing queries from PHP.

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.

Unit	Title and Contents	No. of Lecture Hours
1	**Chapter 1: Introduction to Cyber Crime and Cyber Security** 1.1 Introduction 1.2 Cybercrime:Definition and significance of cybersecurity, Evolution and historical context of cybersecurity 1.3 Cybercrime and Information Security 1.4 Who are Cybercriminals? 1.5 Hackers and Types of Hackers 1.6 Types of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling, Forgery, Web Jacking, Newsgroup, Spam/Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking, Online Frauds, Computer Sabotage, Email Bombing/Mail Bombs, Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft	15

	1.7 Vulnerability, Threats, and Harmful Acts 1.8 CIA Triad	
2	**Chapter 2:- Cybercrime Tools, Techniques and Cyber Laws** 2.1 Introduction 2.2 Proxy Servers and Anonymizers 2.3 Phishing 2.4 Password Cracking 2.5 Keyloggers and Spyware 2.6 Virus and Worms 2.7 Trojan Horses and Backdoors 2.8 Steganography 2.9 DoS and DDoS Attacks 2.10 SQL Injection 2.11 Introduction: Cyber Laws 2.12 Cybercrime and the Legal Landscape around the World 2.13 Why Do We Need Cyberlaws: The Indian Context 2.14 The Indian IT Act 2.14.1 Challenges to Indian Law and Cybercrime Scenario in India 2.14.2 Digital Signatures and the Indian IT Act, Amendments to the Indian IT Act 2.15 Cybercrime and Punishment 2.16 Cyberlaw, Technology and Students: Indian Scenario	**15**

Reference Material
Reference Books

Sr. No.	Title of the Book	Author/s	Publication	Place
1	Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives	Nina Godbole, Sunit Belapure	Wiley	April 2011 India Publications Released.
2	Principles of Information Security. 3rd Edition, 2011.	Michael E Whitman, Herbert J Mattord	Cengage Learning	20 Channel Center Street, Boston, MA 02210 USA
3	Computer Security: Principles and Practice, 3rd edition	William Stallings and Lawrie Brown	Pearson	Boston, Massachusetts, USA
4	Cyber Security Essentials	James Graham Richard Howard Ryan Olson	Auerbach Publications	United States of America

Other Learning Material
E- Resource:

1) Swayam – Cyber Security Course (by NPTEL/IIT Madras) https://nptel.ac.in/courses/106106248
2) Swayam – Cyber laws https://onlinecourses.swayam2.ac.in/cec25_cs04/preview

Semester III					
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 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

Unit	Title and Contents	No. of Lecture Hours
1	**Introduction to WordPress** What is WordPress? Overview of WordPress and its features Brief history and evolution of WordPress Benefits of using WordPress for website development **Setting up a WordPress Website** Choosing a domain and hosting: Selecting a domain name and web hosting service Installing WordPress **WordPress Dashboard** Introduction and Overview of the WordPress dashboard and its fe Creating and editing posts in WordPress Creating and editing pages in WordPress **Themes and Customization** Choosing a WordPress theme for a website Customizing WordPress themes using the theme editor Creating child themes in WordPress	15
2	**Content Management Through WordPress** **Plugins and Extensions** Introduction of WordPress plugins and their uses Installing plugins in WordPress Overview of popular WordPress plugins, such as	15

	Yoast SEO and WooCommerce **Content Creation and Management** Creating high-quality content in WordPress Optimizing content for search engines using keywords and meta tags Managing content in WordPress, including Media Library and publishing posts **Security and Maintenance** Best practices for securing a WordPress website Updating WordPress core, themes, and plugins Backing up WordPress websites using plugins and manual methods	

Reference Material

Reference Books

Sr. No.	Title of the Book	Author/s	Publication	Place
1	Professional WordPress Design and Development	Hal Stern, David Damstra, and Brad Williams	Wiley Publishing, Inc	Canada
2	WordPress® ALL-IN-ONE FOR DUMmIES	Lisa Sabin-Wilson, Cory Miller, Kevin Palmer, Andrea Rennick, and Michael Torbert	Wiley Publishing, Inc	Hoboken
3	WordPress: The Missing Manual	Matthew MacDonald	O'Reilly	Sebastopol
4	Building Web Apps with WordPress	Brian Messenlehner, Jason Coleman	O'Reilly Media	Sebastopol,
5	WordPress Theme Development Beginner's Guide	Tessa Blakeley Silver	Packt Publishing	Birmingham

Other Learning Material

E- Resource:

1. https://wordpress.com/
2. https://infyspringboard.onwingspan.com
3. https://www.wpbeginner.com/

Semester III					
Semester No.	**Course Code**	**Type of Course**	**Course Title**	**Credits**	**Hours/ Week**
3		**Ability Enhancement Course (AEC)**	**Modern Indian Languages 1 : Marathi/Hindi/Sanskrit**	**2**	**2**

The details syllabus of each of the languages will be shared by respective board of studies.

Semester III					
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.

Project Guidelines

- The team should consist of a maximum of 2 students.
- Students can choose any project topic, with no restriction on technology or domain.
- Students must independently handle all stages: problem identification, research, design, implementation testing and reporting.
- Minimum 2 project presentations must be conducted by the guide to monitor progress.
- The final report should follow academic standards with clear sections: abstract, background, aim, design and implementation, testing, conclusion, references.
- Tables and figures must be numbered and referenced in the report.
- Final presentation and demonstration will be evaluated by the project guide and one external examiner appointed by the University.

Formatting Specifications

- **Paper Size**: A4
- **Font**: Times New Roman, 12 pt
- **Line Spacing**: Single
- **Margins**: 1 inch (top, bottom, left, right)
- Spiral Bounded Project Documentation

Recommended Documentation Contents

- **Title Page**: Include project title, team members, guide's name, institution and University Name.
- **Certificate**: Signed by the internal guide and Head of the Department/Co-ordinator.
- **Acknowledgements**: Recognize contributions from individuals and institutions.
- **Table of Contents**: List chapters with page numbers.

- **List of Figures and Tables**: If applicable.

Chapters

1. **Abstract**: A concise summary of the project.
2. **Introduction**:
    - Background of the Project
    - Problem Statement
    - Objectives and Goals
    - Scope and Limitations
3. **System Analysis**:
    - Existing Systems and their Limitations
    - Project Perspective and Features
    - Requirement Analysis (Functional, Performance, Security)
4. **System Design**:
    - Design Constraints
    - Flow Chart
    - User Interfaces (Design Screen)
5. **Implementation Details**:
    - Software and Hardware Specifications
    - Screenshots of Working System and Reports
6. **Testing**:
    - Input, Expected Output, Actual Output
    - Screens with Validations (Eg; Numeric, Character, Mail Id, etc;)
    - Error/ Success Message Window
7. **Conclusion and Recommendations**
8. **Future Scope**
9. **Bibliography and References**
10. **Abbreviations**

BBA(CA) CBCS 2019 Pattern

TYBBA (CA) Sem V Syllabus

Savitribai Phule Pune University
T.Y.B.B.A (C.A.) Semester –V
Course Code: CA-501
Subject Name: Cyber Security

Total Hours : 48 lectures **Total Credits: 03**

Prerequisites: -

- A course on Computer Networks.

Course Objectives:

- To understand the fundamentals of cyber security.
- To understand various categories of Cybercrime, Cyber-attacks on mobile, tools and techniques used in Cybercrime and case studies.
- To have an overview of the Cyber laws and concepts of Cyber forensics.

Course Outcome:-

- Have a good understanding of Cyber Security and the Tools.
- Identify the different types of Cyber Crimes.
- Have a good understanding of Cyber laws
- To develop Cyber forensics awareness.
- Identify attacks, security policies and credit card frauds in mobile and Wireless Computing Era.

Unit	Topic	No of lectures
1	**Chapter 1:- Introduction to Cyber Crime and Cyber Security** 1.1 Introduction 1.2 Cybercrime: Definition and Origin of the Word 1.3 Cybercrime and Information Security 1.4 Who are Cybercriminals? 1.5 Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling,Forgery, Web Jacking, Newsgroup, Spam/Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking,OnlineFrauds,Computer Sabotage, Email Bombing/Mail Bombs, Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft 1.6 Definition of Cyber Security 1.7 Vulnerability, Threats and Harmful acts 1.8 CIA Triad 1.9 Cyber Security Policy and Domains of Cyber Security Policy	07
2	**Chapter 2 :- Cyber offenses and Cyberstalking** 2.1 Criminals Plan: Categories of Cybercrime Cyber Attacks: Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering, and Classification of Social Engineering. 2.2 Cyberstalking: Types of Stalkers, Cases Reported on Cyberstalking, Working of Stalking 2.3 Real-Life Incident of Cyber stalking 2.4 Cybercafe and Cybercrimes	10

	2.5 Botnets: The Fuel for Cybercrime, Botnet, Attack Vector 2.6 Cybercrime: Mobile and Wireless Devices – Proliferation - Trends in Mobility 2.7 Credit Card Frauds in Mobile and Wireless Computing Era 2.8 Security Challenges Posed by Mobile Devices 2.9 Authentication Service Security 2.10 Attacks on Mobile/Cell Phones	
3	**Chapter 3:- Tools and Methods Used in Cybercrime** 3.1 Introduction 3.2 Proxy Servers and Anonymizers 3.3 Phishing 3.4 Password Cracking 3.5 Keyloggers and Spywares 3.6 Virus and Worms 3.7 Trojan Horses and Backdoors 3.8 Steganography 3.9 DoS and DDoS Attacks 3.10 SQL Injection	05
4	**Chapter 4 :- Cybercrimes and Cyber security: The Legal Perspectives** 4.1 Introduction 4.2 Cybercrime and the Legal Landscape around the World 4.3 Why Do We Need Cyberlaws: The Indian Context 4.4 The Indian IT Act 4.5 Challenges to Indian Law and Cybercrime Scenario in India 4.6 Consequences of not Addressing the Weakness in Information Technology Act 4.7 Digital Signatures and the Indian IT Act 4.8 Amendments to the Indian IT Act 4.9 Cybercrime and Punishment 4.10 Cyberlaw, Technology and Students: Indian Scenario	07
5	**Chapter 5:- Cyber Forensics** 5.1 Introduction 5.2 Historical background of Cyber forensics 5.3 Digital Forensics Science 5.4 The Need for Computer Forensics 5.5 Cyber Forensics and Digital evidence 5.6 Forensics Analysis of Email 5.7 Digital Forensics Lifecycle 5.8 Challenges in Computer Forensics	06
6	**Chapter 6:- Cybersecurity: Organizational Implications** 6.1 Organizational Implications: Cost of cybercrimes and IPR issues 6.2 Web threats for organizations 6.3 Security and Privacy Implications from Cloud Computing 6.4 Social media marketing 6.5 Social computing and the associated challenges for organizations, Protecting people's privacy in the organization 6.6 Organizational guidelines for Internet usage and safe computing guidelines and computer usage policy 6.7 Incident handling	07

	6.8 Intellectual property in the cyberspace of cyber security.	
7	**Chapter 7:- Cybercrime: Illustrations, Examples and Mini-Cases** 7.1Real-Life Examples 7.2 Mini-Cases 7.3 Illustrations of Financial Frauds in Cyber Domain 7.4 Digital Signature-Related Crime Scenarios 7.5 Digital Forensics Case Illustrations 7.6 Online Scams	06

References Books:

1. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives – Nina Godbole, SunitBelapure, Wiley: April 2011 India Publications Released.
2. Principles of Information Security,-Michael E Whitman, Herbert J Mattord, 3rd Edition, 2011.
3. Computer Security: Principles and Practice -William Stallings and Lawrie Brown, 3rd edition, Pearson, 2015.
4. Cyber Security Essentials- James Graham Richard Howard Ryan Olson

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Semester –V
Course Code: CA-502
Subject: Object Oriented Software Engineering

Total Hours: 48 **Total Credits: 03**

Pre Requisite: Students shall have the Basic Knowledge of Software Engineering

OBJECTIVES:

1. To understand the fundamentals of object modeling
2. To understand and differentiate Unified Process from other approaches.
3. To design with static UML diagrams.
4. To design with the UML dynamic and implementation diagrams.
5. To improve the software design with design patterns.
6. To test the software against its requirements specification.

Outcomes:

1. Students will be able to give Design Specifications for Project.
2. Students will acquire Knowledge in Basic Modeling.
3. Students will acquire Project Management Skills.

Chapter	Course Content	No of lectures
1	**Introduction and basics of Software Modelling** 1.1 Software Life Cycle Models (Revision of SE) 1.2 System Concepts 1.3 Project Organization 1.4 Communication in Project Management 1.5 Risk management in Project Management	4
2	**SRS Documentation** 2.1 SRS Specification 2.2 Requirement Elicitation **2.3** Business Engineering	4
3	**Introduction to UML** 3.1 Concept of UML 3.2 Advantages of UML	2
4	**Object Oriented Concepts and Principles** 4.1 What is Object Orientation? - Introduction , Object , Classes and Instance , Polymorphism, Inheritance 4.2 Object Oriented System Development- Introduction, Function/Data Methods (With Visibility), Object Oriented Analysis, Object Oriented Construction 4.3 Identifying the Elements of an Object Model 4.4 Identifying Classes and Objects 4.5 Specifying the Attributes (With Visibility)	4

	4.6 Defining Operations 4.7 Finalizing the Object Definition	
5	**Structural Modeling** 5.1 Classes 5.2 Relationship 5.3 Common Mechanism 5.4 Class Diagram (Minimum three examples should be covered) 5.5 Advanced Classes 5.6 Advanced Relationship 5.7 Interface 5.8 Types and Roles 5.9 Packages 5.10 Object Diagram (Minimum three examples should be covered)	**10**
6	**Basic Behavioural Modeling** 6.1 Interactions 6.2 Use Cases and Use Case Diagram with stereo types (Minimum three examples should be covered) 6.3 Interaction Diagram (Minimum two examples should be covered) 6.4 Sequence Diagram (Minimum two examples should be covered) 6.5 Activity Diagram (Minimum two examples should be covered) 6.6 State Chart Diagram (Minimum two examples should be covered)	**10**
7	**Architectural Modelling** 7.1 Component 7.2 Components Diagram (Minimum two examples should be covered) 7.3 Deployment Diagram (Minimum two examples should be covered) 7.4 Collaboration Diagram (Minimum two examples should be covered)	**6**
8	**Object Oriented Analysis** 8.1 Iterative Development and the Rational Unified Process 8.2 Inception 8.3 Understanding Requirements 8.4 Use Case Model From Inception to Elaboration 8.5 Elaboration	**4**
9	**Object Oriented Design** 9.1 The Booch Method, The Coad and Yourdon Method and Jacobson Method and Raumbaugh Method 9.2 The Generic Components of the OO Design Model	**4**

	9.3 The System Design Process - Partitioning the Analysis Model, Concurrency and Sub System Allocation, Task Management Component, The Data Management Component, The Resource Management Component, Inter Sub System Communication	
	Total	**48**

Reference Books:

Sr. No.	Title of the Book	Author's Name	Publication
1	The Unified Modeling Language User/Reference Guide,	**Grady Booch, James Rambaugh**	Pearson Education Inc
2	The Unified software development Process	**Ivar Jacobson, Grady Booch, James Rambaugh**	**Pearson Education**
3	**Agile Software development**	**Alistair Cockbair**	**Pearson Education**

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Semester –V
Course Code: CA-503
Subject: Core Java

Total Hours : 48 **Total Credits: 03**

Prerequisite:

- Student should know basics of object oriented programming.

Course Objectives:

- To introduce the object oriented programming concepts.
- To understand object oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection framework and I/o classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

Unit No.	Topic	No. of Lectures	Reference Books
1	**Java Fundamentals** 1.1 Introduction to Java. 1.1 Features of Java 1.2 Basics of Java: - Data types, variable, expression, operators, constant. 1.3 Structure of Java Program. 1.4 Execution Process of java Program. 1.5 JDK Tools. 1.6 Command Line Arguments. 1.7 Array and String: 1.7.1 Single Array & Multidimensional Array 1.7.2 String, String Buffer 1.8 Built In Packages and Classes : 1.8.1 java.util:- Scanner, Date, Math etc. 1.8.2 java.lang	8	1,2
2	**Classes, Objects and Methods** 2.1 Class and Object 2.2 Object reference 2.3 Constructor: Constructor Overloading 2.4 Method: Method Overloading, Recursion, Passing and Returning object form Method 2.5 new operator, this and static keyword, finalize() method 2.6 Nested class, Inner class, and Anonymous inner class	8	1,2

3	**Inheritance, Package and Collection** 3.1 Overview of Inheritance 3.2 inheritance in constructor 3.3 Inheriting Data members and Methods, 3.4 Multilevel Inheritance – method overriding Handle multilevel constructors 3.5 Use of super and final keyword 3.6 Interface: 3.7 Creation and Implementation of an interface, Interface reference 3.8 Interface inheritance 3.9 Dynamic method dispatch 3.10 Abstract class 3.11 Comparison between Abstract Class and interface **3.12** Access control **3.13 Packages** 3.13.1 Packages Concept 3.13.2 Creating user defined packages 3.13.3 Java Built inpackages 3.13.4 Import statement, Static import 3.14 **Collection** 3.14.1 CollectionFramework. 3.14.2 Interfaces: Collection, List, Set 3.14.3 Navigation: Enumeration, Iterator, ListIterator 3.14.4 Classes: LinkedList, ArrayList, Vector, HashSet	10	
4	**File and Exception Handling** **Exception** 4.1 Exception and Error 4.2 Use of try, catch, throw, throws and finally 4.3 Built in Exception 4.4 Custom exception 4.5 Throwable Class. **File Handling** 4.6 Overview of Different Stream (Byte Stream, Character stream) 4.7 Readers and Writers class 4.8 File Class 4.9 File Input Stream , File Output Stream 4.10 Input Stream Reader and Output Stream Writer class 4.11 FileReader and FileWriter class 4.12 Buffered Reader class.	8	1,2,3
5	**Applet, AWT, Event and Swing Programming** **Applet** 5.1 Introduction 5.2 Typesapplet 5.3 Applet Lifecycle 5.3.1 Creatingapplet 5.3.2 Applet tag	14	1,2,3,4

	5.4 AppletClasses 5.4.1 Color 5.4.2 Graphics 5.4.3 Font **AWT** 5.5 Components and container used inAWT 5.6 Layoutmanagers 5.7 Listeners and Adapterclasses 5.8 Event Delegationmodel **Swing** 5.9 Introduction to Swing Componentand Container Classes 5.10Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JTable, JComboBox, Swing Menus, Dialogs,JFileOpen,JColorChooser.		
	Total Lectures	**48**	

Reference Books:

1. Programming with JAVA - EBalgurusamy
2. The Complete Reference – JAVA HerbertSchildt
3. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
4. Java Programming and Object-oriented Application Development, R. A. Johnson, Ceng

T.Y.B.B.A.(C.A.) Semester –V
Course Code: CA-504
Subject: MongoDB

Total Hours: 48 **Total Creidts:03**

Prerequisites:

- Knowledge of database concepts
- Basic understanding of Big Data platforms

Objectives:

1. Understand importance of NoSQL Databases.
2. Learn various MongoDB commands and MongoDB design goals.
3. Design basic and general-purpose database using MongoDB.

Outcomes:

- Learned to work with MongoDB shell and MongoDB tools.
- Able to do Schema design, Data modelling and all sorts of CRUD Operations.
- Learned to optimize query performance.
- Become capable to analyze the data stored in MongoDB.

Unit	Topic	No. of lectures
1	**Introduction to NoSQL Databases** 1.1 Introduction to NoSQL Databases 1.2 Difference between NoSQL and RDBMS 1.3 Need of NoSQL Databases 1.4 Application of NoSQL Databases 1.5 Types of NoSQL Databases 1.6 What is MongoDB? 1.7 Features of MongoDB	5
2	**MongoDB Basics** 2.1 Installing MongoDB 2.2 MongoDB Server and Database, MongoDB tools 2.3 Collection, Documents and Key-Values 2.4 Data Modeling Concepts 2.4.1 Why Data Modeling? Data Modeling Approach 2.4.2 Analogy between RDBMS & MongoDB Data Model, MongoDB Data 2.4.3 Model (Embedding & Linking) 2.4.4 Challenges for Data Modeling in MongoDB 2.4.5 Data Model Examples and Patterns 2.5 Mongo shell Commands to create, delete database, collection & documents 2.6 MongoDB Datatypes 2.7 Inserting and saving documents 2.7.1 Batch Insert 2.7.2 Insert Validation 2.8 MongoDB GUI like compass	12
3	**MongoDB CRUD Operations**	14

	3.1 MongoDB Development Architecture 3.2 MongoDB Production Architecture 3.3 MongoDB CRUD Introduction, MongoDB CRUD Concepts 3.4 MongoDB CRUD Concerns (Read & Write Operations) 3.5 Concern Levels, Journaling 3.6 Cursor Query Optimizations, Query behaviour in MongoDB 3.7 Distributed Read & Write Queries 3.8 MongoDB CRUD Syntax & Queries	
4	**MongoDB Index and Aggregation** 4.1 Index Introduction, Index Concepts, Index Types, Index Properties 4.2 Index Creation and Indexing Reference 4.3 Introduction to Aggregation 4.4 Approach to Aggregation 4.5 Types of Aggregation (Pipeline, MapReduce & Single Purpose) 4.6 Performance Tuning.	**8**
5	MongoDB Administration 5.1 Administration concepts in MongoDB 5.2 Monitoring issues related to Database 5.3 Monitoring at Server, Database, Collection level, and various Monitoring tools related to MongoDB 5.4 Database Profiling, Locks, Memory Usage, No of connections, page fault 5.5 Backup and Recovery Methods for MongoDB 5.6 Export and Import of Data to and from MongoDB 5.7 Run time configuration of MongoDB 5.8 Production notes/ best practices 5.9 Data Managements in MongoDB (Capped Collections/ Expired data from TTL), Hands on Administrative Tasks.	**9**
Total		**48**

Reference books:

1. MongoDB Basicsby Peter Membrey, David Hows, EelcoPlugge
2. MongoDB RecipesWith Data Modeling and Query Building StrategiesbySubhashiniChellappan, DharanitharanGanesan
3. MongoDB Simply In DepthbyAjit Singh, Sultan Ahmad

Subject Code: 504
Subject: Python

Total Hours :- 48 **Total Credits: 03**

Prerequisites:

1. Experience with a high level language (C/C++, Java, MATLAB) is suggested.
2. Prior knowledge of a scriptinglanguage (Perl, UNIX/Linux shells) and Object-Oriented concepts is helpful but not mandatory.

Course Objectives:

1. To learn and understand Python programming basics and paradigm.
2. To learn and understand python looping, control statements and string manipulations.
3. Students should be made familiar with the concepts of GUI controls and designing GUI applications.
4. To learn and know the concepts of file handling, exception handling.

Course Outcomes: On completion of the course, student will be able

1. Define and demonstrate the use of built-in data structures "lists" and "dictionary".
2. Design and implement a program to solve a real world problem.
3. Design and implement GUI application and how to handle exceptions and files.

Unit	Details	Lectures
I	**Unit 1: Introduction to Python** 1.1 History, feature of Python, setting up path, working with python Interpreter, basic syntax, variable and data types, operators 1.2 **Conditional statements**-If, If-Else, nested if-else, Examples. 1.3 **Looping-**For,While,Nested loops, Examples 1.4 **Control Statements**-Break, Continue, Pass. 1.5 **String Manipulation**-Accessing String, Basic Operations, String Slices, Function and Methods, Examples. 1.6 **Lists**-Introduction, accessing list, operations, working with lists, function & methods. 1.7 **Tuple**-Introduction, Accessing tuples, operations working, function & methods, Examples. 1.8 **Dictionaries**-Introduction, Accessing values in dictionaries, working with dictionaries, properties, function, Examples. 1.9 **Functions**-Defining a function, calling a function, types of function, function arguments, anonymous function, global & local variable, Examples.	**16**
II	**Unit 2: Modules and Packages** **2.1Built in Modules** 2.1.1 Importing modules in python program 2.1.2 Working with Random Modules. 2.1.3 E.g. - built-ins, time, date time, calendar, sys, etc **2.2 User Defined functions** 2.2.1Structure of Python Modules **2.3 Packages** 2.3.1 Predefined Packages 2.3.2User defined Packages	**6**
III	**Unit 3: Classes ,Objects and Inheritance** **3.1 Classes and Objects** 3.1.1 Classes as User Defined Data Type 3.1.2 Objects as Instances of Classes 3.1.3 Creating Class and Objects 3.1.4 Creating Objects By Passing Values 3.1.5 Variables & Methods in a Class **3.2 Inheritance** 3.2.1 Single Inheritance 3.2.2 Multilevel Inheritance	**8**

	3.2.3 Multiple Inheritance 3.2.4 Hybrid Inheritance 3.2.5 Hierarchical Inheritance 3.2.6 IS-A Relationship and HAS-A Relationship	
IV	**Unit 4: Exception Handling** 4.1 Python Exception 4.2 Common Exception 4.3 Exception handling in Python (try-except-else) 4.4 The except statement with no exception 4.5 Multiple Exception 4.6 The try-finally clause 4.7 Custom Exception and assert statement	**4**
V	**Unit 5: GUI Programming** 5.1 Introduction 5.2 Tkinter programming 5.4 Tkinter widgets 5.5 Frame 5.6 Button 5.7 Label 5.8 Entry	**10**
VI	**Unit 6: Python Libraries** 6.1 Statistical Analysis- NumPy, SciPy, Pandas, StatsModels 6.2 Data Visualization- Matplotlib, Seaborn, Plotly 6.3 Data Modelling and Machine Learning- Scikit-learn, XGBoost, Eli5 6.4 Deep Learning- TensorFlow, Pytorch, Keras 6.5 Natural Language Processing (NLP)- NLTK, SpaCy, Gensim	**4**

Reference Books:

1.Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010
2.Dive into Python, Mike
3. Learning Python, 4th Edition by Mark Lutz
4. Programming Python, 4th Edition by Mark Lutz
5.Python Programming:An introduction to computer,John Zelle,3rd Edition.

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Sem-V
Subject Code: 505

Subject: (DSE) Project

Total Credits: 04

For the evaluation/ conduction of project separate guidelines will be provided.

T.Y.B.B.A.(C.A.) Sem-V
Subject Code: 506
Subject: Computer Laboratory Based on 503 and 504(2 credits each)

Total Credits: 04

For the conduction of practicals, practical assignments are given in the lab book.

Savitribai Phule Pune University

T.Y.B.B.A.(C.A.)Sem-V (CBCS 2019 Pattern)
Subject Code: CA-507
Subject: Internet of Things (IoT)

Total Hours: 30 **Total Credits: 02**

Prerequisite:

Basic knowledge of Internet, Networking, and Electronics.

Course Objectives:

1. To understand Technical aspects of Internet of things.
2. To describe smart objects and IoT Architecture.
3. To study and compare different Application protocols ofIoT.
4. To understand IoT platform using Arduino Uno.

Course Outcomes: Students will be able

1. To explain key technologies, smart objects, IoT Architecture and security in Internet of Things.
2. To illustrate the role of IoT protocols for efficient network communication.
3. To understand IoT platform such as Arduino Uno.

Unit No.	Contents Theory	No. of Lectures
1	**Fundamentals of IoT** 1.1 Basic Concepts of IoT 1.2 Major components of IoT devices 1.3 IOT Architecture 1.4 Pros & Cons of IOT	03
2	**Communication Technologies** 2.1 Wireless Communication: Bluetooth, ZigBee, WiFi, RF Links 2.2 Wired Communication: Ethernet 2.3 IOT Protocol: MQTT, CoAP, XMPP, OSGi	05
3	**Microcontroller Fundamental and Arduino uno** 3.1 System on Chip & Microcontroller 3.2 Arduino UNO: Introduction to Arduino, Arduino UNO, Arduino Board, The Anatomy of an Arduino Board 3.3 The Development Environment of Arduino Board 3.4 Writing Arduino Software, The Arduino Sketch 3.5 Fundamentals of Arduino Programming 3.6 Trying the code on an Arduino Emulator 3.7 Arduino Libraries 25 Programming & Interfacing 3.8 Application of IoT 3.9 Case studies: Home Automation, Smart Parking, etc.	07
Total		**15**
Practical Please Refer Lab Book		**15**

Reference Books:

1. Learning internet of things by Waher, Peter -Packt Publishing Ltd, 2015
2. "Fundamentals of Wireless Sensor Networks: Theory and Practice" by WaltenegusDargie,

Christian Poellabauer
3. Internet of Things (A Hands-on-Approach) by Vijay Madisetti , ArshdeepBahga
4. Designing the Internet of Things by Adrian McEwen, Hakim Cassimally
5. Internet of Things with Arduino Cookbook by Schwartz, M. - Packt Publishing Ltd.
6. "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, 1st Edition, Pearson Education (Cisco Press Indian Reprint)
7. "Internet of Things" by Srinivasa K G, CENGAGE Leaning India, 2017
8. Computer Networks by Tanenbaum, Andrew S - Pearson Education Pte. Ltd., Delhi, 4th Edition
9. Data and Computer Communications; By: Stallings, William - Pearson Education Pte. Ltd., Delhi, 6th Edition

TYBBA (CA) Sem VI Syllabus

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)

Subject Code: CA-601

Subject: Recent Trends in IT

Total Hours: 48 **Total Credits: 3+1=4**

Prerequisites:

1. Basic knowledge of related programming and database concepts.

2. Fundamentals of Mathematical logic & Data structures.

Course Objectives

1. To introduce upcoming trends in Information technology.
2. To study Eco friendly software development concepts.
3. To provide a strong foundation of fundamental concepts in Artificial Intelligence.
4. To evaluate the performance of various data mining task.
5. To understand Data analytics using Spark Programming.

Course Outcomes: On completion of the course, student will be able

1. To discuss the basic concepts AI.
2. To apply basic, intermediate and advanced techniques to mine the data.
3. To provide an overview of the concept of Spark programming.

Unit No.	Contents	No. of Lectures
1	**Introduction to recent trends** 1.1 Artificial Intelligence 1.2 Data Warehouse 1.3 Data Mining 1.4 Spark	02
2	**Artificial Intelligence** 2.1 Introduction& Concept of AI 2.2 Applications of AI 2.3 Artificial Intelligence, Intelligent Systems, Knowledge –based Systems, AI Techniques 2.4 Early work in AI & related fields. 2.5 Defining AI problems as a State Space Search 2.6 Search and Control Strategies 2.7 Problem Characteristics 2.8 AI Problem: Water Jug Problem, Tower of Hanoi, Missionaries & Cannibal Problem	08
3	**AI Search Techniques** 3.1 Blind Search Techniques: BFS, DFS, DLS, Iterative deepening Search, Bidirectional Search, and Uniform cost Search 3.2 Heuristic search techniques: Generate and test, Hill Climbing, Best First search, Constraint Satisfaction, Mean-End Analysis, A*, AO*	08
4	**Data Warehousing** 4.1 Introduction to Data warehouse 4.2 Structure of Data Warehouse 4.3 Advantages & uses of Data Warehouse 4.4 Architecture of Data Warehouse 4.5 Multidimensional data model	08

	4.6 OLAP Vs. OLTP 4.7 OLAP Operations 4.8 Types of OLAP Servers: ROLAP versus MOLAP versus HOLAP	
5	**Data Mining** 5.1 Introduction to Data Mining 5.2 Data mining Task 5.3 Data mining issues 5.4 Data Mining versus Knowledge Discovery in Databases 5.5 Data Mining Verification vs. Discovery 5.6 Data Pre-processing – Need, Data Cleaning, Data Integration & Transformation, Data Reduction 5.7 Accuracy Measures: Precision, recall, F-measure, confusion matrix, cross-validation, bootstrap 5.8 Data Mining Techniques 5.9 Frequent item-sets and Association rule mining: Apriori algorithm, FP tree algorithm 5.10 Graph Mining: Frequent sub-graph mining 5.11 Software for data mining : R, Weka, Sample applications of data mining 5.12 Introduction to Text Mining, Web Mining, Spatial Mining, Temporal Mining	**12**
6	**Spark** 6.1 Introduction to Apache Spark 6.2 Spark Installation 6.3 Apache Spark Architecture 6.4 Components of Spark 6.5 Spark RDDs 6.6 RDD Operations: Transformation & Actions 6.7 Spark SQL and Data Frames 6.8 Introduction to Kafka for Spark Streaming	**10**
Total		**48**

Reference Books:

1. Artificial Intelligence by Elaine Rich, Kevin Knight - Tata McGraw Hill, 2nd Edition
2. Artificial Intelligence: A new Synthesis, Nilsson, Elsevier,ISBN 9788181471901
3. Data Mining Concepts and Techniques, by Jiawei Micheline Kamber, Morgan Kauf Mann Publishers.
4. Advanced Analytics with Spark by Sandy RyzaPublicatio O'REILLY
5. Apache Spark for Data Science Cookbook by Padma Priya Chitturi

Savitribai Phule Pune University

T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)
Subject Code: CA-602
Subject: Software Testing

Total Hours: 48 **Total Credits: 3**

Prerequisite:

1. Students shall have basic Knowledge of Software Engineering.
2. Students shall have basic Knowledge of OOSE.

Objectives:

1. To provide learner with knowledge in Software Testing techniques.
2. To understand how testing methods can be used as an effective tool in providing quality assurance for software.
3. To provide skills to design test case plan for testing software.

Outcomes:

1. Students will be introduced to testing tools.
2. Students will acquire Knowledge of Basic SQA.
3. Students will be able to design basic Test Cases.

Chapter	Course Content	No of lectures
1	**Introduction** 1.1 Introduction, Nature of errors, 1.2 Testing Objectives 1.3 Testing principles 1.4 Testing fundamentals, 1.5 Software reviews, Formal Technical reviews, 1.6 Inspection and walkthrough 1.7 Testing Life Cycle	**10**
2	**Approaches to Testing –Testing Methods** 2.1 White Box Testing and types of white box testing 2.2 Test Case Design 2.3 Black Box Testing and types of black box testing 2.4 Gray Box Testing	**5**
3	**Software Testing Strategies &Software metrics** 3.1 Software Testing Process 3.2 Unit Testing 3.3 Integration- Top-down ,Bottom up 3.4 System Testing 3.5 Acceptance Testing (alpha, Beta testing) 3.6 Validation and Verification 3.7 Big Bang Approach 3.8 Sandwich approach 3.9 Performance Testing 3.10 Regression Testing 3.11 Smoke Testing 3.13 Load Testing	**10**
4	**Software metrics** 4.1 Introduction 4.2 Basic Metrics –size-oriented metric, Function –oriented metric 4.3 Cyclometic Complexity Metrics Examples on Cyclometic Complexity	**10**
5	**Testing for Specialized Environments** 5.1 Testing GUI's 5.2 Testing of Client/Server Architectures 5.3 Testing Documentation and Help Facilities 5.4 Testing for Real-Time Systems	**5**

6	**Testing Tools& Software Quality Assurance (Introduction)** 6.1 JUnit, Apache JMeter, Win runner 6.2 Load runner, Rational Robot 6.3 Quality Concepts, Quality Movement, Background Issues, SQA activities 6.4 Formal approaches to SQA 6.5 Statistical Quality Assurance 6.6 Software Reliability 6.7 The ISO 9000 Quality Standards 6.8 SQA Plan 6.9 Six sigma 6.10 Informal Reviews	**8**
	Total	**48**

Reference Books:

Sr. No.	Title of the Book	Author's Name	Publication
1.	**Software Engineering – A Practitioner's approach**	**Roger S Pressman**	**7th Edition Tata McGraw-Hill**
2.	Effective Methods of Software Testing.	**William E Perry**	Wiley Publishing Inc
3.	**Software Testing Principles and Practices**	**Srinivasan Desikan, Gopalswamy Ramesh**	**Pearson Publication**
4.	**Total Quality Management**	**DaleH. Besterfield,**	**Prentice Hall, 2003**

Savitribai Phule Pune University

T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)
Subject Code: CA-603
Subject: Advanced Java

Total Hours: 48 **Total Credits: 3**

Prerequisite: Students should know basic programming concepts.

Objectives -:

1. To know the concept of Java Programming.
2. To understand how to use programming in day to day applications.

3. To develop programming logic.

Outcomes:

1. Students will know the concepts of JDBC Programming.
2. Students will know the concepts of Multithreading and Socket Programming.
3. Students will know the concepts of Spring and Hibernate.
4. Students will develop the project by using JSP and JDBC.
5. Students will develop applications in Spring and hibernate.

Sr. No	**Topic**	Number Of Lectures
1.	**JDBC** 1.1 Introduction 1.2 JDBC Architecture. 1.3 JDBC Process 1.4 **Working with ResultSet Interface.**	**8**
2	**Multithreading:** 2.1 Introduction to Multithreading. 2.2 Thread creation: Thread Class, Runnable Interface. 2.3 Life cycle of Thread. 2.4 Thread Priority. 2.5 Execution of Thread Application. 2.6 Synchronization and Interthread communication.	**12**
3	**Networking:** 3.1 Overview of Networking. 3.2 Networking Basics: Port Number, Protocols and classes. 3.3 Sockets, Reading from and Writing to a Socket.	**5**
4	**Servlet and JSP** 4.1 Introduction to Servlet 4.2 Types of Servlet: Generic Servlet and Http Servlet 4.3 Life cycle of servlet 4.4 Session Tracking. 4.5 Servlet with database. **JSP** 4.6 Introduction to JSP. 4.7 JSP Life Cycle. 4.8 Components of JSP. 4.9 JSP with Database.	**12**
5	**Spring & Hibernate** **Spring:** 5.1 Introduction 5.2 Applications and Benefits of spring 5.3 Architecture and Environment Setup 5.4 Hello World Example 5.5 Core Spring- IoC Containers, Spring Bean Definition, Scope, Lifecycle **Hibernate** 5.6 Architecture and Environment 5.7 Configuration, Sessions, Persistent Class 5.8 Mapping Files, Mapping Types 5.9 Examples	**11**

Reference Books:

1. The Complete Reference – JAVA Herbert Schildt
2. Professional Hibernate, by Eric Pugh, Joseph D. Gradecki by Wiley Publishing, Inc., ISBN: 0- 7645-7677-1
3. Spring In Action, Craig Walls, Ryan Breidenbach, Manning Publishing Co., ISBN: 1-932394- 35-4
4. Head First Servlets and JSP: Passing the Sun Certified Web Component Developer Exam -2nd Edition-Bryan Basham, Kathy Sierra, Bert Bates- O'REILLY.

Savitribai Phule Pune University

T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)
Subject Code: CA-604
Subject: Android Programming

Total Hours: 48 **Total Credits: 3**

Pre-requisite:

1. Concepts of OOP's.
2. Basic Knowledge About JAVA Programming

Objective:

1. To understand the Android Operating System and develop applications using Google's Android open-source platform.
2. To understand the issues relating to Wireless applications.

Outcome:

1. Student will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more.
2. Demonstrate their understanding of the fundamentals of Android operating systems
   Demonstrate their skills of using Android software development tools

Unit	Topic	No. of lectures
1	**INTRODUCTION TO Android Programming** 1.1 What is Android? 1.2 History and Versions 1.3 Android Architecture 1.4 Basic Building Blocks 1.5 Android API Levels 1.6 Application Structure 1.7 First Hello World Program	**04**
2	**ACTIVITY, INTENT AND LAYOUT** 2.1 Introduction to Activity 2.2 Activity life cycle 2.3 Introduction to Intent 2.4 Types of Intent(Implicit and Explicit Intent) 2.5 Layout Manager 2.5.1View and View Group 2.5.2 Linear Layout 2.5.3 Relative Layout 2.5.4 Table Layout 2.5.5 Grid Layout 2.5.6 Constraint Layout 2.5.7 Frame Layout 2.5.8 Scroll Layout	**07**
3	**BASIC UI DESIGN** 3.1 Button(Push Button, Check Box, Radio Button, Toggle Button, Image Button) 3.2 Text Fields 3.3 Spinner 3.4 List View 3.5 Toast 3.6 Scroll View 3.6 ProgressBar View 3.7 Auto Complete Text View 3.8 Dialog Box 3.8.1 Alert Dialog. 3.8.2 DatePicker Dialog. 3.8.3 TimePicker Dialog. 3.8.4 Custom Dialog.	**10**
4	**ADAPTER AND MENU** 4.1 Base Adapter 4.2 Array Adapter 4.3 ListView using Adapter 4.4GridView using Adapter 4.5Photo Gallery using Adapter	**05**

	4.6 Using Menu with Views 4.6.1 Option Menu 4.5.2 Context Menu 4.5.3 Popup Menu	
5	**THREADS AND NOTIFICATION** 5.1 Worker thread 5.2 Handlers & Runnable 5.3 AsynTask (in detail) 5.4 Broadcast Receiver 5.5 Services 5.5.1Service life Cycle 5.5.2 Bounded Service 5.5.2 Unbounded Service 5.6 Notification 5.7 Alarm 5.8 Accessing Phone services(Call,SMS)	**06**
6	**CONTENT PROVIDER** 6.1Content Providers 6.2 SQLite Programming 6.3 SQLiteOpenHelper 6.4 SQLiteDatabse 6.5 Cursor 6.6 Searching for content 6.7 Adding, changing, and removing content 6.8 Building and executing queries 6.9 Android JSON	**08**
7	**LOCATION BASED SERVICES AND GOOGLE MAP** **7.1** Display Google Maps 7.1.1 Creating the project 7.1.2 Obtaining the Maps API Key 7.1.3 Displaying the Map 7.1.4 Displaying the Zoom Control 7.1.5 Changing Views 7.1.6 Navigating to a specific location 7.1.7 Adding Markers 7.1.8 Getting the location that was touched 7.1.9 Geocoding and Reverse Geocoding 7.2. Getting Location Data 7.3. Monitoring a Location	**08**
	Total Lectures	**48**

Reference Books:

1. Beginning Android4 Application Development, By Wei-Meng Lee WILEY India Edition WROX Publication
2. Professional Android 4 Application Development, By Reto Meier WROX Publication
3. The official site for Android developers - https://developer.android.com

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)
Subject Code: CA-604
Subject: Dot Net Framework

Total Hours: 48 **Total Credits: 3**

Course Prerequisites:

Student should have basic knowledge of:

- Visual Basic
- HTML
- Object Oriented concepts
- Ms-Access, Mysql, SQL Server

Course Objectives:

- To learn Microsoft framework architecture.
- Understand development of windows application.
- To learn data access mechanism.
- Create and consume libraries.
- Create a web application.
- To develop the website and application.

Course Outcome:

- Use the features of Dot Net Framework along with the features of VB, C# and ASP
- Design and develop window based and web based .NET applications.
- Design and develop a Website.
- Design and Implement database connectivity using ADO.NET for VB, C# and ASP.

Sr.No	Chapter Name	No.of Lectures
1	**Introduction to DOT NET FRAMEWORK** 1.1 What is Framework? 1.2 Architecture of Dot Net Framework 1.2.1 Common Language Runtime 1.2.2 Common Type System(CTS) 1.2.3 Common Language Specification(CLS) 1.2.3 JIT Compilers 1.2.3 Base Class Library 1.3 IDE (Integrated Development Environment) 1.4 Event Driven Programming	5
2	**Introduction to VB.Net** 2.1 Basics of VB.Net 2.1.1 Operators 2.1.2 Data Types 2.1.3 Control Structures 2.2Build Windows Applications 2.2.1 Controls: Form, TextBox, Button, Label, CheckBox, ListBox, ComboBox, RadioButton, DateTimePicker, MonthCalender, Timer, Progressbar,Scrollbar, PictureBox, ImageBox, ImageList, TreeView, ListView, Toolbar, StatusBar, Datagridview 2.2.2 Menus and PopUp Menu 2.2.3 Predefined Dialog controls: Color,Save,File,Open, Font 2.2.4 DialogBox - InputBox(), MessageBox, MsgBox()	11
3	**Introduction to C#** 3.1 Language Fundamentals 3.1.1 Data type and Control Constructs 3.1.2 Value and Reference Types,Boxing 3.1.3 Arrays 3.1.4 String class and its various operations 3.1.5 Functions 3.2 Object Oriented Concepts 3.2.1 Defining classes and Objects	12

	3.2.2 Access modifiers 3.2.3 Constructors 3.2.4 Inheritance 3.2.5 Interface 3.2.6 Abstract Class 3.2.7 Method Overloading and Overriding 3.2.8 Delegates	
4	**Introduction to ASP.NET** 4.1 What isASP.NET? 4.2 ASP.NET Page Life Cycle 4.3 Architecture ofASP.NET 4.4 Forms, WebPages, HTML forms, 4.5 Request & Response in Non-ASP.NET pages 4.6 Using ASP.NET Server Controls 4.7 Overview of Control structures 4.8 Functions 4.9 HTML events 4.9.1 ASP.NET Web control events 4.9.2 Event driven programming and postback 4.10 Introduction to Web forms 4.10.1 Web Controls 4.10.2 Server Controls 4.10.3 Client Controls 4.10.4 Navigation Controls 4.10.5 Validations 4.10.6 Master Page 4.10.7 State Management Techniques	10
5	**Architecture of Ado.Net** 5.1 Basics of Ado.net 5.1.1Connection Object 5.1.2Command Object 5.1.3Dataset 5.1.4Data Table 5.1.5Data Reader Object 5.1.6Data Adapter Object 5.2 Datagridview& Data Binding: Insert, Update, Delete records 5.3 Navigation Using Data Source	10
Total		48

Reference Books:

- Beginning Visual C#, WroxPublication
- **BeginningASP.NET3.5,WroxPublication**
- **ProgrammingASP.NET3.5byJesseLiberty,DanMaharry,DanHurwitz,O'Reilly**
- Programming Microsoft Visual Basic.NET – Francesco Balena
- The Complete Reference -Visual Basic .NET – Jefrey R. Shapiro
- ADO.NET Examples and Best Practices for C# Programmers, By Peter D, Blackburn, William
- VB.NET database programming with ADO.NET -Anne Prince and Doug Lowe

Savitribai Phule Pune University

T.Y.B.B.A.(C.A.) Semester-VI

Subject: Project

Course Code : DSE– 605

Total Credits: 04

For the evaluation / conduction of project separate guidelines will be provided.

T.Y.B.B.A.(C.A.) Semester-VI
Subject: Computer Laboratory Based on 603 and 604(2 credits each)
Course Code: 606
Total Credits: 04

For the conduction of practical's, Practical Assignments are given in the Lab book.

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Semester-VI
Subject: Soft Skill
Course Code : CA – 607

Total Hours: 30 **Credit:02**

Prerequisite:

1. Basic Writing Skills in English including grammar.
2. Basic knowledge in communication and a good understanding of English.
3. Ready to adhere the new techniques.

Objectives:

1. It helps participants to communicate effectively and to carry themselves confidently.
2. They also learn how to identify and overcome the barriers in interpersonal relationships.

3. To improve oral and written communication, teamwork, leadership, problem-solving and decision-making skills, to gain best results.
4. This course is useful for landing a great job, building a career and also finding employment as soft skills trainers.

Outcomes:

1. Understand the significance and essence of a wide range of soft skills
2. Learn how to apply soft skills in a wide range of routine social and professional settings.
3. Learn how to employ soft skills to improve interpersonal relationships.
4. Learn how to employ soft skills to enhance employability and ensure workplace and career success.

Unit	Topics	No. of Lectures
1	**Introduction to Soft Skills** 1.1 An Introduction to Soft skill - 1.1.1 Definition and Significance of Soft Skills 1.1.2 Soft skill Process 1.1.3 Uses of Soft Skill Development.	02
2	**Communication Skills** 2.1 Introduction - Components of communication process, Communication process , Effective communication process. 2.2 Types of communication – 2.2.1 Verbal Communication – • Punctuation • Meaning & opposites , vocabulary • Real Life conversations 2.2.2 Non – Verbal Communication - • Facial Expression , Posture , Gesture , Eye contact • appearance (dress code), Body Language, listening skills • essential formal writing skills	04
3	**Skills Development** 3.1 Interview Skills – Interviewer and Interviewee – in-depth perspectives. Before, During and After the Interview. Tips for Success. 3.2 Presentation Skills - Types, Content, Audience Analysis, Essential Tips Before, During and After, Overcoming Nervousness. 3.3 Etiquette and Manners - Social and Business 3.4 Time Management - Concept, Essentials, Tips 3.5 Personality Development - Meaning, Nature, Features,	05

	Stages, Models, Learning Skills, Adaptability Skills.	
4	**Skill Implementation** 4.1 Resume writing – 4.1.1 How to write your resume. • Contact details. • Opening statement. • List of key skills. • List of technical/software skills. • Personal attributes/career overview. • Educational qualifications. • Employment history /volunteering/work placements. • References/referees. 4.1.2 Types of resume 4.2 Group Discussion - Importance, Planning, Elements, and Skills assessed, Effectively disagreeing, Initiating, Summarizing and Attaining the Objective. 4.3 Teamwork and Leadership Skills - Concept of Teams, Building effective teams, Concept of Leadership and honing Leadership skills , A Good Leader, Leaders and Managers , Types of Leaders , Leadership Behaviour.	04
Total		15
Practical Please Refer Lab Book		15

Reference Books :

1. Managing Soft Skills for Personality Development – edited by B.N.Ghosh, McGraw Hill India, 2012.
2. English and Soft Skills – S.P.Dhanavel, Orient Blackswan India, 2010.
3. Soft skills Training – A workbook to develop skills for employment by Fredrick H. Wentz .
4. Personality Development and Soft skills, Oxford University Press by Barun K. Mitra
5. The Time Trap : the Classic book on Time Management by R. Alec Mackenzie