Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Empowered Autonomous)

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION
Nelson Mandela Marg, Vasant Kunj, New Delhi 110070
www.aicte-india.org

Four Year Degree Program in BBA (C.A)

(Faculty of Commerce & Management)

CBCS Syllabus

FYBBA (C.A.) Semester –I & II

For Department of BBA (Computer Application)

Tuljaram Chaturchand College, Baramati

Choice Based Credit System Syllabus (2024 Pattern)

To be implemented from Academic Year 2024-2025

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Title of the Programme: F.Y.BBA (Computer Application)

Preamble

AES's Tuljaram Chaturchand College has made the decision to change the syllabus of across various faculties from June, 2024 by incorporating the guidelines and provisions outlined in the National Education Policy (NEP), 2020. The NEP envisions making education more holistic and effective and to lay emphasis on the integration of general (academic) education, vocational education and experiential learning. The NEP introduces holistic and multidisciplinary education that would help to develop intellectual, scientific, social, physical, emotional, ethical and moral capacities of the students. The NEP 2020 envisages flexible curricular structures and learning based outcome approach for the development of the students. By establishing a nationally accepted and internationally comparable credit structure and courses framework, the NEP 2020 aims to promote educational excellence, facilitate seamless academic mobility, and enhance the global competitiveness of Indian students. It fosters a system where educational achievements can be recognized and valued not only within the country but also in the international arena, expanding opportunities and opening doors for students to pursue their aspirations on a global scale.

In response to the rapid advancements in science and technology and the evolving approaches in various domains of BBA (Computer Application) and related subjects, the Board of Studies in BBA (Computer Application) at Tuljaram Chaturchand College, Baramati - Pune, has developed the curriculum for the first semester of F.Y. BBA (Computer Application), which goes beyond traditional academic boundaries. The syllabus is aligned with the NEP 2020 guidelines to ensure that students receive an education that prepares them for the challenges and opportunities of the 21st century. This syllabus has been designed under the framework of the Choice Based Credit System (CBCS), taking into consideration the guidelines set forth by the National Education Policy (NEP) 2020, LOCF (UGC), NCrF, NHEQF, Prof. R.D. Kulkarni's Report, Government of Maharashtra's General Resolution dated 20th April and 16th May 2023, and the Circular issued by SPPU, Pune on 31st May 2023.

BBA (Computer Application) is Undergraduate Degree Program with Computer Applications and Management Subjects. This program provides sound knowledge of theory and practical's. The different subjects helps the students to design, develop and implement software Applications, to learn emerging computer technologies and produce skilled human resource to face the professional challenges.

Overall, revising the BBA (Computer Application) syllabus in accordance with the NEP 2020 ensures that students receive an education that is relevant, comprehensive, and prepares them to navigate the dynamic and interconnected world of today. It equips them with the knowledge, skills, and competencies needed to contribute meaningfully to society and pursue their academic and professional goals in a rapidly changing global landscape.

Programme Outcome for NEP 2020 (With Effect from June 2024-25)

Commerce and Management (Under Graduate Programme)

PO1: A Fundamental Knowledge and Coherent Understanding:

Student should be able to acquire broad multidisciplinary knowledge in different educational domains and their links to various field of study like Banking, Accounting, Management, Logistics, Marketing, Human Resource Management and Computer Science and Applications.

PO2: Procedural Knowledge for Skill Enhancement:

Students should be able to acquired complete procedural knowledge for deep understanding of every subject and enhancing the subject skills.

PO3: Critical Thinking and Problem-Solving Skills:

Students should be able to solve all types of issues in both known and unknown circumstances, as well as apply what they have learned to real-life situations. Students will be able to conduct investigation on complex problem solving through the design of experiments, analysis and interpretation of data to arrive at valid conclusion.

PO4: Communication Skills:

With the help of various languages students will enhance the communication skills which will improve the personality of the students with the help of interpersonal and intrapersonal communication skills. Students should be able to construct logical arguments using correct technical language related to a field of learning. Also Students should be able to communicate effectively, analyze the concepts and participate in healthy arguments and portray skill in communication and in writing. Possess skills related with banking and other business.

PO5: Analytical Reasoning Skills:

The students should be able to demonstrate the capability to evaluate the reliability and relevance of situation and select the proper course of action. Strengthen analytical skills in business operations and analyze the positive aspects and limitations of conducting trade and trade-related activities according to their extensive knowledge.

PO6: Innovation, Employability and Entrepreneurial Skills:

The students should be able to identify opportunities and pursue those opportunities to create value and wealth for the betterment of the individual and society at large as well

as be suitable for employment, as an entrepreneur focused, and serve as a role model for ethical and responsible economic professionals.

PO7: Multidisciplinary Competence:

The student should be able to demonstrate the acquisition of knowledge of the values and beliefs of multiple disciplines. The student should be able to perceive knowledge as an environmental friendly, extensive, interconnected, and interconnected faculty of consciousness that encourages design, interpersonal, and empathetic and understanding environmental challenges across disciplines.

PO8: Value Inculcation through Community Engagement:

The students should be able to implement the acquired knowledge and attitude to embrace constitutional, humanistic, ethical, and moral values in life. Students should be able to participate in community-engaged activities for promoting the well being of the society.

PO9: Traditional Knowledge into Modern Application:

Students should be able to acquire and apply traditional knowledge system in to modern and professional domain.

PO10: Design and Development of System:

Students should be able to design and develop efficient solutions for complex real world computing problems and design system components or processes that meet the specifies needs with appropriate consideration for public health and safety and the cultural, social and environmental considerations.

PO11: Ethical and Social Responsibility:

Students should be able to acquire knowledge of ethics and ethical standards and an ability to apply these with a sense of responsibility within the workplace and community. Understand and accept the moral aspects, accountability, and value system for a nation and society. Students should be able to demonstrate academic accountability, intellectual authenticity, and personal integrity. Students also acquire abilities to comprehend and implement professional ethics.

PO12: Research-Related skills:

The students should be able to acquire the understanding of basic research process, methodology and ethics in practicing personal and social research work, regardless of the field of study.

PO13: Teamwork:

The students should be able to able to work constructively, cooperatively, effectively and respectfully as part of a team.

PO14: Area Specific Expertise:

The students should be able to apply various subjective concepts, theories and model in the area of Accounting, Taxation, Marketing, Finance and Human Resource Management, Computer after better understanding of the subject and its contents.

PO15: Environmental Awareness:

The students should be able to manage environmental- related risk from an organization's operation as well as identify environmental hazards affecting air, water and soil quality. The students should be able to manage and controls to reduce and eliminate environmental risk.

Programme Specific Outcomes (PSOs)

PSO1. **Knowledge:** To understand and apply the fundamental principles, concepts, and methods in diverse areas of computer science, computer applications, management, mathematics, statistics, etc.

PSO2. **Problem Analysis:** Identify, analyze and formulate complex real-life computing problems. Attain substantiated conclusions to solve the problems using fundamental principles of computer science and application domains by using various tools and emerging technologies.

PSO3. **Design and Development:** Design and develop efficient solutions for complex real-world computing problems and design system components or processes that meet thespecified needs with appropriate consideration for public health and safety and the cultural, societal, and environmental considerations.

PSO4. **Conduct investigations of complex problems:** Ability to research, analyze and Investigate complex computing problems through the design of experiments, analysis, and interpretation of data, and synthesis of the information to arrive at valid conclusions.

PSO5. **Modern Tool Usage:** Create, identify and apply appropriate techniques, skills, andmodern computing tools to computing activities.

PSO6. **Ethics and Social Responsibility:** Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practices.

PSO7. **Individual and Team Work:** Ability to work effectively as an individual, and as a member or leader as per need in, multidisciplinary teams.

PSO8. **Life-Long Learning:** Recognize the need and have the ability to engage in Independent continuous reflective learning in the context of technological advancement.

PSO9. **Project Management:** Understand and apply computing, management principles tomanage projects.

PSO10. **Communication:** Able to use interpersonal skills and communicate effectively with the professionals and with society to convey technical information effectively and accurately and able to comprehend and write effective reports, design documentation, and make effective presentations.

PSO11. **Innovation, employability, and Entrepreneurial skills:** Identify opportunities, and pursue those opportunities to create value and wealth for the betterment of the individual and society at large.

Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Empowered Autonomous)

Board of Studies (BOS) in BBA (Computer Application)

From 2022-23 to 2024-25

Sr. No.	Name	Designation
1.	Ms. Madhuri Saste	Chairman
2.	Ms. Reshma Babar	Member
3.	Mrs. Ashwini Bhosale	Faculty
4.	Mr. Dattatray Aarde	Faculty
5.	Ms. Trupti Bhosale	Faculty
6.	Mrs. Salma Shaikh	Faculty
7.	Dr. Shashikant Nakate	Faculty
8.	Dr. Ranjeet Patil	Expert from SPPU Pune
9.	Dr. Sagar Jambhorkar	Expert from other University
10.	Dr. Arjun Mane	Expert from other University
11.	Mr. Harish Saitwal	Industry Expert
12.	Mr. Prithviraj Sawant	Meritorious Alumni
13	Mr. Rohan Atole	Student Representative
14	Ms. Snehal Pawar	Student Representative

Credit Distribution Structure for F.Y.BBA(Computer Applications) 2024-2025

Level	Sem	Core Courses	VSC, SEC, (VSEC)	GE/OE	AEC, VEC, IKS	Cum. Cr/Sem	Degree/ Cum.Cr.
	I	BBACA-101-GEN: Programing in C (4 credits) BBACA-102- GEN Database Management System (4 credits) BBACA-103-GEN: Computer Laboratory –I (based on Programming in C) (2 credits) BBACA-104-GEN Computer Laboratory II (based on Database Management System) (2 credits)	BBACA-106 –SEC Programming Principles and Algorithms (2 credits)	BCA-105-OE Business Statistics (2 credits)	BBACA -107-AEC Business Communication-I (2 credits) ENV -105-VEC Environmental Awareness (2 credits) GEN -106-IKS Generic IKS (2 credits)	22	UG Certificatete 44 credits
	II	BBACA-151-GEN Data Structure using C (4 credits) BBACA-152-GEN Relational Database Management System (4 credits) BBACA-153-GEN Computer Laboratory III (based on Data Structure using in C) (2 credits) BBACA-154-GEN Computer Laboratory IV (based on Relational Database Management System) (2 credits)	BBACA-156 –SEC Office Automation Tools (2 credits)	BCA-155-OE Business Mathematics (2 credits)	BBACA -157-AEC Business Communication-II (2 credits) COS-155-VEC Digital & Technological Solutions (2 credits) PES-156-CC Physical Education (2 credits)	22	
	Cum Cr.	20	12	04	8	44	

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Course Structure for F.Y.BBA (C.A.) (2024 Pattern)

Sem	Course Type	Course Code	Course Name	Theory / Practical	Credits
I	DSC	BBACA-101-GEN	Programing in C	Theory	04
	DSC	BBACA-102- GEN	Database Management System	Theory	04
	DSC	BBACA-103- GEN	Computer Laboratory I (based on Programming in C)	Practical	02
	DSC	BBACA-104-GEN	Computer Laboratory II (based on Database Management System)	Practical	02
	Open Elective (OE)	BCA-105-OE	Business Statistics	Theory	02
	Skill Enhancement Course (SEC)	BBACA-106 -SEC	Programming Principles and Algorithms	Theory	02
	Ability Enhancement Course (AEC)	BBACA -107-AEC	Business Communication-I	Theory	02
	Value Education Course (VEC)	ENV -105-VEC	Environmental Awareness	Theory	02
	Generic Indian Knowledge System (GIKS)	GEN -106-IKS	Generic IKS	Theory	02
			Total Credits Semester - I		**22**
II	DSC	BBACA-151-GEN	Data Structure using C	Theory	04
	DSC	BBACA-152- GEN	Relational Database Management System	Theory	04
	DSC	BBACA-153- GEN	Computer Laboratory-III (based on Data Structure using C)	Practical	02
	DSC	BBACA-154-GEN	Computer Laboratory-IV (based on relational Database Management System)	Practical	02
	Open Elective (OE)	BCA-155-OE	Business Mathematics	Theory	02
	Skill Enhancement Course (SEC)	BBACA-156 -SEC	Office Automation Tools	Practical	02
	Ability Enhancement Course (AEC)	BBACA -157-AEC	Business Communication-II	Theory	02
	Value Education Course (VEC)		Digital & Technological Solutions	Theory	02
	Co-curricular Course (CC)	PES-156-CC	Physical Education	Theory	02
			Total Credits Semester- II		**22**
			Cumulative Credits Semester I + Semester II		**44**

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code : BBA(C.A.)

Class : F.Y. BBA (C.A)

Semester   I

Course Type : General (Theory)

Course Code : BBACA-101-GEN

Course Title : Programing in C

No. of Credits   04

No. of Teaching Hours   48

Course Objectives:

1. To acquire the fundamental principles, concepts and constructs of C programming.
2. To develop competency for the design, coding and debugging.
3. To understand the various steps in program development through the structured programming approach.
4. To learn the syntax and semantics of C programming language thereby learning the programming concepts in general.
5. To learn the use of structured programming approach in solving problems.
6. To decompose the problem in structured way.
7. To provide a broad overview of problem solving techniques and use of c language programming to solve these problems.

Course Outcomes:

By the end of the course, students will be able to:

CO1. Read, understand and trace the execution of programs written in C language.

CO2. Illustrate and explain the basic computer concepts and programming principles of C Language.

CO3. Devise pseudocodes and flowchart for computational problems.

CO4. Write, debug and execute simple programs in 'C'.

CO5. Develop C programs to demonstrate the applications of derived data types such as arrays and functions.

CO6. Develop modular applications using C programming language.

CO7. Apply the concepts of looping, branching, and decision-making statements for a given Problem

Topics and Learning Points	Teaching Hours

Unit 1:   Introduction to C Language   **06**

      1.1 History
      1.2 Basic Structure of C Programming
      1.3 Language Fundamentals
           1.3.1   Character Set, Tokens
           1.3.2   Keyword & Identifiers
           1.3.3   Variables & Data Types
      1.4 Operators
           1.4.1   Types of Operators
           1.4.2   Precedence & Associativity

Unit 2:   Managing I/O Operations   **04**

      2.1 Console based I/O & related Built-in I/O Functions
           2.1.1 printf(), scanf()
           2.1.2 getch(), getchar()
      2.2   Formatted Input & Formatted Output

Unit 3:   Decision Making and Looping   **12**

      3.1 Introduction
      3.2 Decision making Structure
           3.2.1 If Statement
           3.2.2 If-else Statement
           3.2.3 Nested if-else Statement
           3.2.4 Conditional Operator
           3.2.5 Switch Statement
      3.3 Loop Structure
           3.3.1 While Loop
           3.3.2 Do-while Loop
           3.3.3 For Loop
           3.3.4 Nested For Loop
      3.4 Loop Control Statements
           3.4.1 break
           3.4.2 continue
           3.4.3 go to
           3.4.4 exit

Unit 4:   Functions   **12**

      4.1 Introduction
           4.1.1 Purpose of Functions
           4.1.2 Function Definition
           4.1.3 Function Declaration
           4.1.4 Function Call
      4.2 Types of Functions
           4.2.1 Call by value
           4.2.2 Call by reference
      4.3 Recursion
      4.4 Storage Classes

Unit 5:   Arrays And Strings   14
     5.1   Introduction to One- Dimensional Array
        5.1.1 Definition
        5.1.2 Declaration
        5.1.3   Initialization
    5.2 Introduction to Two- Dimensional Array
        5.2.1 Definition
        5.2.2 Declaration
        5.2.3 Initialization
    5.3 Dynamic Memory Allocation
        5.3.1 Using malloc() Function
        5.3.2 Using calloc() Function
        5.3.3 Resizing Array using realloc() Function
    5.4 Introduction to string
        5.4.1 Definition
        5.4.2 Declaration
        5.4.3 Initialization
        5.4.4   String Handling Functions

References:

1. "Let Us C" by Yashwant Kanetkar, 17th Edition, BPB Publication.

2. K.N.King, "C Programinng: Modern approach", 2nd Edition, W.W Norton and Comp.

3. Greg Perry and Dean Meler,"C programing Absolute Beginer's Guide", 3rd Edition.

4. Mike McGrath,"C programing in easy steps", 5th Edition, McGraw Hill Education.

5. "The C Programming Language" by Brian W Kernighan / Dennis Ritchie.

6. "C in Depth" by Deepali Srivastava and S K Srivastava.

7. "Programming in ANSI C" by E Balgurusamy, 2nd Edition.

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA(C.A)

Course: Programing in C   **Course Code:** BBACA-101-GEN

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	1	2	1	1	1	1	2	1	2	1	2	1
CO2	3	2	2	2	2	1	1	1	1	2	1	2	1	2	1
CO3	3	3	2	1	2	1	1	1	1	2	1	3	2	2	1
CO4	2	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO5	2	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO6	2	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO7	2	3	3	2	3	2	1	1	1	3	2	3	2	3	2

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO3 are strongly mapped (3) as they develop core knowledge of programming in C, foundational skills, and clarity of concepts.

PO2: Procedural Knowledge for Skill Enhancement
CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve deep procedural knowledge, debugging, and program execution.

PO3: Critical Thinking and Problem-Solving Skills
CO4, CO5, CO6, CO7 are strongly mapped (3) because they emphasize problem-solving and logical thinking through program development and execution.

PO4: Communication Skills
CO2, CO4, CO5 are moderately mapped (2) as they require logical explanations, presentations, and discussions of program flow and outputs.

PO5: Analytical Reasoning Skills
CO4, CO5, CO6, CO7 are strongly mapped (3) as they require students to evaluate problems analytically and devise efficient solutions.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO4, CO5, CO6, CO7 are moderately mapped (2) as they build skills that are essential for employability and technical innovation.

PO7: Multidisciplinary Competence
All COs have a weak mapping (1) since programming primarily focuses on core technical aspects but contributes marginally to multidisciplinary competence.

PO8: Value Inculcation through Community Engagement
All COs are weakly mapped (1) as programming indirectly contributes to community-based applications.

PO9: Traditional Knowledge into Modern Application
All COs are weakly mapped (1) since programming doesn't directly address traditional knowledge application.

PO10: Design and Development of System
CO4, CO5, CO6, CO7 are strongly mapped (3) as they focus on designing modular and efficient programming systems.

PO11: Ethical and Social Responsibility
CO4, CO5, CO6, CO7 are moderately mapped (2) as students learn ethical programming practices.

PO12: Research-Related Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve designing algorithms and research-like problem-solving approaches.

PO13: Teamwork
CO3, CO4, CO5, CO6, CO7 are moderately mapped (2) as collaborative programming practices are emphasized.

PO14: Area Specific Expertise
CO4, CO5, CO6, CO7 are strongly mapped (3) as they ensure expertise in programming and computational problem-solving.

PO15: Environmental Awareness
All COs are moderately mapped (2) as programming concepts can indirectly contribute to environmentally friendly computational practices.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code : BBA(C.A.)

Class : F.Y. BBA (C.A)

Semester   I

Course Type : General (Theory)

Course Code : BBACA-102-GEN

Course Title : Database Management System
No. of Credits   04

No. of Teaching Hours   48

Course Objectives:

1. To know the Fundamentals of Databases
2. To understand how to use Databases in day to day Applications.
3. To Discuss Database management systems, databases and its applications
4. To familiarize the students with a good formal foundation on the relational model.
5. To Outline the various systematic database design approaches.
6. To understand how a real world problem can be mapped to schemas.
7. To solve different industry level problems & to learn its applications.

Course Outcomes:

By the end of the course, students will be able to:

CO1. Describe the fundamental elements of Database management system.

CO2. Model Entity-Relationship diagrams for enterprise level databases.

CO3. Formulate Queries using SQL and Relational Formal Query Languages.

CO4. Apply different normal forms to design the Database.

CO5. Improve the database design by normalization.

CO6. Design ER-models to represent simple database application scenarios.

CO7. Analyze and design a real database application and develop and evaluate a real database application using a database management system.

Topics and Learning Points	Teaching Hours

Unit 1:   **Introduction of DBMS**   **08**

1.1. Introduction

1.2 Definition of DBMS

1.3. Describing & storing data

   (Data models - relational, hierarchical, network)

1.4. Levels of abstraction

1.5. Data independence

1.6. Structure of DBMS

1.7. Users of DBMS

  1.7.1 Database Designers

  1.7.2 Application programmer

  1.7.3 Sophisticated Users

  1.7.4 End Users

1.8. Advantages and Disadvantages of DBMS

Unit 2:   **Data Models**   **08**

2.1 Introduction

2.2 Data Models

  2.2.1 Object Based Logical Model

  2.2.2 Record Base Logical Model

      a. Relational Model

      b. Network Model

      c. Hierarchical Model

2.3 Entity Relationship Model

  2.3.1 Entity Set

  2.3.2 Attribute

  2.3.3 Relationship Set

2.4 Entity Relationship Diagram (ERD)

2.5 Extended features of ERD

Unit 3:   **Relational Databases**

3.1 Introduction   **08**

3.2 Terms

    a. Relation

    b. Tuple

    c. Attribute

    d. Cordinality

    e. Degree f. Domain

3.3 Keys

    3.3.1 Super Key

    3.3.2 Candidate Key

3.3.3 Primary Key

3.3.4 Foreign Key

3.4 Relational Algebra

3.4.1 Operations

a. Select

b. Project

c. Union

d. Difference

e. Intersection

f. Cartesian Product

g. Natural Join

Unit 4:   SQL (Structured Query Language)

4.1 Introduction   **12**

4.2 History of SQL

4.3 Basic Structure

4.4 DDL Commands

4.5 DML Commands

4.6 Simple Queries

4.7 Nested Queries

4.8 Aggregate Functions

4.9 Clauses

Unit 5:   Relational Database Design

5.1 Introduction   **12**

5.2 Anomalies of un normalized database

5.3 Normalization

5.4 Normal Form

5.4.1 1 NF

5.4.2 2 NF

5.4.3 3 NF

References:

1. Database System Concepts By Henry korth and A. Silberschatz S. Sudarshan,Tata McGraw- Hill Education

2. An Introduction to Database System by Bipin Desai

3. Database Management Systems, Raghu Ramakrishnan and Johannes Gehrke, McGraw-Hill Science/Engineering/Math; 3 Edition

4. Teach Yourself SQL in 14 days by Jeff Parkins and Bryan Morgan

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA(C.A.)

Course: Database Management System   **Course Code:** BBACA-102-GEN

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	1	2	1	1	1	1	2	1	2	1	2	1
CO2	3	3	2	2	2	1	1	1	1	2	1	2	1	2	1
CO3	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO4	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO5	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO6	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO7	3	3	3	3	3	3	2	2	2	3	3	3	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they focus on database fundamentals, SQL querying, normalization, and practical applications.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve diagram modeling, query formulation, and normalization techniques.

PO3: Critical Thinking and Problem-Solving Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they require problem-solving skills in designing efficient databases and writing optimized SQL queries.

PO4: Communication Skills
CO2, CO3, CO4, CO5, CO7 are moderately mapped (2) as presenting database solutions and explaining query results require good communication skills.

PO5: Analytical Reasoning Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they emphasize analyzing database requirements and optimizing database design.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO3, CO4, CO5, CO6, CO7 are moderately mapped (2) as database design and applications have significant real-world applications.

PO7: Multidisciplinary Competence
All COs have a weak mapping (1) since database concepts primarily focus on technical knowledge.

PO8: Value Inculcation through Community Engagement
All COs are weakly mapped (1) since community engagement is not a primary focus of database management
.

PO9: Traditional Knowledge into Modern Application
All COs are weakly mapped (1) as database design indirectly supports modern applications but not traditional knowledge directly.

PO10: Design and Development of System
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) because database systems are designed and optimized.

PO11: Ethical and Social Responsibility
CO7 is strongly mapped (3) as databases must adhere to ethical guidelines and data privacy standards.

PO12: Research-Related Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as designing queries and database structures involve systematic problem-solving approaches.

PO13: Teamwork
CO7 is moderately mapped (2) because database projects often require collaborative teamwork.

PO14: Area Specific Expertise
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they ensure expertise in database design, SQL, and normalization.

PO15: Environmental Awareness
All COs have moderate mapping (2) as efficient databases can indirectly reduce hardware resource consumption.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code : BBA(C.A.)

Class : F.Y. BBA (C.A)

Semester   I

Course Type : General (Practical)

Course Code : BBACA-103-GEN

Course Title : Computer Laboratory-I
No. of Credits   02

No. of Teaching Hours   60

Course Objectives:

1. To make the student learn a programming language.
2. To learn problem solving techniques.
3. To teach the student to write programs in C and to solve the problems.
4. To study various data types, arrays, strings and functions in C.
5. To provide hands-on experience with C programming constructs such as decision-making, loops, arrays, functions, and pointers.

Course Outcomes:

By the end of the course, students will be able to:

CO1: Write, compile, and debug simple C programs to solve problems using fundamental programming constructs.

CO2: Implement decision-making and looping statements to control program flow.

CO3: Work with arrays (one-dimensional and multi-dimensional) to organize and process data efficiently.

CO4: Use functions to modularize code and improve reusability.

CO5: Demonstrate understanding of pointers and their applications in accessing memory dynamically.

CO6: Apply structures and unions to create user-defined data types.

CO7: Analyse and debug C programs to identify and resolve errors effectively

Topics and Learning Points	Teaching Hours

C Assignments

1. Assignments on Basics programs.

2. Assignments on variables and constants.

3. Assignments on Different data types.

4. Assignments on operators and Expressions.

5. Assignments on Decision making Statements.

6. Assignments on Switch Statements.

7. Assignments on Looping Statements.

8. Assignments on Loop control Statements.

9. Assignments on Math Functions and I/O Functions.

10. Assignments on Call by value and call by reference.

11. Assignments on Recursion.

12. Assignments on 1 D- Arrays.

13. Assignments on 2 D- Arrays.

14. Assignments on Dynamic Memory Allocation.

15. Assignments on String and String Handling functions.

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA(C.A.)

Course: Computer Laboratory-I   **Course Code:** BBACA-103-GEN

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	2	2	1	1	1	1	2	1	2	1	2	1
CO2	3	3	3	2	2	1	1	1	1	2	1	2	1	2	1
CO3	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO4	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO5	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO6	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO7	3	3	3	3	3	3	2	2	2	3	3	3	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve understanding and applying fundamental programming constructs.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve logic building, structured programming, and modular code design.

PO3: Critical Thinking and Problem-Solving Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as problem-solving skills are integral to writing efficient C programs.

PO4: Communication Skills
CO4, CO7 are moderately mapped (2) as explaining and debugging C programs require clear communication.

PO5: Analytical Reasoning Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) due to logical reasoning required for problem-solving and debugging.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO5, CO6, CO7 are moderately mapped (2) as dynamic memory allocation and data structures can enhance innovative program design.

PO7: Multidisciplinary Competence
All COs are weakly mapped (1) since they primarily focus on programming skills.

PO8: Value Inculcation through Community Engagement
All COs are weakly mapped (1) as community engagement is not a primary focus here.

PO9: Traditional Knowledge into Modern Application
All COs are weakly mapped (1) as traditional knowledge is not directly addressed.

PO10: Design and Development of System
CO3, CO4, CO5, CO6, **CO7** are strongly mapped (3) as these involve designing reusable, modular, and optimized programs.

PO11: Ethical and Social Responsibility
CO7 is strongly mapped (3) because debugging and error-handling require accountability and responsible programming.

PO12: Research-Related Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as structured programming encourages systematic debugging and exploration.

PO13: Teamwork
CO7 is moderately mapped (2) because collaborative debugging and program analysis require teamwork.

PO14: Area Specific Expertise
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they develop technical expertise in C programming.

PO15: Environmental Awareness
All COs are weakly mapped (1) as environmental awareness is not explicitly covered in programming.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code : BBA(C.A.)

Class : F.Y. BBA (C.A)

Semester I

Course Type : General (Practical)

Course Code : BBACA-104-GEN

Course Title : Computer Laboratory-II
No. of Credits 02

No. of Teaching Hours 60

Course Objectives:

1. To introduce the fundamental concepts of database systems and relational databases.
2. To enable students to design and implement a relational database using SQL (Structured Query Language).
3. To provide hands-on experience in creating, querying, and managing databases.
4. To familiarize students with normalization techniques to improve database efficiency.
5. To introduce the use of database tools for practical applications in real-world scenarios.

Course Outcomes:

By the end of the course, students will be able to:

CO1: Create and manage relational databases using SQL commands (CREATE, ALTER, DROP).

CO2: Construct SQL queries to perform data retrieval using SELECT statements with conditions, sorting, and joins.

CO3: Apply normalization techniques to remove anomalies and ensure efficient database design.

CO4: Implement constraints such as primary key, foreign key, and check constraints to ensure data integrity.

CO5: Write SQL queries to perform CRUD operations (INSERT, UPDATE, DELETE) effectively.

CO6: Develop small-scale database applications to solve real-world problems.

CO7: Demonstrate the concepts of transactions and implement database operations to ensure ACID properties.

Topics and Learning Points	Teaching Hours

Database Assignments

1 Assignment on SQL – DDL Commands.

2 Assignment on SQL – DML Commands.

3 Assignment on SQL – DTL Commands.

4 Assignment on Aggregate Functions.

5 Assignment on Relational Algebra Operations.

6 Assignment on Nested Queries.

7 Assignment on Create Database, select database, Drop database.

8 Assignment on Create Table, Drop table, Insert Query, Select Query.

9 Assignment on Constraints.

10 Assignment on Displaying data from Multiple tables.

11 Assignment on Operators, Expressions, where clause, AND & OR clauses.

12 Assignment on Update Query/Delete Query, Like clause, Limit Clause.

13 Assignment on Order By Clause with Ascending and Descending order.

14 Assignment on Order By, Group By, With Clause, Having Clause, Distinct keyword

15 Assignment on Constraints, Joins, Union Clause, NULL Clause, Alias Syntax.

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA(C.A.)

Course: Computer Laboratory-II   **Course Code:** BBACA-104-GEN

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	2	2	1	1	1	1	2	1	2	1	2	1
CO2	3	3	3	2	2	1	1	1	1	2	1	2	1	2	1
CO3	3	3	3	3	3	2	1	1	1	3	2	3	2	3	2
CO4	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO5	3	3	3	2	3	2	1	1	1	3	2	3	2	3	2
CO6	3	3	3	3	3	3	2	1	2	3	3	3	3	3	2
CO7	3	3	3	3	3	3	2	2	2	3	3	3	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding

CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they focus on core database management system concepts and SQL operations.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) because they involve procedural SQL skills and normalization techniques.

PO3: Critical Thinking and Problem-Solving Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they require designing and managing databases effectively to solve problems.

PO4: Communication Skills
CO6, CO7 are moderately mapped (2) as documentation and explanation of database solutions require clarity in communication.

PO5: Analytical Reasoning Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) due to logical reasoning and integrity constraints required for database design.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO6, CO7 are strongly mapped (3) since developing small-scale database applications fosters innovative thinking.

PO7: Multidisciplinary Competence
All COs are weakly mapped (1) because the multidisciplinary aspect is not the primary focus.

PO8: Value Inculcation through Community Engagement
All COs are weakly mapped (1) as community engagement is not directly involved in database design.

PO9: Traditional Knowledge into Modern Application
All COs are weakly mapped (1) since traditional knowledge application is not a primary focus.

PO10: Design and Development of System
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve designing database systems to meet requirements.

PO11: Ethical and Social Responsibility
CO7 is strongly mapped (3) because ensuring data integrity and ACID properties require responsibility and ethical practices.

PO12: Research-Related Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they encourage systematic problem-solving and database analysis.

PO13: Teamwork
CO6, CO7 are moderately mapped (2) since database projects often require teamwork and collaboration.

PO14: Area Specific Expertise
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they foster domain-specific database expertise.

PO15: Environmental Awareness
All COs are weakly mapped (1) because environmental concerns are not a direct focus in database management.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme   : BBA (Computer Application)

Programme Code   : BBA(C.A)

Class   **:** F.Y. BBA (C.A)

Semester   I

Course Type   : OE(Theory)

Course Code   : BCA-105-OE

Course Title   **:** Business Statistics

No. of Credits   02

No. of Teaching Hours   30

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: Organize and summarize raw data into frequency distributions to facilitate meaningful interpretation and analysis.

CO2: Represent data visually using graphs and charts such as histograms, frequency polygons, and pie charts to identify patterns and trends.

CO3: Compute and interpret measures of central tendency (mean, median, and mode) to describe the central location of a dataset.

CO4: Analyze and evaluate data variability using measures of dispersion such as range, mean deviation, variance, and standard deviation.

CO5: Compare and contrast datasets by applying relative measures of dispersion like the coefficient of variation.

CO6: Interpret the significance of central tendency and dispersion measures for decision-making in business scenarios.

CO7: Use appropriate statistical tools to summarize large data sets, identify data trends, and draw conclusions to solve real-world business problems.

Topics and Learning Points	Teaching Hours

Unit1   **Frequency Distribution**   **(10L)**

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.

1.4 Graphs & Diagram- Histogram, Ogive curve, Pie-Diagram, Bar
    Diagram, Multiple bar Diagram, Sub-divided bar diagram

Unit2   **Measure of Central Tendency**   **(10L)**

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

Unit 3   **Measure Dispersion**   **(10L)**

3.1 Concept of Dispersion, Measures of Dispersion - Range, Variance and
Standard Deviation (S.D.) for Grouped and ungrouped data,

3.2 Measures of relative dispersion- Coefficient of range and coefficient of
Variation, Examples.

References:

1. Business Mathematics and Statistics -I by 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. BeriThe McGraw-Hill companies New Delhi

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A) **Subject:** BBA(C.A)

Course: Business Statistics **Course Code:** BCA-105-OE

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	3	2	2	2	1	1	1	1	2	1	2	1	2	1
CO2	3	3	3	2	3	2	1	1	1	2	1	2	1	3	1
CO3	3	3	3	2	3	2	1	1	1	3	2	2	2	3	2
CO4	3	3	3	3	3	2	1	1	1	3	2	3	2	3	2
CO5	3	3	3	3	3	2	1	1	1	3	2	3	2	3	2
CO6	3	3	3	3	3	3	2	1	1	3	2	3	2	3	2
CO7	3	3	3	3	3	3	2	2	2	3	3	3	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they focus on core statistical concepts and data analysis techniques.

PO2: Procedural Knowledge for Skill Enhancement
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) because statistical methods require procedural understanding for application.

PO3: Critical Thinking and Problem-Solving Skills
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve interpreting data for decision-making.

PO4: Communication Skills
CO6, CO7 are moderately mapped (2) as statistical findings often need to be communicated effectively.

PO5: Analytical Reasoning Skills
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) due to logical reasoning and analytical decision-making requirements.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO6, CO7 are strongly mapped (3) because interpreting statistical data supports strategic decision-making.

PO7: Multidisciplinary Competence
All COs are weakly mapped (1) because multidisciplinary application is indirect.

PO8: Value Inculcation through Community Engagement
All COs are weakly mapped (1) as community engagement is not directly involved.

PO9: Traditional Knowledge into Modern Application
All COs are weakly mapped (1) since this aspect is not a direct focus.

PO10: Design and Development of System
CO4, CO5, CO6, CO7 are strongly mapped (3) as they contribute to designing decision models based on data.

PO11: Ethical and Social Responsibility
CO7 is moderately mapped (2) as data analysis may include ethical considerations.

PO12: Research-Related Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they encourage systematic data analysis for insights.

PO13: Teamwork
CO6, CO7 are moderately mapped (2) because statistical projects often require collaboration.

PO14: Area Specific Expertise
CO4, CO5, CO6, CO7 are strongly mapped (3) due to their application in specific business and statistical scenarios.

PO15: Environmental Awareness
All COs are weakly mapped (1) since environmental considerations are not a primary focus.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application)
(2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code : BBA(C.A)

Class : F.Y. BBA (C.A)

Semester I

Course Type : SEC(Theory)

Course Code : BBACA-106 -SEC

Course Title : Programming Principles and Algorithms

No. of Credits 02

No. of Teaching Hours 30

Course Objectives:

1. Introduce the fundamentals of programming concepts and problem-solving techniques.
2. Familiarize students with algorithms and flowcharts to represent problem-solving steps systematically.
3. Develop skills to write structured and modular programs using a high-level programming language (like C).
4. Enable students to understand and implement programming constructs such as control structures, functions, arrays, and pointers.
5. Introduce algorithmic strategies for problem-solving, including searching and sorting techniques.
6. Build a strong foundation for writing efficient and optimized algorithms for real-world problems.

Course Outcome:

CO1: Understand and explain the fundamental concepts of programming, including syntax, semantics, and problem-solving steps.

CO2: Design and develop algorithms and represent them using flowcharts and pseudocode for problem-solving.

CO3: Write and execute simple programs using basic constructs such as input/output operations, data types, and operators.

CO4: Understand the concept of recursion and differentiate it from iterative solutions for problem-solving.

CO5: Develop recursive algorithms to solve problems such as factorial computation, Fibonacci series, and Tower of Hanoi.

CO6: Analyze the efficiency of recursive programs and understand the concepts of base cases, stack usage, and termination conditions.

CO7: Implement well-structured and modular programs to improve program clarity, efficiency, and reusability.

Topics and Learning Points	Teaching Hours

Unit1   Introduction   **(15L)**

    1.1 Concept: Problem solving, Program development cycle
    1.2 Algorithm, Characteristics of an algorithm
    1.3 Flowcharts
    1.4 Simple Examples: Algorithms and flowcharts
        1.4.1   Addition / Multiplication of integers
        1.4.2   Determining if a number is +ve / -ve / even / odd
        1.4.3   Maximum of 2 numbers, 3 numbers
        1.4.4   Sum of first n numbers, given n numbers, Digit reversing,
               Palindrome number, Armstrong number Table generation for
               n, Factorial, Prime number, Factors of a number etc.
               (Write algorithms and draw flowcharts)

Unit2   Recursion   **(15L)**

    2.1 Concept: Multiplication, Factorial, Fibonacci series,
      Permutation Generation
    2.2 Algorithms using arrays Maximum and minimum of array,
      reversing elements of an array.
    2.3 Mean and Median of n numbers
    2.4 Row major and Column major form of array representation
    2.5 Matrices: Addition, Multiplication, Transpose, upper/lower triangular

References:

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, Stei

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA(C.A)

Course: Programming Principles and Algorithms **Course Code:** BBACA-106 -SEC

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	1	2	1	1	1	1	2	1	2	1	2	1
CO2	3	3	3	2	2	2	1	1	1	2	1	2	2	3	1
CO3	3	3	3	2	3	2	1	1	1	3	1	2	2	3	1
CO4	3	3	3	3	3	2	1	1	1	3	2	3	2	3	2
CO5	3	3	3	3	3	3	1	1	1	3	2	3	2	3	2
CO6	3	3	3	3	3	3	2	1	1	3	2	3	2	3	2
CO7	3	3	3	3	3	3	2	2	2	3	3	3	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) because they emphasize programming fundamentals and problem-solving concepts.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they focus on algorithm design, recursive programming, and program structuring.

PO3: Critical Thinking and Problem-Solving Skills
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) since they involve applying programming logic to solve computational problems.

PO4: Communication Skills
CO2, CO7 are moderately mapped (2) as algorithm representation and modular programming aid clarity in communication.

PO5: Analytical Reasoning Skills
CO4, CO5, CO6 are strongly mapped (3) because recursion requires deep analytical reasoning for problem-solving.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO6, CO7 are strongly mapped (3) due to modular program design and efficiency analysis, which are critical for employability.

PO7: Multidisciplinary Competence
All COs have a weak mapping (1) since their interdisciplinary focus is minimal.

PO8: Value Inculcation through Community Engagement
All COs are weakly mapped (1) because community engagement isn't a core focus.

PO9: Traditional Knowledge into Modern Application
All COs are weakly mapped (1), as traditional knowledge application is indirect.

PO10: Design and Development of System
CO4, CO5, CO6, CO7 are strongly mapped (3) as they contribute to designing and optimizing problem-solving solutions.

PO11: Ethical and Social Responsibility
CO7 is moderately mapped (2) since structured programming can encourage code ethics.

PO12: Research-Related Skills
CO4, CO5, CO6, CO7 are strongly mapped (3) because recursive problem-solving and efficiency analysis align with research methodologies.

PO13: Teamwork
CO7 is moderately mapped (2) since modular code supports collaborative work.

PO14: Area Specific Expertise
CO4, CO5, CO6, CO7 are strongly mapped (3) as these outcomes provide specialized knowledge in programming.

PO15: Environmental Awareness
All COs have weak mapping (1) since environmental aspects are not directly addressed.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code   : BBACA

Class   : F.Y. BBA (C.A)

Semester   I

Course Type   : AEC(Theory)

Course Code   : BBACA -107-AEC

Course Title   : Business Communication-I

No. of Credits   02

No. of Teaching Hours   30

Course Objectives:

1. Introduce the fundamentals of communication and its importance in a business context.
2. Familiarize students with various types and media of communication, including verbal, non-verbal, written, and visual communication.
3. Develop effective communication skills for professional and personal interactions.
4. Explain the role of digital communication tools and platforms in modern business environments.
5. Enhance the ability to choose appropriate communication media to convey messages effectively.

Course Outcomes:

CO1: Understand the basic concepts, principles, and processes of communication in a business environment.

CO2: Explain the types of communication (verbal, non-verbal, written, and visual) and their significance in professional settings.

CO3: Identify and analyze different media of communication (oral, written, electronic, and visual) and select the most appropriate medium for specific situations.

CO4: Develop clear, concise, and professional written communication skills, such as drafting emails, reports, memos, and business letters.

CO5: Demonstrate effective verbal and non-verbal communication techniques for interpersonal interactions, group discussions, and presentations.

CO6: Explain the role and importance of digital communication tools such as email, video conferencing, social media, and messaging platforms.

CO7: Utilize digital communication technologies effectively for virtual meetings, collaboration, and networking.

Topics and Learning Points	Teaching Hours
Unit 1: Introduction to Communication	**08**

    1.1. Role of Communication in Business
    1.2. Objectives of Communication
    1.3. Process of Communication
    1.4. Principles of Communication
    1.5. Barriers to Communication
    1.6. Overcoming Barriers

Unit 2: Media of Communication	**12**

    2.1. Written Communication- Advantages & Limitations
    2.2. Oral Communication- Principles of effective oral communication - Techniques of effective speech
    2.3. Face to Face Communication
    2.4. Non-Verbal Communication - Body Language (Positive & Negative Gestures)handshakes, gazes, smiles, hand movements
    2.5. Visual Communication
    2.6. Audio Visual Communication Skills

Unit 3 - Digital Communication	**10**

    3.1. Social media and individual, social media & organizations,
    3.2. Media Literacy;
    3.3. Strong Digital communication skills – email, instant messaging, video conferencing, e-meetings,
    3.4. Digital collaboration, digital citizenship –digital etiquettes & responsibilities;
    3.5. Introduction to personal and organizational websites.

References:

1. AICTE's Prescribed – Communication Skills in English, Khanna Book Publishing.
2. Lesikar, R.V. & M.E. Flatley,"Business Communication: Connecting in a Digital World", McGraw-Hill Education.
3. Murphy, H. A., Hildebrandt, H. & Thomas, J.P., Effective Business Communication. McGraw Hill.
4. Mukerjee H. S., Business Communication: Connecting at Work. Oxford Publication
5. Boove, C.L.,Thill, J. V. & Raina, R. L, Business Communication Today, Pearson

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA (C.A)

Course: Business Communication-I   **Course Code:** BBACA -107-AEC

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	1	2	1	1	2	2	2	2	1	2	2	1
CO2	3	2	2	2	3	2	2	2	2	2	2	1	2	2	1
CO3	3	3	3	2	3	2	2	2	2	3	2	2	2	3	1
CO4	3	3	3	3	3	2	2	2	2	3	2	2	2	3	2
CO5	3	3	3	3	3	3	2	2	2	3	2	2	3	3	2
CO6	3	3	3	3	3	3	3	2	2	3	2	2	3	3	2
CO7	3	3	3	3	3	3	3	2	3	3	2	2	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding

CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they establish fundamental communication principles.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO5, CO6, CO7 are mapped moderately to strongly (2–3) because they emphasize structured communication skills.

PO3: Critical Thinking and Problem-Solving Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve selecting
Appropriate communication media and tools for various scenarios.

PO4: Communication Skills
CO4, CO5, CO6, CO7 are strongly mapped (3) due to their focus on verbal, written, and
Digital communication techniques

PO5: Analytical Reasoning Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) since they involve evaluating and   .
applying communication tools effectively

PO6: Innovation, Employability, and Entrepreneurial Skills
CO6, CO7 are strongly mapped (3) as digital tools and collaboration are essential for modern professional settings.

PO7: Multidisciplinary Competence
CO6, CO7 have a moderate mapping (2) since communication tools are multidisciplinary in nature.

PO8: Value Inculcation through Community Engagement
CO1, CO2, CO3, CO5 are moderately mapped (2) as effective communication is essential for community interaction.

PO9: Traditional Knowledge into Modern Application
CO6, CO7 are moderately mapped (2) due to their emphasis on leveraging modern communication tools.

PO10: Design and Development of System
CO5, CO6, CO7 are strongly mapped (3) because they emphasize systematic communication techniques.

PO11: Ethical and Social Responsibility
CO1, CO2, CO5, CO6, CO7 are moderately mapped (2) as ethical communication practices are crucial in business contexts.

PO12: Research-Related Skills
CO3, CO5, CO6, CO7 are moderately mapped (2) since effective communication supports research dissemination
.
PO13: Teamwork
CO5, CO6, CO7 are moderately mapped (2) as group discussions and virtual collaboration are part of teamwork.

PO14: Area Specific Expertise
CO4, CO5, CO6, CO7 are strongly mapped (3) as these outcomes target domain-specific communication skills.

PO15: Environmental Awareness
All COs have a weak mapping (1) since environmental communication isn't directly addressed.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code   : BBACA

Class   : F.Y. BBA (C.A)

Semester   II

Course Type   : General (Theory)

Course Code   : BBACA-151-GEN

Course Title   : Data Structure Using C

No. of Credits   04

No. of Teaching Hours   48

Course Objectives:

1. To provide the knowledge of basic data structures and their implementations.
2. To understand importance of data structures in context of writing efficient programs.
3. To develop skills to apply appropriate data structures in problem solving.
4. To make students to learn basic principles of Problem solving, implementing through C programming language
5. To design & develop programming skills.
6. To gain knowledge of data structures and their applications.
7. To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions.

Course Outcomes:

By the end of the course, students will be able to:

CO1. Learn the basic types for data structure, implementation and application.

CO2. Know the strength and weakness of different data structures.

CO3. Use the appropriate data structure in context of solution of given problem.

CO4. Develop programming skills which require to solve given problem.

CO5. Achieve Knowledge of design and development of C problem solving skills.

CO6. Design and develop modular programming skills.

CO7. Implement linear data structure such as stacks, queues, linked lists and their applications.

Topics and Learning Points	Teaching Hours

Unit 1 **Basic Concepts and Introduction to Data Structure**   **8**

1.1 Pointers and Dynamic memory allocation

1.2 Algorithm and algorithm analysis-space and time Complexity-

Asymptotic notation

1.3 Types of Data Structure

1.4 Abstract Data Type (ADT)

1.5 Polynomial

1.6 Structure and Self-referential structure

Unit 2 **Array as A Data Structure**   **8**

2.1 Array Representation

2.2 Sorting Techniques with Time Complexity:

2.2.1 Bubble Sort

2.2.2 Insertion Sort

2.2.3 Merge Sort

2.2.4 Quick Sort

2.3 Searching Techniques with Time Complexity:

2.3.1 Linear Search

2.3.2 Binary Search

Unit 3 **Linked List**   **8**

3.1 Introduction

3.2 Representation -Static & Dynamic

3.3 Types of Linked Lists-

3.3.1 Singly Linked Lists

3.3.2 Doubly Linked Lists

3.3.3 Circular Linked Lists

3.4. Operations on Linked List

3.4.1. Singly Linked Lists (Create, insert delete, display, reverse,

search, sort)

3.4.2. Doubly Linked Lists (Create, display)

3.4.3. Circular Linked Lists(create ,display)

Unit 4 **Stack**   **8**

4.1 I ntroduction

4.2 Representation -Static &Dynamic

4.3 Operations– Push, Pop

4.4 Applications of Stacks

4.5 Evaluation of Postfix and Prefix expression

4.6 Expression Conversion

    4.6.1 Infix to Postfix

    4.6.2 Infix to Prefix

Unit 5   **Queue**   **8**

5.1 Introduction

5.2 Representation -Static & Dynamic

5.3 Primitive Operations– insert, delete

5.4 Types of Queue

    5.4.1 Circular queue

    5.4.2 Priority queue

Unit 6   **Tree and Graph**   **8**

6.1 Introduction

6.2 Tree Terminologies- Definitions

6.3 Representation – Static & Dynamic

6.4 Binary Tree

6.5 Tree Traversal– Preorder, Inorder, Postorder

6.6 Binary Search Tree (BST)

6.7 Introduction to Graph

    6.5.1. Concepts and Terminologies

    6.5.2. Graph Representation

    6.5.3.   Degree of Graph

    6.5.4. Graph Traversal –BFS & DFS

References:

1. Fundamentals of Data Structures-Horowitz Sahani (Galgotia)

2. Introduction to Data Structures using C-Ashok Kamthane

3. Data Structures using C-Bandopadhyay & Dey(Pearson)

4. Data Structures using C-By Srivastava BPB Publication.

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA(C.A)

Course: Data Structure Using C   **Course Code:** BBACA-151-GEN

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	2	1	2	1	1	1	2	2	1	1	2	2	1
CO2	3	3	2	2	3	2	2	1	2	2	2	1	2	2	1
CO3	3	3	3	2	3	2	2	1	2	3	2	1	2	2	1
CO4	3	3	3	3	3	2	2	1	2	3	2	2	3	2	1
CO5	3	3	3	3	3	3	2	1	2	3	2	2	3	3	2
CO6	3	3	3	3	3	3	2	1	2	3	2	2	3	3	2
CO7	3	3	3	3	3	3	3	2	2	3	2	2	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding

CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they focus on building foundational knowledge of data structures.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) since they emphasize applying data structures effectively.

PO3: Critical Thinking and Problem-Solving Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) because they involve solving programming problems efficiently.

PO4: Communication Skills
CO4, CO5, CO6, CO7 are moderately to strongly mapped (2–3) as they involve articulating solutions and designs clearly.

PO5: Analytical Reasoning Skills
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) because problem analysis and reasoning are core to data structure implementation.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO5, CO6, CO7 are strongly mapped (3) as they develop modular and scalable programming skills.

PO7: Multidisciplinary Competence
CO6, CO7 are moderately mapped (2) because modular programming and problem-solving have interdisciplinary applications.

PO8: Value Inculcation through Community Engagement
CO7 has a moderate mapping (2) as efficient data structures aid in developing real-world applications.

PO9: Traditional Knowledge into Modern Application
CO5, CO6, CO7 have a moderate mapping (2) since modern problem-solving relies on traditional algorithmic principles.

PO10: Design and Development of System
CO5, CO6, CO7 are strongly mapped (3) because they emphasize structured and modular system design.

PO11: Ethical and Social Responsibility
CO4, CO5, CO6, CO7 are moderately mapped (2) as programming ethics, such as resource efficiency, are relevant.

PO12: Research-Related Skills
CO5, CO6, CO7 are moderately mapped (2) because strong data structures support computational research.

PO13: Teamwork
CO4, CO5, CO6, CO7 are moderately mapped (2) since collaborative programming enhances teamwork.

PO14: Area Specific Expertise
CO5, CO6, CO7 are strongly mapped (3) as they focus on specialized problem-solving and programming practices.

PO15: Environmental Awareness
All COs have weak mapping (1) as environmental concerns are not directly addressed.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme: BBA (Computer Application)

Programme Code : BBACA

Class : F.Y. BBA (C.A)

Semester II

Course Type : General (Theory)

Course Code : BBACA-152-GEN

Course Title : Relational Database Management System

No. of Credits 04

No. of Teaching Hours 48

Course Objectives:

1. To teach fundamental concepts of RDBMS (PL/PgSQL)
2. To teach Database Management operations
3. Be familiar with the basic issues of Transaction Processing
4. Be familiar with the basic issues of Transaction Concurrency Control
5. To teach Data Security and its importance
6. To understand Relational Database Concepts
7. To understand Transaction Management Concepts in Database System.
8. To write PL/SQL programs that use: procedure, function, package, cursor and trigger.

Course Outcomes:

By the end of the course, students will be able to:
CO1. Describe the fundamental elements of Database Management System.

CO2. Formulate Queries using SQL and Relational Formal Query Languages.

CO3. Apply different normal forms to design the Database.

CO4. Improve the Database design by Normalization.

CO5. Analyze and design a real Database Application and develop and evaluate a

real Database Application using a Database Management System.

CO6. Use database techniques such as SQL & PL/SQL.

CO7. Explain Transaction Management in Relational Database System.

CO8. Use advanced Database Programming concepts.

Topics and Learning Points	Teaching Hours
Unit 1: **Introduction to RDBMS**	**06**

1.1 Introduction to popular RDBMS product and their features

1.2 Difference Between DBMS and RDBMS

1.3 Relationship among application programs and RDBMS

| **Unit 2:**   **PL-SQL** | **12** |

2.1   Overview of PLSQL

2.2   Data Types

2.3   PLSQL Block

2.4   % Type, % rowtype

2.5   Operators, Functions, Comparison, Numeric, Character,
        Date

2.6   Control Statement

2.7   Exception Handling

        2.7.1. Predefined

        2.7.2. User defined exception

2.8   Functions, Procedures

2.9   Cursor

        2.9.1. Definition

        2.9.2. Types of Cursor implicit, Explicit (Attributes),

        2.9.3. Parameterized Cursor.

2.10 Trigger Package

| **Unit 3:**   **Transaction Management** | **12** |

3.1   Transaction Concept

3.2   Transaction Properties

3.3   Transaction States

3.4   Concurrent Execution

3.5   Serializability

        3.5.1 Conflict Serializability

        3.5.2 View Serializability

3.6   Recoverability

        3.6.1 Recoverable Schedule

        3.6.2 Cascadless Schedule

Unit 4   Concurrency Control & Recovery System   12

4.1   Lock Based Protocol

   4.1.1 Locks

   4.1.2 Granting of Locks

   4.1.3 Two Phase Locking Protocol

4.2   Timestamp Based Protocol

   4.2.1 Timestamp

   4.2.2 Timestamp Ordering Protocol

   4.2.3 Thomas Write rule

4.3   Validation Based Protocol

4.4   Deadlock Handling

   4.4.1 Deadlock Prevention

   4.4.2 Deadlock Detection

   4.4.3 Deadlock Recovery

4.5   Failure Classification

   4.5.1   Transaction Failure

   4.5.2   System Crash

   4.5.3   Disk Failure

4.6 Storage Structure

   4.6.1 Storage Types

   4.6.2 Data Access

4.7 Recovery & Atomicity

   4.7.1 Log Based Recovery

   4.7.2 Deferred Database Modification

   4.7.3 Immediate Database Modification

   4.7.4 Checkpoints

4.8   Recovery with concurrent transaction

   4.8.1 Transaction Rollback

   4.8.2 Restart Recovery

4.9 Remote Backup System

References:

1. Database System Concepts By Henry korth and A. Silberschatz S. Sudarshan, Tata McGraw- Hill Education
2. Fundamentals of Database Systems, By: Elmasri and Navathe, 4th Edition Practical PostgreSQL O'REILLY
3. SQL/PLSQL the programming language of oracle Ivan Bayross BPB Publications New Delhi.
4. Database Management Systems, Raghu Ramakrishnan and Johannes Gehrke, McGraw- Hill Science/Engineering/Math; 3 Edition
5. PostgreSQL Query Optimization: The Ultimate Guide to Building Efficient Queries 1st ed. Edition by Henrietta Dombrovskaya (Author), Boris Novikov (Contributor), Anna Bailliekova (Contributor)

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA(C.A)

Course: : Relational Database Management System **Course Code:** BBACA-152-GEN

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	3	2	2	2	1	1	1	2	3	2	2	3	2	1
CO2	3	3	3	2	3	3	2	1	2	3	2	1	3	2	1
CO3	3	3	3	2	3	3	2	1	2	3	2	2	3	3	2
CO4	3	3	3	3	3	3	2	1	2	3	2	2	3	3	2
CO5	3	3	3	3	3	3	3	2	2	3	2	3	3	3	2
CO6	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
CO7	3	3	3	3	3	3	3	2	2	3	2	2	3	3	3

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they require a fundamental understanding of database management systems, SQL, normalization, and transaction management.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO6, CO7 are strongly mapped (3) since these COs require procedural knowledge to apply SQL, design databases, and manage transactions.

PO3: Critical Thinking and Problem-Solving Skills
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) because they emphasize problem-solving using database techniques, including query formulation, normalization, and application development.

PO4: Communication Skills
CO5, CO6, CO7 are moderately mapped (2) since developing and explaining database applications and transactions involves clear communication.

PO5: Analytical Reasoning Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) because these COs involve analyzing database designs, queries, and transactions.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO5, CO6, CO7 are strongly mapped (3) because applying database management and transaction concepts leads to practical, innovative applications.

PO7: Multidisciplinary Competence
CO5, CO6, CO7 are moderately mapped (2) as database management is applicable across various domains like software engineering, business applications, and system design.

PO8: Value Inculcation through Community Engagement
CO5 has a weak mapping (1) as real-world database applications may impact community-based projects but are not the focus of this CO.

PO9: Traditional Knowledge into Modern Application
CO1, CO2, CO3, CO4, CO5, CO6, CO7 have a moderate mapping (2) since modern database applications leverage traditional relational database concepts and SQL.

PO10: Design and Development of System
CO5, CO6, CO7 are strongly mapped (3) because designing and implementing real-world database applications requires in-depth knowledge of system design principles.

PO11: Ethical and Social Responsibility
CO1, CO5, CO6, CO7 have a moderate mapping (2) as they involve ethical considerations such as data integrity, privacy, and secure transaction management.

PO12: Research-Related Skills
CO5, CO6, CO7 have a moderate mapping (2) since understanding database systems and transactions is crucial for computational research.

PO13: Teamwork
CO5, CO6, CO7 are moderately mapped (2) because real-world database development is often done in teams, requiring collaboration and coordination.

PO14: Area Specific Expertise
CO5, CO6, CO7 are strongly mapped (3) as expertise in database management, SQL, and transaction handling is essential for specialization in this area.

PO15: Environmental Awareness
CO5, CO6, CO7 have weak mapping (1) since database management systems are not directly related to environmental awareness but contribute to system resource management.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code   : BBACA

Class   : F.Y. BBA (C.A)

Semester   II

Course Type   : General (Practical)

Course Code   : BBACA-153-GEN

Course Title   : Computer Laboratory-III

No. of Credits   02

No. of Teaching Hours 60

Course Objectives:

1. To introduce students to fundamental data structures such as arrays, linked lists, stacks, queues, and trees, and implement them in C programming.
2. To enhance problem-solving and logical thinking skills by developing efficient algorithms for real-world applications.
3. To provide hands-on experience in implementing data structures and algorithms through laboratory exercises.
4. To enable students to analyze and compare the time and space complexity of various data structures and algorithms.
5. To understand and apply sorting, searching, and traversal techniques for different data structures.

Course Outcome:

By the end of this lab course, students will be able to:

CO1. Implement and demonstrate the functionality of basic data structures such as arrays, linked lists, stacks, and queues in C.

CO2. Apply data structures to solve practical problems and develop efficient algorithms for specific tasks.

CO3. Compare and analyze the performance of different sorting and searching algorithms in terms of time and space complexity.

CO4. Construct and traverse trees and graphs for applications like shortest path and

hierarchical data representation.

CO5. Write modular and reusable code by applying best practices in C programming for implementing data structures.

CO6.Gain proficiency in debugging and testing programs to ensure correctness and efficiency.

CO7. Implement linear data structure such as stacks, queues, linked lists and their Applications.

Topics and Learning Points	Teaching Hours

Data Structure using C Assignments

1   Write a C program to copy one array to another using pointers.

2   Write a C program to swap two arrays using pointers.

3   Write a C program to search an element in array using pointers.

4   Write a C program to add two matrix using pointers.

5   Write a C program to multiply two matrix using pointers.

6   Write a C program to find maximum and minimum number using DMA

7   Write a 'C' program that create a 2-D table of integers whose size will be specified at run time. (Dynamic Memory Allocation)

8   Write a 'C' program to accept the details of employees from user and display it on the screen using Dynamic Memory Allocation.

9   Write a 'C' program for addition of two polynomials using array.

10   Write a 'C' program to sort array elements using Bubble sort method.

11   Write a 'C' program to sort array elements using Insertion sort method

12   Write a 'C' program to sort array elements in ascending order using Selection sort method.

13   Write a 'C' program to sort the element using Quick sort (recursive) method.

14   Write a 'C' program to sort the array elements in ascending order using Merge sort method.

15   Write a 'C' program for implementing Linear Search method using function.

16   Write a 'C' program to search given elements into the list using Non-Recursive Binary Search Method.

17   Write a 'C' program to search given element into the list using Recursive Binary search method.

18   Write a program in C to create and display a Singly Linked List.

19   Write a program in C to create a singly linked list of n nodes and display it in reverse order.

20   Write a 'C' program to create two singly linked lists and perform the union of two lists and display it.

21   Write a 'C' program to create two singly linked lists and perform the intersection operations on two lists and display the resultant list

22   Write a program in C to insert a new node at the end of a Singly Linked List.

23   Write a 'C' program to swap mth and nth element of singly linked list

24   Write a menu driven program using 'C' for singly linked list-

   .   To create linked list.

   .   To display linked list

   .   To insert node at last position of linked list.

   .   To delete node from specific position of linked list.

25   Write a program in C to insert a node at the beginning of a doubly linked list.

26   Write a program in C to insert a new node at any position in a doubly linked list.

27   Write a 'C' program to create Circular Singly Link list and display it.

28   Write a 'C' program to accept an infix expression, convert it into its equivalent postfix expression and display the result.

29   Write a 'C' program to accept an infix expression, convert it into its equivalent prefix expression and display the result.

30   Write menu driven program using 'C' for Dynamic implementation of Stack. The menu includes following operations:

   a.   push

   b.   pop

   c.   display

   d.   exit

31   Write menu driven program using 'C' for Circular doubly linked list. The menu includes

   a.   Create

   b.   Display

   c.   Exit

32   Write a menu driven program using 'C' for Dynamic implementation of Queue for integers. The menu includes

   a.   Insert

   b.   Delete

      c. Display

      d. Exit

33   Write menu driven program using 'C' for Binary Search Tree. The menu includes

      a. Create a BST

      b. Insert element in a BST

      c. Delete a given element from BST

      d. Display

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA (C.A)
Course: Computer Laboratory-III   **Course Code:** : BBACA-153-GEN

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	3	3	2	3	1	1	2	2	3	2	2	3	2	1
CO2	3	3	3	3	3	2	2	2	2	3	3	2	3	2	1
CO3	3	3	3	3	3	3	2	2	3	3	3	2	3	2	1
CO4	3	3	3	3	3	3	2	2	3	3	3	2	3	3	2
CO5	3	3	3	2	3	3	3	3	2	3	3	3	3	3	2
CO6	3	3	3	2	3	3	3	2	3	3	3	3	3	2	3
CO7	3	3	3	3	3	2	3	2	2	3	3	3	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as these COs involve implementing and understanding core data structures, algorithms, and their applications.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve applying programming constructs to solve real-world problems using data structures.

PO3: Critical Thinking and Problem-Solving Skills
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) because these COs require analyzing problems, applying data structures efficiently, and implementing algorithms with the best time-space trade-offs.

PO4: Communication Skills
CO5, CO6 are moderately mapped (2) as these COs involve writing clear, modular, and reusable code and ensuring efficient communication through documentation and debugging.

PO5: Analytical Reasoning Skills

CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as these COs require deep analytical skills to understand and evaluate algorithms, data structures, and their performances.

PO6: Innovation, Employability, and Entrepreneurial Skills

CO2, CO3, CO4, CO5, CO7 are strongly mapped (3) as solving practical problems with data structures and developing efficient algorithms is crucial in real-world applications and innovation.

PO7: Multidisciplinary Competence

CO5, CO6, CO7 are moderately mapped (2) as the knowledge of data structures is widely applicable across various domains such as software development, engineering, and business applications.

PO8: Value Inculcation through Community Engagement

CO5 has a weak mapping (1) as the application of data structures in community engagement is minimal, but understanding algorithm efficiency may support scalable community-based systems.

PO9: Traditional Knowledge into Modern Application

CO1, CO2, CO3, CO4, CO5, CO6, CO7 have a moderate mapping (2) as modern data structure applications build on traditional concepts and principles of computer science.

PO10: Design and Development of System

CO2, CO3, CO4, CO5, CO6 are strongly mapped (3) since designing and developing algorithms and systems using appropriate data structures is key to creating efficient, scalable software systems.

PO11: Ethical and Social Responsibility

CO2, CO5, CO6 have a moderate mapping (2) as ethical coding practices and debugging contribute to writing error-free code and ensuring that data structures are used efficiently.

PO12: Research-Related Skills

CO5, CO6, CO7 have a moderate mapping (2) as data structure analysis, algorithm design, and debugging are important for research in computer science and related fields.

PO13: Teamwork

CO5, CO6, CO7 are moderately mapped (2) as the application of data structures in team-based projects requires collaboration, sharing code, and debugging.

PO14: Area Specific Expertise

CO5, CO6, CO7 are strongly mapped (3) as expertise in implementing and analyzing data structures is a specialized skill critical for software development.

PO15: Environmental Awareness

CO5, CO6 have weak mapping (1) since environmental awareness is not directly related to data structure implementation, though efficient code can indirectly contribute to resource optimization.

Name of the Programme : BBA (Computer Application)

Programme Code   : BBACA

Class   : F.Y. BBA (C.A)

Semester   II

Course Type   : General (Practical)

Course Code   : BBACA-154-GEN

Course Title   : Computer Laboratory- IV

No. of Credits   02

No. of Teaching Hours   60

Course Objectives:

1. To provide hands-on experience in designing, creating, and managing relational databases.
2. To familiarize students with SQL (Structured Query Language) for performing database operations such as querying, updating, and managing data.
3. To understand and implement database normalization techniques for efficient data storage and retrieval.
4. To develop skills in creating and managing database schemas, tables, constraints, and relationships.
5. To expose students to advanced database concepts such as stored procedures, triggers, and transactions.

Course Outcome:

By the end of this lab course, students will be able to:

CO1.Design and implement relational database schemas using appropriate tools and techniques.

CO2.Construct and execute SQL queries for data insertion, modification, deletion, and retrieval from relational databases.

CO3. Apply normalization techniques to minimize data redundancy and enhance database efficiency.

CO4. Implement database constraints such as primary keys, foreign keys, and unique constraints to ensure data integrity.

CO5.Create and execute stored procedures, functions, and triggers to automate database operations.

CO6. Handle database transactions by ensuring ACID (Atomicity, Consistency, Isolation, Durability) properties for reliable data management.

CO7.Analyze and optimize query performance for effective data retrieval and decision-making in large datasets.

Topics and Learning Points

Relational Database Management System Assignment

Consider the following entities and their relationship.
Customer (c_no, c_name, c_city, c_ph_no)

Ticket (t_no, booking_date, fare, traveling_date)

Relationship between Customer and Ticket is one-to-many.

Constraints: primary key, foreign key

c_name should not be null,

fare should be greater than zero.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:
1) Write a procedure to display names of customer who have booked bus on given date.
2) Write a trigger that restricts insertion of ticket having traveling date smaller than booking date.(Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Student (s_reg_no, s_name, s_class)

Competition (comp_no, comp_name, comp_type)

Relationship between Student and Competition is many-to-many with descriptive attribute rank and year.

Constraints: primary key, foreign key,

primary key for third table(s_reg_no, comp_no, year),

s_name and comp_name should not be null,

comp_type can be sports or academic.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will accept s_reg_no of student and returns total number of competition in which student has participated in a given year.
2) Write a cursor which will display year wise details of competitions held. (Use parameterized cursor)

Consider the following entities and their relationship.
Owner (o_no, o_name, o_city, o_ph_no)

Estate (e_no, e_type, e_city, e_price)

Relationship between Owner and Estate is one-to-many.

Constraints : primary key, foreign key,

o_name should not be null,
e_type can be flat, bungalow or land.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will accept owner number and display details of all estates of given owner which belongs to pune city.
2) Write a cursor which will display type wise estate details. (Use parameterized cursor)

Consider the following entities and their relationship.
Bus(bus_no, capacity, source, destination)
Driver(driver_no, driver_name, license_no, addr, age, salary)
Relationship between Bus and Driver is many-to-many with descriptive attribute date_of_duty_allotted and shift.

Constraints: primary key, foreign key,

primary key for third table (bus_no, driver_no,date_of_duty_allotted),

driver_name should not be null,

shift can be morning or evening.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will return name of driver having maximum salary.
2) Write a cursor which will display date wise bus and their driver details.

Consider the following entities and their relationship.
Drug(d_no, d_name, company, price)
       Medical _store(m_no, m_name, m_city, ph_no)

Relationship between Drug and Medical_Store is many-to-many with descriptive attribute quantity.

Constraints:primary key, foreign key,

m_name and d_name should not be null,
m_city can be pune or pimpri.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a package, which consists of one procedure and one function. Pass drug number as a parameter to procedure and display details of that drug. Pass city as a parameter to a function and return total number of medical_store in given city.
2) Write a trigger that restricts insertion and updation of drug having price less than zero. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Train(t_no, t_name)
Passenger (p_no, p_name, addr, age)

Relationship between Train and Passenger is many-to-many with descriptive attribute date, seat_no and amt.

Constraints : primary key, foreign key,

primary key for third table (t_no, p_no, date),

t_name and p_name should not be null,

amt should be greater than zero.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will display train details having maximum passenger for a given date.
2) Write a cursor which will display date wise train and their passenger details.

Consider the following entities and their relationship.
Route(route_no, source, destination, no_of_station)
Bus (bus_no, capacity, depot_name)

Relationship between Route and Bus is one-to-many

Constraints: primary key, foreign key,

depot_name should not be null,

bus capacity should be greater than 40.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display all bus details for a given route.
2) Write a trigger that restricts insertion of route having number of station less than zero. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
University (u_no, u_name, u_city)
College (c_no, c_name, c_city, year_of_establishment)

Relationship between University and College is one-to-many

Constraints: primary key, foreign key,

u_name and c_name should not be null.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a package, which consists of one procedure and one function. Pass university number as a parameter to procedure and display details of that university. Pass city as a parameter to a function and return total number of colleges in given city.
2) Write a cursor which will display university wise their college details. (Use parameterized cursor)

Consider the following entities and their relationship.
Patient (p_no, p_name, p_addr)
Doctor (d_no, d_name, d_addr, city)

Relationship between Patient and Doctor is many-to-many with descriptive attribute disease and no_of_visits.

Constraints: primary key, foreign key,

    primary key for third table(p_no, d_no, disease),

    p_name and d_name should not be null.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display patient detail who has visited more than 3 times to the given doctor for 'Diabetes'.
2) Write a trigger which will restrict insertion or updation of doctor_patient details having no_of_visits less than zero. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Crop (c_no, c_name, c_season, pesticides)
  Farmer (f_no, f_name, f_location)

Relationship between Crop and Farmer is many-to-many with descriptive attribute year.

Constraints: primary key, foreign key,

    primary key for third table(c_no, f_no, year),

    c_name and f_name should not be null,

c_season can be rabi or kharif.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will return total number of farmers harvesting given crop in a given year.
2) Write a cursor which will display season wise information of crops harvested by the farmers. (Use parameterized cursor)

Consider the following entities and their relationship.
Researcher (r_no, r_name, r_city)
  Research_Paper (rp_no, rp_title, rp_subject, rp_level)

Relationship between Researcher and Research_Paper is many-to-many with descriptive attribute year.

Constraints: primary key, foreign key,

    r_name and rp_title should not be null,
     rp_subject can be computer, electronics or finance.
     rp_level can be state, national or international.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display details of research paper of a given subject for a specified year.
2) Write a trigger before insert or update of each row of research_paper published after 2010 be entered into table. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Donor (donor_no, donor_name, city)
  Blood_donation_detail (bd_no, blood_group, qty, date_of_collection)

Relationship between Donor and Blood_donation_detail is one-to-many.

Constraints: primary key, foreign key,

donor_name should not be null,

blood_group can be A+, A-, B+, B-, AB+, AB-, O+, O-

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will count total amount of blood collected for a given blood group on given date.
2) Write a cursor which will display donor wise blood donation details. (Use parameterized cursor)

Consider the following entities and their relationship.
Client (c_no, c_name, c_addr, birth_date)
   Policy_info (p_no, p_name, maturity_amt, prem_amt, policy_term)

Relationship between Client and Policy_info is many-to-many with descriptive attribute date_of_purchase.

Constraints: primary key, foreign key,

c_name and p_name should not be null,
   policy_term should be greater than zero.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display all policy details of given client for a given year.
2) Write a trigger which restricts insertion of policy_info having maturity amount less than premium amount. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Company (c_no, c_name, c_city, c_share_value)
   Person (p_no, p_name, p_city, p_ph_no)

Relationship between Company and Person is many-to-many with descriptive attribute no_of_shares.

Constraints: primary key, foreign key,

c_name and p_name should not be null,
   no_of_shares should be greater than zero.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will return name of person having maximum number of shares of given company.
2) Write a cursor which will display person wise share details. (Use parameterized cursor)

Consider the following entities and their relationship.
Person (p_no, p_name, p_addr)
   Investment (inv_no, inv_name, inv_date, inv_amt)

Relationship between Person and Investment is one-to-many.

Constraints: primary key, foreign key,

p_name and inv_name should not be null,

inv_amt should be greater than 10000.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display details of person, made investment on given date.
2) Write a trigger that restricts insertion or updation of investment having inv_date greater than current date. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Customer (c_no, c_name, c_city, c_ph_no)

Ticket (t_no, booking_date, fare, traveling_date)

Relationship between Customer and Ticket is one-to-many.

Constraints: primary key, foreign key,

c_name should not be null,

fare should be greater than zero.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:
1) Write a function which will calculate and return total fare collected from customers on given date.
2) Write a cursor which will display date wise ticket booked by customer. (Use parameterized cursor)
Consider the following entities and their relationship.
Student (s_reg_no, s_name, s_class)

Competition (comp_no, comp_name, comp_type)

Relationship between Student and Competition is many-to-many with descriptive attribute rank and year.

Constraints: primary key, foreign key,

primary key for third table(s_reg_no, comp_no, year)

s_name and comp_name should not be null,

comp_type can be sports or academic.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will accept year and type of competition as an input and display details of competition accordingly.
2) Write a trigger that restricts insertion of rank value greater than 3. (Raise user defined exception and give appropriate message)
Consider the following entities and their relationship.
Owner (o_no, o_name, o_city, o_ph_no)
Estate (e_no, e_type, e_city, e_price)

The Relationship between Owner and Estate is one-to-many.

Constraints: primary key, foreign key,

o_name should not be null,
e_type can be flat, bungalow or land.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will count and returns number of owners who have purchase estate in the same city in which they live.
2) Write a trigger that restricts insertion or updation of estate having price less than 1 lakh. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Bus(bus_no, capacity, source, destination)
Driver(driver_no, driver_name, license_no, addr, age, salary)
Relationship between Bus and Driver is many-to-many with descriptive attribute date_of_duty_allotted and shift

Constraints: primary key, foreign key,

primary key for third table (bus_no, driver_no, date_of_duty_allotted),

driver_name should not be null,
shift can be morning or evening.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display bus_no and name of allotted driver on given date and shift.
2) Write a trigger that restricts insertion or updation of driver table if driver age is less than 18 or greater than 50. (Raise user defined exception and give appropriate message).

Consider the following entities and their relationship.
Drug(d_no, d_name, company, price)
   Medical _Store(m_no,m_name,m_city,ph_no)
Relationship between Drug and Medical_Store is many-to-many with descriptive attribute quantity.

Constraints:primary key, foreign key,

m_name and d_name should not be null,
m_city can be pune or pimpri

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will count total number of drugs available in given medical store.
2) Write a cursor which will display medical store wise drug details with available quantity.

Consider the following entities and their relationship.
Train(t_no, t_name)
Passenger (p_no, p_name, addr, age)

Relationship between Train and Passenger is many-to-many with descriptive attribute date, seat_no and amt.

Constraints : primary key, foreign key,

primary key for third table (t_no, p_no, date),

t_name and p_name should not be null,

amt should be greater than zero.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display passenger details of given train on '1 July 2014'.
2) Write a trigger that restricts insertion of train_passenger detail having date less than current date. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Route(route_no, source, destination, no_of_station)
Bus (bus_no, capacity, depot_name)

Relationship between Route and Bus is one-to-many

Constraints: primary key, foreign key,

depot_name should not be null,

bus capacity should be greater than 40.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will return total number of routes having number of stations greater than 10.
2) Write a cursor which will display route wise bus details. (Use parameterized cursor)

Consider the following entities and their relationship.
University (u_no, u_name, u_city)
College (c_no, c_name, c_city, year_of_establishment)

Relationship between University and College is one-to-many

Constraints: primary key, foreign key,

u_name and c_name should not be null.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display year wise details of colleges belongs to given University.
2) Write a trigger that restricts insertion of college having year of establishment greater than current year. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Patient (p_no, p_name, p_addr)
Doctor (d_no, d_name, d_addr, city)
Relationship between Patient and Doctor is many-to-many with descriptive attribute disease and no_of_visits.

Constraints: primary key, foreign key,
primary key for third table(p_no, d_no, disease),
p_name and d_name should not be null.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will count total number of patients visiting to given doctor for 'Asthma'.
2) Write a cursor which will display doctor wise details of patients visited to them. (Use parameterized cursor)

Consider the following entities and their relationship.
Crop (c_no, c_name, c_season, pesticides)
     Farmer (f_no, f_name, f_location)

Relationship between Crop and Farmer is many-to-many with descriptive attribute year.

Constraints: primary key, foreign key,

        primary key for third table(c_no, f_no, year),

        c_name and f_name should not be null,

c_season can be rabi or kharif.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display crop detail harvested by given farmer in given year.
2) Write a trigger which will restricts insertion or updation of crop_farmer table having year greater than current year. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Researcher (r_no, r_name, r_city)
     Research_Paper (rp_no, rp_title, rp_subject, rp_level)

Relationship between Researcher and Research_Paper is many-to-many with descriptive attribute year.

Constraints: primary key, foreign key,

        r_name and rp_title should not be null,
           rp_subject can be computer or electronics or finance.
           rp_level can be state, national or international.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will return name of subject for which maximum numbers of national level papers were presented by researcher in year 2013.
2) Write a cursor which will display rp_level wise and researcher wise details of research paper presented by them.

Consider the following entities and their relationship.
Donor (donor_no, donor_name, city)
     Blood_donation_detail (bd_no, blood_group, qty, date_of_collection)
Relationship between Donor and Blood_donation_detail is one-to-many.

Constraints: primary key, foreign key,

        donor_name should not be null,

        blood_group can be A+, A-, B+, B-, AB+, AB-, O+, O-

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display blood group wise total amount of quantity of blood available.
2) Write a trigger that restricts insertion of blood_donation_details having quantity greater than 300ml. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Client (c_no, c_name, c_addr, birth_date)
    Policy_info (p_no, p_name, maturity_amt, prem_amt, policy_term)
Relationship between Client and Policy_info is many-to-many with descriptive attribute date_of_purchase.

Constraints: primary key, foreign key,

        c_name and p_name should not be null,
        policy_term should be greater than zero.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a function which will return name of policy taken by minimum number of clients.
2) Write a cursor which will display client wise policy details. (Use parameterized cursor)

Consider the following entities and their relationship.
Company (c_no, c_name, c_city, c_share_value)
    Person (p_no, p_name, p_city, p_ph_no)
Relationship between Company and Person is many-to-many with descriptive attribute no_of_shares.

Constraints: primary key, foreign key,

        c_name and p_name should not be null,
        no_of_shares should be greater than zero.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:

1) Write a procedure which will display names of person who are shareholder of the given company.
2) Write a trigger which get activated when share value of company become less than Rs. 10. (Raise user defined exception and give appropriate message)

Consider the following entities and their relationship.
Person (p_no, p_name, p_addr)
    Investment (inv_no, inv_name, inv_date, inv_amt)
Relationship between Person and Investment is one-to-many.

Constraints: primary key, foreign key,

        p_name and inv_name should not be null,

        inv_amt should be greater than 10000.

Create a RDB in 3NF and write PL/SQL blocks in Oracle for the following:
1) Write a function which will return name of person having maximum total amount of investment.
2) Write a cursor which will display person wise details of investment. (Use parameterized cursor)

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA (C.A)

Course: Computer Laboratory- IV   **Course Code:** BBACA-154-GEN

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	3	3	2	3	1	2	2	2	3	2	2	3	2	1
CO2	3	3	3	3	3	2	2	2	2	3	3	2	3	2	1
CO3	3	3	3	3	3	3	2	2	3	3	3	2	3	2	1
CO4	3	3	3	3	3	3	2	2	3	3	3	2	3	3	2
CO5	3	3	3	2	3	3	3	3	2	3	3	3	3	3	2
CO6	3	3	3	2	3	3	3	2	3	3	3	3	3	2	3
CO7	3	3	3	3	3	2	3	2	2	3	3	3	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve the application of fundamental database concepts such as designing relational schemas, writing SQL queries, and implementing normalization.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they require the procedural knowledge to write and execute SQL queries, implement database constraints, and automate operations.

PO3: Critical Thinking and Problem-Solving Skills
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) since constructing and optimizing SQL queries, applying normalization, and managing transactions involve significant problem-solving and critical thinking.

PO4: Communication Skills
CO5, CO6 are moderately mapped (2) as they require the ability to communicate complex database operations like stored procedures, functions, and triggers to stakeholders.

PO5: Analytical Reasoning Skills
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as these COs require data analysis and optimization for effective database management and performance improvement.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO2, CO3, CO4, CO5, CO7 are strongly mapped (3) as these skills directly enhance employability by enabling the creation of robust and efficient databases and database-driven applications.

PO7: Multidisciplinary Competence
CO5, CO6, CO7 are moderately mapped (2) as the knowledge of relational databases and their implementation in various fields (like business, healthcare, etc.) requires multidisciplinary competence.

PO8: Value Inculcation through Community Engagement
CO5 has a weak mapping (1) as the direct impact on community engagement is minimal but might be indirectly related through automated data management systems.

PO9: Traditional Knowledge into Modern Application
CO1, CO2, CO3, CO4, CO5, CO6, CO7 have moderate mapping (2) since modern database systems build on traditional concepts like SQL and normalization.

PO10: Design and Development of System
CO2, CO3, CO4, CO5, CO6 are strongly mapped (3) because designing relational databases, writing SQL queries, and optimizing query performance are key to building effective database systems.

PO11: Ethical and Social Responsibility
CO2, CO5, CO6 have a moderate mapping (2) as writing efficient SQL queries, handling database transactions, and ensuring data integrity involve adhering to ethical practices in database management.

PO12: Research-Related Skills
CO5, CO6, CO7 have moderate mapping (2) as data management, optimization, and analysis contribute to research in database systems and applied fields.

PO13: Teamwork
CO5, CO6, CO7 are moderately mapped (2) as teamwork skills are needed for collaborative database design, query optimization, and maintaining database applications.

PO14: Area Specific Expertise
CO5, CO6, CO7 are strongly mapped (3) as expertise in relational databases, SQL, and performance optimization is crucial for specialized roles in database management.

PO15: Environmental Awareness
CO5, CO6 have weak mapping (1) as environmental awareness is not directly relevant to database operations but may relate indirectly to resource optimization through efficient queries

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code   : BBACA

Class   : F.Y. BBA (C.A)

Semester   II

Course Type   : OE(Theory)

Course Code   : BCA-155-OE

Course Title   : Business Mathematics

No. of Credits   02

No. of Teaching Hours   30

Course Objectives:

1. Learn to work with infinite sequences and series.

2. To understand the ideas of the basis step and the inductive step in a proof by mathematical induction.

3. To understand how to perform the operations of union, intersection, complements, anddifference on sets using proper notation.

4. To understand construct and interpret Venn diagram.

5. To provide detailed of matrices which is applied for solving system of linear equations and useful in various fields of technology.

6. Learn to compute determinants and know their properties.

7. Work with matrices and determine if a given square matrix is invertible.

Course Outcome:

By the end of the course, students will be able to:

CO1. Identify the base case, induction hypothesis, and inductive step in an induction argument, to prove statements using mathematical induction.

CO2. Able to use logical notations to define and reason about fundamental mathematical concepts such as sets relations and functions.

CO3. Basic knowledge of set theory, functions, and relations concepts.

CO4. Construct simple mathematical proofs and possess the ability to verify them.

CO5. Apply the knowledge of matrices to solve the problem.

CO6. Utilize applications of matrices to solve industrial problem.

CO7 Able to find the determinant of a product of square matrices, of the transpose of a square **matrix**, and of the inverse of an invertible matrix.

Topics and Learning Points	Teaching Hours

Unit1   **Sequence, Series and Mathematical Induction**   **(10L)**

1.1 Sequence and Series.

1.2 Arithmetic Progression (A.P.), Arithmetic Mean (A.M.), Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P. Arithmetic and geometric series, infinite G.P. and its sum, geometric mean (G.M.).

1.3 Relation between A.M. and G.M.

1.4 Process of the proof by induction

1.5 The principle of mathematical induction and simple applications

Unit2   **Sets**   **(10L)**

2.1 Introduction.

2.2 Methods of describing of a set: Tabular form, Set builder form.

2.3 Finite set, Infinite set, Empty set, Power set, Subset, Universal set, Equal sets, disjoint sets, and Complementary set.

2.4 Operation on Sets: Union of sets, Intersection of sets, Difference of sets, Examples.

2.5 De Morgan's Laws (without proof).

2.6 Venn diagram, Examples.

2.7 Cartesian product of two sets, Examples.

2.8 Idempotent laws, Identity laws, Commutative Laws, Associative laws, Distributive laws, Inverse laws, Involution laws.

2.9 Duality.

2.10 Examples based on above.

Unit 3   **Matrix and Determinant**   **(10L)**

3.1 Introduction.

3.2 Types of matrices: Row matrix, Column matrix, Null matrix, Unit matrix, Square Matrix, Diagonal matrix, Scalar matrix, Symmetric   matrix, Skew -symmetric matrix, Transpose of a matrix.

3.3 Definition of Determinants of order 2nd & 3rd and their

expansions.
3.4 Singular and Non-Singular Matrices.
3.5 Algebra of Matrices: Equality of matrices, Scalar Multiplication of Matrix, Addition of matrices, Subtraction of matrices, Multiplication of matrices.
3.6 Elementary Row & Column Transformations.
3.7 Inverse of Matrix.
3.8 Examples based on above

References:

1. Mathematical Foundations of Data analysis – Jeft. M. Phillips

2. Calculus and Linear Algebra - Book by Donald John Lewis andWilfred Kaplan

3. Vector Calculus, Linear Algebra, and Differential Forms-John H. Hubbard, Barbara Hubbard

4. Discrete Mathematics & Structures by Satinder Bal Gupta,University Science Press

5. Fundamental Approach to Discrete Mathematics by D. P.Acharja

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA (C.A)
Course: Business Mathematics   **Course Code:** BCA-155-OE

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

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CO3	3	3	3	3	3	2	2	2	3	3	3	2	3	2	1
CO4	3	3	3	3	3	2	3	3	3	3	3	3	3	3	2
CO5	3	3	3	3	3	3	3	3	2	3	3	3	3	3	2
CO6	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
CO7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they require solid foundational knowledge in mathematical induction, set theory, and matrix operations.

PO2: Procedural Knowledge for Skill Enhancement
CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they involve understanding logical notations, constructing proofs, and applying knowledge of matrices.

PO3: Critical Thinking and Problem-Solving Skills
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) since these COs involve logical reasoning and solving complex mathematical problems using various techniques.
PO4: Communication Skills
CO4 has a strong mapping (3) as constructing mathematical proofs and clearly explaining them requires effective communication skills.

PO5: Analytical Reasoning Skills
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as these COs require strong analytical reasoning for problem-solving, applying logical notations, and verifying mathematical proofs.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO5, CO6, CO7 are strongly mapped (3) since applying knowledge of matrices and their applications in real-world scenarios is crucial for employability in various fields.

PO7: Multidisciplinary Competence
CO5, CO6, CO7 are strongly mapped (3) as matrices and set theory have applications across disciplines like engineering, economics, computer science, and more.

PO8: Value Inculcation through Community Engagement
CO6 has a moderate mapping (2) as the application of matrices to solve industrial problems may indirectly relate to community engagement through real-world problem-solving.

PO9: Traditional Knowledge into Modern Application
CO5, CO6, CO7 have moderate mapping (2) as these skills build on traditional mathematical concepts applied in modern industrial and business contexts.

PO10: Design and Development of System
CO5, CO6, CO7 are strongly mapped (3) since applying matrix theory to solve practical problems and designing systems (e.g., industrial applications) requires proficiency in both theory and system design.

PO11: Ethical and Social Responsibility
CO6 has a weak mapping (1) as applying matrices to solve industrial problems may have ethical implications, but it's not the primary focus of this CO.

PO12: Research-Related Skills
CO4, CO6, CO7 have moderate mapping (2) as these COs involve constructing proofs, applying mathematical knowledge, and solving complex problems, all essential in research.

PO13: Teamwork
CO6, CO7 are moderately mapped (2) as the application of mathematical knowledge in real-world contexts might require teamwork, especially in interdisciplinary settings.

PO14: Area Specific Expertise
CO5, CO6, CO7 are strongly mapped (3) as expertise in set theory, matrix operations, and their real-world applications is crucial for specialized roles in industries such as data science, engineering, and economics.

PO15: Environmental Awareness
CO6 has weak mapping (1) as environmental awareness is not directly linked to this set of course outcomes, though industrial applications could indirectly involve resource optimization

Name of the Programme   : BBA (Computer Application)

Programme Code   : BBA(C.A)

Class   : F.Y. BBA (C.A)

Semester   II

Course Type   : SEC(Practical)

Course Code   : BBACA-156 -SEC

Course Title   : Office Automation Tools

No. of Credits   02

No. of Teaching Hours   60

Course Objectives:

1. To introduce students to the basic concepts of Windows operating systems and file management.
2. To develop proficiency in using word processing software for creating, editing, and formatting documents.
3. To enable students to effectively work with spreadsheet packages for data analysis, formatting, and presentation.
4. To provide knowledge of presentation tools to create and deliver professional slideshows.
5. To equip students with practical skills for data management, document creation, and automation in an office environment.

Course Outcomes:

By the end of the course, students will be able to:

CO1: Demonstrate basic operations of the Windows operating system, including file management, creating folders, shortcuts, and navigation using Windows Explorer.

CO2: Apply basic DOS commands for file handling and understand their role in system operations.

CO3: Create, format, and manage professional documents using word processing tools, including working with text, tables, graphics, frames, and mail merge.

CO4: Develop and analyze worksheets in a spreadsheet package by using functions, organizing data, creating charts, and protecting sensitive information.

CO5: Design and deliver interactive and visually appealing presentations using slides, animations, templates, and slideshow tools.

CO6: Integrate and apply knowledge of office automation tools for efficient data management, reporting, and professional document creation in an organizational setup.

CO7 The students will be able to use various Office Automation Tools like MSWord, MS Excel & MS PowerPoint.

Topics and Learning Points	Teaching Hours
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

References:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech,2005

2. The Complete Computer upgrade and repair book,3rd edition Cheryl A Schmidt, WILEY Dreamtech

3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

4. Microsoft Office for Dummies by Wallace Wang

5. Mastering Office 2016 by Lalit Mali, Notion Press Microsoft Office for Dummies by Wallace Wang OpenOffice.org for DUMMIES by Gurdy Leete, Ellen Finkelstein and Mary Leete

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA(C.A)

Course: Office Automation Tools   **Course Code:** BBACA-156 -SEC

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	3	3	2	1	2	2	3	2	2	2	3	2	1
CO2	2	2	3	2	2	1	2	2	2	2	2	2	3	2	1
CO3	3	3	3	3	3	2	2	2	2	3	3	3	3	2	1
CO4	3	3	3	3	3	3	3	2	2	3	3	3	3	3	2
CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CO7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as these COs involve understanding the basic operations of office tools and their application for document and data management.

PO2: Procedural Knowledge for Skill Enhancement
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as they require procedural knowledge and practical skills in using office automation tools effectively in real-world tasks.

PO3: Critical Thinking and Problem-Solving Skills
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as these COs require the ability to think critically, analyze data, and use tools like spreadsheets and presentation software to address real-world problems.

PO4: Communication Skills CO3, CO5
are strongly mapped (3) as creating professional documents and delivering presentations requires effective communication and clarity.

PO5: Analytical Reasoning Skills
CO4, CO6, CO7 are strongly mapped (3) as they involve analyzing data, using functions, organizing data, and integrating office tools for efficient management.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO5, CO6, CO7 are strongly mapped (3) as proficiency in using MS Office tools for reporting, presentation, and data management directly supports employability and entrepreneurial activities.

PO7: Multidisciplinary Competence
CO6, CO7 are strongly mapped (3) as the application of office tools like MS Word, MS Excel, and MS PowerPoint is essential across multiple disciplines, especially in data handling, communication, and presentations.

PO8: Value Inculcation through Community Engagement
CO6 has a moderate mapping (2) as using office tools effectively can improve organizational communication, which indirectly supports community engagement efforts.

PO9: Traditional Knowledge into Modern Application
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as office tools like Word, Excel, and PowerPoint are traditional tools with modern applications in various sectors.

PO10: Design and Development of System
CO4, CO6, CO7 are strongly mapped (3) as these COs involve designing and delivering professional documents, presentations, and spreadsheets which contribute to system development in professional settings.

PO11: Ethical and Social Responsibility
CO6 has a moderate mapping (2) as using office automation tools for efficient data management and reporting indirectly promotes ethical practices in information handling.

PO12: Research-Related Skills
CO5, CO6 have moderate mapping (2) as these COs require skills in creating visual presentations and reports that are often crucial in research and analysis tasks.

PO13: Teamwork
CO6, CO7 are strongly mapped (3) as using office tools often requires collaboration for efficient document creation, reporting, and presentation.

PO14: Area Specific Expertise
CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as mastery in office automation tools like MS Word, Excel, and PowerPoint is an area-specific expertise needed across industries.

PO15: Environmental Awareness
CO6 has weak mapping (1) as the application of office tools may have some indirect environmental benefits through efficient data management, though the primary focus is not on environmental issues.

CBCS Syllabus as per NEP 2020 for F.Y. BBA (Computer Application) (2024 Pattern)

Name of the Programme : BBA (Computer Application)

Programme Code : BBA(C.A)

Class : F.Y. BBA (C.A)

Semester   II

Course Type : AEC (Theory)

Course Code : BBACA -157-AEC

Course Title : Business Communication-II

No. of Credits   02

No. of Teaching Hours   30

Course Objectives:

1. To enhance students' ability to communicate effectively in professional and business contexts through oral and written communication.
2. To develop proficiency in crafting clear, concise, and persuasive business documents such as emails, reports, and proposals.
3. To build confidence and competence in oral communication, including public speaking, group discussions, and presentations.
4. To cultivate active listening, critical thinking, and feedback skills to improve interpersonal communication and collaboration.
5. To familiarize students with modern communication tools and strategies used in business contexts.

Course Outcome:

By the end of the course, students will be able to:

CO1. Demonstrate effective written communication skills by creating professional business documents such as reports, memos, emails, and proposals.

CO2.Deliver clear, engaging, and structured oral presentations tailored to the target audience and context.

CO3. Apply active listening and non-verbal communication techniques to enhance interpersonal and team communication.

CO4. Engage in persuasive communication by presenting logical and compelling arguments during discussions, meetings, or negotiations.

CO5. Write and edit business correspondence with accuracy, clarity, and an appropriate tone for professional settings.

CO6. Adapt oral and written communication strategies to address diverse audiences and multicultural work environments.

CO7. Use digital communication tools and platforms effectively to collaborate and share information in professional scenarios.

Topics and Learning Points	Teaching Hours
Unit:1 **Oral Communication**	**10**
1.1 Listening, Importance of listening, Guidelines of Effective Listening.	
1.2 Group Communication/Discussion-Activity	
1.3 Speeches- Characteristics of Good Speech, Model Speech Requirement Engineering and Analysis	
1.4 Presentation- Elements of Presentation, Designing a Presentation, Practicing Delivery of Presentation, Media Management	
1.5 Press Conference, Seminars, Workshop, Conferences, Business Etiquettes	
1.6 Dialogue Skills- Need for Dialogue and Conversation Skill, Good Manners	
Unit:2 Written Communication	**10**
2.1 Layout of Business Letter, Enquiry letter, Order Letter, Complaint letter, Sales Letter, Office Memo	
2.2 Job Application Letter- Appointment, Promotion, Resignation letter	
2.3 Report Writing- Introduction, Reports by Individuals, Reports by Committees.	

References:

1. AICTE's Prescribed – Communication Skills in English, Khanna Book Publishing.

2. Lesikar, R.V. & M.E. Flatley,"Business Communication: Connecting in a Digital World", McGraw-Hill Education.

3. Murphy, H. A., Hildebrandt, H. & Thomas, J.P., Effective Business Communication.

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4. Mukerjee H. S., Business Communication: Connecting at Work. Oxford Publication

5. Boove, C.L.,Thill, J. V. & Raina, R. L, Business Communication Today, Pearson.

6. Rao, M. T. (2023) Minor Hints: Lectures Delivered to H.H. the Maharaja Gaekwar, Sayaji Rao III. Gyan Publishing

7. Getting Ready for the Real World: HBR, 2020: The Science of Strong Business Writing.

Choice Based Credit System Syllabus (2024 Pattern)

Mapping of Program Outcomes with Course Outcomes

Class: F.Y. BBA (C.A)   **Subject:** BBA(C.A)

Course: Business Communication-II   **Course   Code:**   BBACA -157-AEC

Weightage: 1=weak or low relation, 2=Moderate or partial relation, 3=Strong or direct relation

CO-PO Mapping Table

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	3	3	3	3	3	3	2	3	3	2	2	3	3	2
CO2	3	3	3	3	3	2	2	3	3	3	2	2	3	3	2
CO3	2	3	3	3	3	2	3	2	3	3	3	3	2	3	2
CO4	2	3	3	3	3	2	3	2	3	3	3	3	2	3	2
CO5	3	3	3	3	3	3	3	2	3	3	2	3	3	3	2
CO6	3	3	3	3	3	3	3	2	3	3	3	3	2	3	2
CO7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

PO1: Fundamental Knowledge and Coherent Understanding
CO1, CO2, CO5, CO6, CO7 are strongly mapped (3) as these COs require foundational knowledge of effective communication in both written and oral forms, including digital tools and multicultural settings.

PO2: Procedural Knowledge for Skill Enhancement
CO1, CO2, CO3, CO5, CO6, CO7 are strongly mapped (3) as these COs involve practical skills in creating documents, delivering presentations, and applying communication techniques, all of which are procedural in nature.

PO3: Critical Thinking and Problem-Solving Skills
CO1, CO4, CO5, CO6 are strongly mapped (3) as these COs require analytical thinking, particularly in persuasive communication, writing, and adapting strategies to different contexts.

PO4: Communication Skills
CO1, CO2, CO3, CO4, CO5, CO6, CO7 are strongly mapped (3) as these COs directly contribute to the development of advanced communication skills in writing, speaking, and using digital tools for collaboration.

PO5: Analytical Reasoning Skills
CO1, CO2, CO3, CO4 are strongly mapped (3) as they require critical reasoning, structuring arguments, and delivering clear, reasoned communication in both professional and interpersonal contexts.

PO6: Innovation, Employability, and Entrepreneurial Skills
CO5, CO6, CO7 are strongly mapped (3) as mastery of business communication tools enhances employability, encourages innovation, and prepares students for collaborative work environments.

PO7: Multidisciplinary Competence
CO6, CO7 are strongly mapped (3) as digital communication tools and strategies for multicultural work environments are necessary across various professional domains.

PO8: Value Inculcation through Community Engagement
CO6 is moderately mapped (2) as communication in a multicultural environment can promote inclusion and diversity in community engagement efforts.

PO9: Traditional Knowledge into Modern Application
CO1, CO2, CO5, CO6, CO7 are strongly mapped (3) as these COs apply traditional business communication principles (reports, emails, presentations) with modern digital tools and strategies for effective communication.

PO10: Design and Development of System
CO1, CO2, CO5, CO7 are strongly mapped (3) as these COs involve designing professional documents, delivering structured presentations, and using collaborative tools to develop communication systems in business environments.

PO11: Ethical and Social Responsibility
CO3, CO6 are moderately mapped (2) as active listening, non-verbal communication, and adapting to diverse audiences contribute to more ethical and responsible communication practices in business.

PO12: Research-Related Skills
CO1, CO2, CO5, CO7 are moderately mapped (2) as preparing well-structured business documents and using digital tools often support research and report writing in professional contexts.

PO13: Teamwork
CO3, CO4, CO7 are strongly mapped (3) as team communication, persuasion, and digital collaboration are essential for effective teamwork in business environments.

PO14: Area Specific Expertise
CO1, CO5, CO6, CO7 are strongly mapped (3) as these COs require specialized knowledge of communication tools and techniques needed in professional settings.

PO15: Environmental Awareness
CO7 has a weak mapping (3) as the use of digital communication tools can reduce paper consumption and improve the overall environmental footprint of business operations.