

Sant Ravidas Shikshan Sanstha's  
***SUPRIYATAI SULE COLLEGE OF MANAGEMENT SCIENCE***

(Affiliated to Dr. B.A.M. University, Chh. Sambhajinagar)

Sawangi Harsul, Dist. Chh. Sambhajinagar

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Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – I

Academic Year 2021-22

Subject: Financial Accounting – I

Course Outcomes (Cos)

CO1: Understand the theoretical framework of accounting and to prepare financial statements

CO2: Explain and determine depreciation and value of inventory

CO3: Learn accounting for hire purchase transactions, leases, branches and departments

CO4: Understand the concepts of partnership firm and prepare accounts for dissolution of a Partnership firm

CO5: Develop the skill of preparation of trading and profit and loss account and balance sheet using computerized accounting.

Program Outcomes (POs)

PO1: After completing three years for Bachelors in program, students will gain thorough fundamental knowledge of Commerce and Finance.

PO2 : PO 3: PO 4: PO 5: The students can acquire knowledge of Commercial Laws relevant for enterprises and their amendments.

PO3: All-inclusive structure of the course offers a number of value based and job oriented courses; and, ensures that students trained are up-to-date in knowledge.

PO4: It helps students to acquire conceptual knowledge of financial accounting and to impart skills for recording various kinds of business transactions and for preparing Accounts of corporate sectors

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PO5: The commerce and Finance focused curriculum offers specialization and elective courses. The practical exposure in these courses would equip the student to face the modern-day challenges in the field of commerce and business.

**Subject: Industrial Economics**

**Course Outcomes (Cos)**

CO1: To describe the basic relationship between Industrial and economic development.

CO2: To understand the industrial structure policies finance and management structures.

CO3: Sociologists are concerned with many topics, ranging from demographic trends to discrimination and inequalities to industrialization and democracy.

CO4: We create theories to explain the similarities, differences, and trends we see, and these theories are oftentimes based on statistical data.

**Program Outcomes (POs)**

PO1: Provides knowledge about the industrial development and Employment chances created and highlights the inter linkages between industrialisation and Agriculture industrialisation and productivity and industrialisation and foreign trade.

PO2: Explain the role of industrial policy and financial matters with regard to the industrial sickness and capacity utilisation in industry.

PO3: Gives an overview of different management systems and the rationalization of industries.

**Subject: Business Statistics**

**Course Outcomes (Cos)**

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CO1: To understand the basic concepts in Probability and Theoretical Distribution.

CO2: To apply statistical testing of hypothesis in decision making.

CO3: To estimate simple linear regression models using OLS technique.

**Program Outcomes (POs)**

PO1: To know the average value of any variable and to know the average deviation from the mean value of given variable  
PO2: To understand the concept of probability and to understand the probable occurrence of any given event satisfying a particular law of probability.

PO3: To carry over the testing of hypothesis procedure to find the validity and the representative character of a particular sample derived from a given population.

PO4: To understand the average movement in the values of a given group of variables over a given time period. Helps in identifying the overall movement in the whole sale price index cost of living index and the movement in the changes in the human development values.

PO5: To understand the practical relationship between two or more variables and to estimate and forecast the values of some strategic variables and the growth rate of economic and other social variables

**Subject: Operative System – I**

**Course Outcomes (Cos)**

CO1: Describe the fundamental concepts of operating systems, including their structure, services, and types.

CO2: Explain process management concepts like process creation, scheduling, synchronization, and inter-process communication.

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CO3: Explain process management concepts like process creation, scheduling, synchronization, and inter-process communication.

CO4: Describe file system concepts, including file organization, directory structures, and disk scheduling.

CO5: Understand and apply different synchronization mechanisms to solve classic problems like the producer-consumer problem.

**Program Outcomes (POs)**

PO1: attics, computer science, and relevant domains to solve computing problems.

PO2: **Problem Analysis:** Identifying, formulating, and analyzing complex computing problems using fundamental principles.

PO3: **Design/Development of Solutions:** Designing and evaluating solutions for complex computing problems, considering various constraints.

PO4: **Conduct Investigations of Complex Problems:** Conducting research-based investigations, including designing experiments, analyzing data, and synthesizing information.

PO5: **Modern Tool Usage:** Utilizing modern computing tools and techniques for various tasks.

**Subject: Business communication**

**Course Outcomes (Cos)**

CO1: Students should be able to explain the fundamentals of communication, including sender, receiver, message, channel, feedback, and potential barriers.

Students should be able to communicate effectively with individuals from diverse cultural backgrounds.

CO2: Students should be able to write clear, concise, and professional business documents like emails, memos, reports, and proposals.

CO3: Students should be able to deliver presentations, participate in meetings, and engage in effective interpersonal communication in a business setting.

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CO4: Students should be able to tailor their communication style to different audiences, situations, and media (e.g., formal vs. informal, digital vs. in-person).

CO5: Students should be able to recognize and interpret nonverbal cues (body language, facial expressions, etc.) and use them effectively in communication.

CO6: Students should be able to actively listen to and understand the perspectives of others in business settings.

**Program Outcomes (POs)**

**PO1: Effective Communication:**

Graduates should be able to communicate effectively in both written and oral forms, adapting their style to different audiences and situations.

**PO2: Critical Thinking and Problem Solving:**

Graduates should be able to analyze business situations, identify problems, and develop effective solutions.

**PO3: Business Acumen:**

Graduates should possess a strong understanding of business principles, practices, and the overall business environment.

**PO4: Teamwork and Collaboration:**

Graduates should be able to work effectively in teams, contributing to shared goals and collaborating with others.

**PO5: Ethical Reasoning and Responsibility:**

Graduates should be able to make ethical business decisions and understand their social responsibilities.

**Subject: In office automation tools**

**Course Outcomes (Cos)**

CO1: Creating, formatting, and managing documents using word processing software like Microsoft Word.

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CO2: Using spreadsheet software like Microsoft Excel for data entry, calculation, analysis, and creating charts.

CO3: Developing and delivering presentations using presentation software such as Microsoft PowerPoint.

CO4: Utilizing email and other communication tools effectively.

CO5: Understanding database concepts and using tools for basic database operations (depending on the specific course).

**Program Outcomes (POs)**

**PO1: Enhanced Communication Skills:** Students will be able to communicate effectively using various tools and formats.

**PO2: Problem-Solving:** Students will be able to apply their knowledge of office automation tools to solve practical problems.

**PO3: Information Technology Application:** Students will be able to use technology effectively in a work environment.

**PO4: Analytical Skills:** Students will be able to analyze data and present it effectively.

**PO5: Teamwork and Collaboration:** Students may develop skills in working with others using these tools.

**Subject: Basic web Technology**

**Course Outcomes (Cos)**

CO1: Create well-structured static web pages using HTML, incorporating various elements such as text, images, links, and tables.

CO2: Implement cascading style sheets (CSS) to control the presentation and layout of web pages, utilizing inline, embedded, and external stylesheets

CO3: Develop interactive web pages using JavaScript for client-side data validation, dynamic content manipulation, and enhanced user experiences.

CO4: Create and validate XML documents using DTD (Document Type Definition) or XML Schema for structured data representation.

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CO5: Create and validate XML documents using DTD (Document Type Definition) or XML Schema for structured data representation.

CO6: Understand the basics of database connectivity (e.g., JDBC) and perform operations like creating, inserting, updating, and deleting data in database tables from a web application.

### Program Outcomes (POs)

PO1: **Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals, and computer science principles to the solution of complex computing problems.

PO2: **Problem Analysis:** Identify, formulate, research literature, and analyze complex computing problems, reaching substantiated conclusions using principles of mathematics, computing sciences, and relevant engineering disciplines.

PO3: **Design/Development of Solutions:** Design solutions for complex computing problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4: **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex computing activities with an understanding of the limitations.

PO5: **Communication:** Communicate effectively on complex computing activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

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Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – II

Academic Year 2021-22

Subject: Accountancy – II

Course Outcomes (Cos)

CO1: Understand the theoretical knowledge and real-time application of accounting. CO3 CO4 CO5 Construct BEP through the application of CVP analysis.

CO2: Demonstrate appropriate accounting tools and techniques with problems related to accounting data in real time scenario

CO3: Apply costing techniques and cost-profit analysis in major decision-making processes in the organization.

CO4: Outline the learning through the preparation of necessary financial statements for the decision making

Program Outcomes (POs)

PO1: To provide an adequate basic understanding of Management Education among the students.

PO2: To prepare students to exploit opportunities being newly created in the Management Profession

PO3: To train the students in communication skills effectively.

PO4: To develop appropriate skills in the students so as to make them competent and provide themselves with self-employment

PO5: To understand finance and other core business content

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**Subject: Industrial Organization**

**Course Outcomes (Cos)**

CO1: Define and explain key concepts related to industrial organization, such as market structures, pricing strategies, and competitive behavior.

CO2: Apply economic principles and models to analyze the behavior of firms in different market structures.

CO3: Analyze the dynamics of specific industries, including factors influencing competition, innovation, and regulation.

CO4: Evaluate the effectiveness of different business strategies in various market contexts.

CO5: Understand the role of government regulations and policies in shaping industrial organization.

**Program Outcomes (POs)**

- **PO1: Computational Knowledge:** Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge to solve complex computing problems.

**PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.

**PO3: Design/Development of Solutions:**

Design solutions for complex problems and design, develop, and evaluate computer-based systems, processes, components, or programs to meet desired needs.

**PO4: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations. **PO5: Ethics and Professionalism:**

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Understand and commit to professional ethics and responsibilities and norms of computing practice.

**Subject: Mathematics**

**Course Outcomes (Cos)**

CO1: COs might include the ability to understand and apply concepts like sets, relations, functions, matrices, mathematical logic, and group theory.

CO2: COs may focus on developing analytical skills to solve real-world problems using mathematical methodologies.

CO3: Students might learn to apply mathematical logic to solve problems and understand its role in computer science.

CO4: Some math courses might focus on calculus, with COs including understanding limits, continuity, derivatives, and their applications.

CO5: Students may learn to solve simple first-order and higher-order linear differential equations.

CO6: COs could cover the ability to evaluate and apply concepts related to 3D geometry.

**Program Outcomes (POs)**

**PO1: Applying Mathematical Knowledge:**

A PO might be the ability to apply mathematical knowledge to become competent professionals, potentially in the field of computer applications.

**PO2: Problem Solving and Modeling:**

Another PO could involve applying mathematical concepts and computational techniques to solve and model problems in computer science.

**PO3: Data Analysis:**

A BCA program might aim to develop skills in analyzing data using mathematical and statistical tools.

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**PO4: Ethical and Professional Conduct:**

A PO could emphasize the importance of ethical principles and responsibilities in the context of computing, potentially drawing on mathematical reasoning.

**PO5: Lifelong Learning:**

A BCA program might encourage students to engage in independent and lifelong learning, including the continued development of mathematical skills.

**Subject: Programming in C**

**Course Outcomes (Cos)**

CO1: Grasp the basics of computer programming concepts, including C character sets, identifiers, keywords, data types, operators, and control structures.

CO2: Utilize C's features to implement procedural programming paradigms, including functions, arrays, pointers, and structures.

CO3: Design, write, and debug C programs to solve various computational problems.

CO4: Implement basic data structures like arrays and linked lists using C, and apply them in program development.

CO5: Understand and implement file input/output operations in C for data persistence.

**Program Outcomes (POs)**

**PO1: Problem Analysis:** Identify, formulate, and analyze complex computing problems, reaching substantiated conclusions using principles of mathematics and computer science.

**PO2: Design/Development of Solutions:**

Design and evaluate solutions for complex computing problems and design and evaluate systems, components, or processes that meet specified needs.

**PO3: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern computing tools to complex computing activities.

**PO4: Professional Ethics:**

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Understand and commit to professional ethics and responsibilities and norms of computing practice

**Subject: operating system**

**Course Outcomes (Cos)**

CO1: Students will gain knowledge about different types of operating systems and their functionalities.

CO2: Students will learn about process concepts, scheduling algorithms, and inter-process communication.

CO3: Students will understand the concept of deadlocks and various techniques to prevent, detect, and resolve them.

CO4: Students will learn about different memory management techniques (paging, segmentation, virtual memory) and file system structures.

CO5: Students will explore the practical applications of OS concepts in various real-world scenarios.

**Program Outcomes (POs)**

PO1: **Computing Fundamentals:** Apply knowledge of mathematics, statistics, and computer science to solve complex problems.

PO2: **Problem Analysis:** Identify, formulate, and analyze complex computing problems using fundamental principles.

PO3: **Design and Development:** Design and develop solutions for complex computing problems, considering factors like public health and safety.

PO4: **Modern Tool Usage:** Utilize modern computing tools and techniques for various computing activities.

PO5: **Ethical Practices:** Understand and commit to professional ethics and cyber regulations.

**Subject: Industrial Economics**

**Course Outcomes (Cos)**

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**CO1:** Students should be able to explain the basic concepts of the World Wide Web, including the client-server model, URLs, HTTP, and different types of websites.

**CO2:** Students should be able to create well-structured and semantic web pages using HTML, including different elements, attributes, and forms.

**CO3:** Students should be able to apply CSS to style web pages, including selectors, properties, and layout techniques like Flexbox or Grid

**CO4:** Students should be able to write basic JavaScript code to add interactivity and dynamic behavior to web pages.

**CO5:** Students should be able to integrate HTML, CSS, and JavaScript to create simple, functional websites.

### **Program Outcomes (POs)**

**PO1: Fundamental Computer Knowledge:** Understanding the basic concepts of computer hardware and software.

**PO2: Problem Analysis and Solving:** Ability to analyze and define the requirements for a web development project and develop appropriate solutions.

**PO3: Design and Development:** Designing and developing web pages and applications using appropriate technologies.

**PO4: Database Management:** Understanding how to integrate databases with web applications.

**PO5: Communication Skills:** Effectively communicating technical information related to web development

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Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – III

Academic Year 2021-22

Subject: Principle of Management

Course Outcomes (Cos)

CO1: Students will be able to define management, explain its core functions (planning, organizing, leading, controlling), and understand different management theories.

CO2: Students will be able to apply these principles to real-world business scenarios, including decision-making, communication, and motivation.

CO3: Students will be able to analyze complex management problems and develop appropriate solutions.

CO4: Students will develop essential management skills like leadership, teamwork, and communication.

CO5: Students will gain an understanding of ethical considerations and social responsibility in management.

Program Outcomes (POs)

**PO1: Applying Fundamental Principles:** Students will be able to apply fundamental principles of mathematics, computing, and management to identify and solve problems.

**PO2: Developing Professional Skills:** Students will develop professional skills such as communication, teamwork, and project management.

**PO3: Understanding Business Environment:** Students will gain an understanding of the business environment and its impact on computing and management.

**PO4: Demonstrating Ethical and Social Responsibility:**

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Students will demonstrate awareness of ethical issues and social responsibilities related to computing and management.

**PO5: Lifelong Learning:**

Students will develop the ability to engage in continuous learning and professional development.

**Subject: OPPS using C ++**

**Course Outcomes (Cos)**

**CO1:** Comprehend core Object-Oriented Programming (OOP) principles such as encapsulation, inheritance, polymorphism, and abstraction.

**CO2:** Effectively implement OOP concepts using C++ language features, including classes, objects, constructors, destructors, member functions, access specifiers, and operator overloading.

**CO3:** Design and develop robust and efficient object-oriented programs in C++ to solve real-world problems.

**CO4:** Demonstrate proficiency in using advanced C++ features like templates, exception handling, and file I/O for building complex applications.

**CO5:** Identify and resolve errors in C++ programs, and effectively test and validate the functionality of object-oriented solutions.

**Program Outcomes (POs)**

**PO1: Computational Knowledge:** Apply knowledge of computing fundamentals, computer science, and mathematics to solve complex computing problems.

**PO2: Problem Analysis:** Identify, formulate, and analyze complex computing problems, reaching substantiated conclusions using principles of mathematics, computer science, and relevant domain disciplines.

**PO3: Design/Development of Solutions:** Design and evaluate solutions for complex computing problems and design and evaluate systems, components, or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

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**PO4: Conduct Investigations of Complex Computing Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern Tool Usage:** Create, select, adapt, and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations

**Subject: Business law -I**

**Course Outcomes (Cos)**

CO1: Students gain a general understanding of the legal principles governing business transactions.

CO2: Students learn about the formation, validity, and breach of contracts.

CO3: Students learn about the legal aspects of the sale and purchase of goods.

CO4: Students gain knowledge of negotiable instruments like cheques and promissory notes.

CO5: Students learn about the formation and basic legal aspects of companies, partnerships, and limited liability partnerships.

**Program Outcomes (POs)**

**PO1: Effective Communication:** Students learn to communicate effectively in both formal and informal settings.

**PO2: Problem Analysis and Solving:** Students develop analytical skills and the ability to solve business-related problems.

**PO3: Ethical Decision Making:** Students are trained to apply ethical principles in business practices.

**PO4: Teamwork and Collaboration:** Students learn to work effectively in teams.

**PO5: Adaptability and Continuous Learning:** Students are encouraged to adapt to changing business environments and embrace lifelong learning.

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**Subject: DBMS**

**Course Outcomes (Cos)**

CO1: Describe the fundamental concepts of DBMS, including data models, schemas, and instances.

CO2: Explain the principles of database design, including entity-relationship modeling and normalization.

CO3: Explain the principles of database design, including entity-relationship modeling and normalization.

CO4: Design and implement database schemas using different data models.

CO5: Apply SQL (Structured Query Language) for data manipulation and retrieval.

CO6: Understand and apply database transaction management concepts.

**Program Outcomes (POs)**

**PO1: Apply knowledge of computing fundamentals:** COs related to SQL, database design, and normalization directly apply computing knowledge.

**PO2: Identify, formulate, and solve complex computing problems:** DBMS skills are essential for analysing and solving data-related problems in various domains.

**PO3: Design and evaluate solutions for complex computing problems:** COs related to database design and normalization enable students to design efficient and effective database solutions.

**PO4: Create, select, adapt and apply appropriate techniques:** Students learn to choose appropriate database technologies and techniques for specific applications

**PO5: Understand and commit to professional ethics'** knowledge can be applied to ensure data security and privacy, promoting ethical practices.

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**Subject: E-Business Essentials**

**Course Outcomes (Cos)**

- CO1: Understand the fundamental concepts and principles of e-commerce.
- CO2: Identify and differentiate various e-commerce business models.
- CO3: Analyze the technical aspects of e-commerce, including website development and payment systems.
- CO4: Develop and implement digital marketing strategies.
- CO5: Understand the legal and ethical considerations of e-business.
- CO6: Evaluate the security and privacy issues in e-commerce.

**Program Outcomes (POs)**

- PO1:(Computational Knowledge):** Apply knowledge of computing fundamentals, data structures, and algorithms to solve problems.
- PO2: (Design/Development of Solutions):** Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- PO3: (Modern Tool Usage):** Use current techniques, skills, and tools necessary for computing practice.
- PO4: (Professional Ethics):** Understand and commit to professional ethics and social responsibilities.

**Subject: Data Structures and Algorithms**

**Course Outcomes (Cos)**

- CO1: Apply knowledge of computing fundamentals, mathematics, and domain-specific knowledge to solve complex computing problems.
- CO2: Identify, formulate, research literature, and analyze complex computing problems reaching substantiated conclusions using principles of mathematics, computing sciences, and relevant domain disciplines.
- CO3: Design and evaluate solutions for complex computing problems, and design and develop systems, components, or processes that meet specified needs

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with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

CO4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**Program Outcomes (POs)**

**PO1 Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern computing tools including prediction and modeling to complex computing activities with an understanding of the limitations.

**PO2: Professional Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the computing practice.

**PO3: Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Subject: DBMS using Oracle**

**Course Outcomes (Cos)**

CO1: This involves comprehending the core principles of RDBMS, including data models, schema, instances, and the advantages of DBMS over traditional file systems.

CO2: This outcome focuses on mastering SQL commands for data definition (DDL), data manipulation (DML), data control (DCL), and transaction control (TCL). Students should be able to write and execute queries, insert, update, delete, and manage data effectively within an Oracle environment.

CO3: This includes the ability to retrieve complex data using different types of subqueries (correlated, non-correlated) and various join operations (inner, outer, self-joins) to combine data from multiple tables.

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CO4: This outcome involves learning the fundamentals of PL/SQL, including variables, control structures, procedures, functions, and triggers, to develop robust database applications.

**Program Outcomes (POs)**

**PO1 Critical Thinking and Problem Solving:** Ability to identify, analyze, and solve complex computing problems by applying knowledge of computing fundamentals, mathematics, and relevant domain disciplines.

**PO2: Effective Communication:** Ability to communicate effectively, both orally and in writing, with diverse audiences, including technical and non-technical stakeholders.

**PO3: Modern Tool Usage:** Proficiency in selecting and applying appropriate modern computing tools, techniques, and skills necessary for designing and developing software solutions.

**PO4: Individual and Team Work:** Ability to function effectively as an individual and as a member or leader in diverse teams, including multidisciplinary settings.

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Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – IV

Academic Year 2021-22

Subject: Principle of Management

Course Outcomes (Cos)

Subject: Data Structures and Algorithms

Course Outcomes (Cos)

CO1: Helps in applying cost accounting methods for evaluation purpose.

CO2: This will help the students in preparing external reports based on cost and to Identify cost classification based on how cost responds to changes in production levels and how these changes affect managerial decision making

Program Outcomes (POs)

PO1: It facilitates to know the mechanism of maintaining 'Single and Double Column Cashbook'

PO2: This course benefits students in finding early step employability in MSMEs in Accounts.

PO3: It develops confidence amongst students for the preparation of professional courses like CA, CMA and CS.

Subject: Java Programming

Course Outcomes (Cos)

CO1: Understanding syntax, data types, operators, control flow statements, and basic object-oriented principles.

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CO2: Applying concepts like classes, objects, inheritance, polymorphism, and encapsulation in Java.

CO3: Working with packages, interfaces, exception handling, and multithreading to build robust applications.

CO4: Creating user interfaces using AWT or Swing and potentially exploring basic web development with servlets or JSPs.

CO5: Evaluating the efficiency of algorithms and choosing appropriate data structures for specific tasks.

**Program Outcomes (POs)**

**PO1 Computational Knowledge:** Applying knowledge of computing fundamentals, data structures, and algorithms to solve computational problems.

**PO2: Problem Analysis:** Identifying, analyzing, and defining computing requirements for a given problem.

**PO3: Design/Development of Solutions:** Designing and implementing solutions for complex computing problems using appropriate algorithms, data structures, and programming paradigms.

**PO4: Modern Tool Usage:** Selecting and applying modern computing tools, techniques, and resources to address computational tasks effectively.

**PO5: Professional Ethics:** Understanding and adhering to ethical principles and professional responsibilities in the field of computing.

**Subject: Data Structures and Algorithms**

**Course Outcomes (Cos)**

CO1: Students will be able to explain the purpose and function of Management Information Systems (MIS) and Decision Support Systems (DSS) in organizations, including their different components and how they support various business processes.

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CO2: Students will be able to analyze the information needs of an organization and identify how MIS and DSS can be used to address those needs effectively.

CO3: Students will be able to design basic DSS solutions, understand the different types of DSS models and algorithms, and evaluate the effectiveness of existing DSS implementations.

CO4: Students will be able to apply the concepts of MIS and DSS in practical scenarios, such as analyzing data, creating reports, and supporting decision-making processes.

CO5: Students will be able to recognize the ethical implications of using information systems, including issues related to data privacy, security, and responsible use of information.

### **Program Outcomes (POs)**

PO1: : **Disciplinary Knowledge:** Students will demonstrate a solid understanding of computer science principles and their application to information systems and decision-making.

- **PO2: Communication Skills:** Students will be able to effectively communicate technical information related to MIS and DSS to both technical and non-technical audiences.
- **PO3: Critical Thinking and Problem-Solving:** Students will be able to analyze complex problems, identify information requirements, and design and evaluate DSS solutions.
- **PO4: Research Skills:** Students will be able to conduct research on MIS and DSS topics, analyze data, and draw conclusions to support decision-making.
- **PO5: Teamwork and Leadership:** Students will be able to collaborate effectively in teams to design and implement MIS and DSS solutions.

**Subject: Business Low -II**

**Course Outcomes (Cos)**

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CO1: To help the students to understand the concept of Consent, Free Consent, Classification of contracts, Modes of Discharge of Contracts, Breach of Contract and Remedies against the breach

CO2: . 2. To help the students to understand the various provisions related to Member of a Company, Modes of Acquiring & Cessation of Membership, Rules regarding Director, Qualification & Disqualification, Legal position of Director. Legal provisions relating to Company Meetings, i.e. Annual General Meeting, Extra-ordinary General Meeting, Board Meeting

**Program Outcomes (POs)**

PO1: Demonstrate an understanding of the Legal Environment of Business.

PO2: Apply basic legal knowledge to business transactions.

PO3: Communicate effectively using standard business and legal terminology.

**Subject: Entrepreneurship Development**

**Course Outcomes (Cos)**

CO1: Understanding the entrepreneurial process and its various stages.

CO2: Identifying and evaluating business opportunities.

CO3: Developing a business plan with market analysis, financial projections, and operational strategies.

CO4: Understanding the legal and regulatory aspects of starting and running a business.

CO5: Developing essential skills like communication, teamwork, and problem-solving relevant to entrepreneurship.

**Program Outcomes (POs)**

PO1 **Computational Knowledge:** Apply knowledge of computing fundamentals, mathematics, and statistics appropriate to the discipline.

PO2: **Problem Analysis:** Identify, analyze, research literature, and solve complex computing problems by applying principles of algorithms, data structures, and relevant computing theory.

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**PO3: Problem Analysis:** Identify, analyze, research literature, and solve complex computing problems by applying principles of algorithms, data structures, and relevant computing theory.

**PO4: Design/Development of Solutions:** Design, implement, and evaluate computer-based systems, processes, components, or programs to meet desired needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

**PO5: Problem Analysis:** Identify, analyze, research literature, and solve complex computing problems by applying principles of algorithms, data structures, and relevant computing theory.

### Subject: PC Maintenance

#### Course Outcomes (Cos)

**CO1:** Students will be able to identify and explain the functions of various hardware components like the CPU, RAM, motherboard, storage devices, and peripherals.

**CO2:** Hands-on experience in assembling and disassembling a computer system, including proper connection and cable management.

**CO3:** Students will learn to diagnose and resolve common hardware problems, such as identifying faulty components and implementing solutions.

**CO4:** Understanding how to install and configure operating systems and other essential software.

#### Program Outcomes (POs)

**PO1 Engineering Knowledge:** Applying fundamental computing knowledge to solve problems.

**PO2: Problem Analysis:** Identifying, analyzing, and solving complex computing problems.

**PO3: Design/Development of Solutions:** Designing, developing, and evaluating computer-based systems

**PO4: Conduct Investigations of Complex Problems:** Using research methods to analyze and interpret data.

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**PO5: Modern Tool Usage:** Utilizing current technologies and tools for computing practice

**Subject: Advance Networking**

**Course Outcomes (Cos)**

CO1: Students will be able to describe and differentiate various network architectures (e.g., LAN, WAN, MAN, wireless) and their components.

CO2: Students will be able to explain and apply key network protocols (e.g., TCP/IP, UDP, HTTP, DNS) and their functionalities.

CO3: Students will be able to design, configure, and implement small to medium-sized network solutions using appropriate technologies and tools.

CO4: Students will be able to diagnose and resolve common network problems using various troubleshooting techniques and tools.

CO5: Students will be able to implement basic security measures to protect network resources and data

CO6: Students will be able to grasp advanced concepts like virtualization, cloud networking, and software-defined networking (SDN).

**Program Outcomes (POs)**

PO1: **Individual and Team Work:** Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

PO2: **Problem Analysis:** Identify, analyze, research literature, and define computing requirements appropriate to its solution.

PO3: **Design/Development of Solutions:** Design, implement, and evaluate a computing-based system, process, component, or program to meet desired needs.

PO4: **Modern Tool Usage:** Use current techniques, skills, and tools necessary for computing practice.

PO5: **Professional Ethics:** Understand and commit to professional ethics and cyber regulations.

**Course BCA**

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Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – V

Academic Year 2021-22

Subject: Data Structures and Algorithms

Course Outcomes (Cos)

CO1: Students learn the fundamental concepts and principles of management accounting, such as cost accounting, budgeting, and variance analysis

CO2: Graduates can apply accounting principles and techniques to perform specific tasks, such as creating budgets, analyzing financial statements, and preparing reports for internal use.

CO3: Students learn to analyze and interpret both quantitative and qualitative data to provide insights for internal decision-making.

CO4: A key outcome is the ability to use accounting information to support strategic planning and decision-making, a primary function of management accounting.

CO5: Courses may include specific outcomes like learning how to set up computerized accounting books or demonstrate knowledge of various tax issues.

Program Outcomes (POs)

PO1: Graduates can apply knowledge from various business disciplines, such as accounting, finance, and management, to solve complex business problems.

PO2: Students develop analytical skills to make informed business decisions and solve problems, a core function of management accounting.

PO3: Graduates are equipped with the communication and presentation skills needed for professional roles.

PO4: The program provides proficiency in using modern business tools, such as accounting software like TALLY.

Subject: SQL-2017

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### Course Outcomes (Cos)

CO1: Understand the principles of relational databases and the role of SQL as a standard language for data manipulation and retrieval.

CO2: Design and implement database schemas using T-SQL, including creating tables, indexes, stored procedures, triggers, and views.

CO3: Query data effectively using various SQL commands, including joins, subqueries, and functions.

CO4: Apply data management and administration tasks, such as backup, restore, security configurations, and performance tuning using tools like SQL Server Management Studio (SSMS).

CO5: Explore advanced features like JSON support, in-memory OLTP, or machine learning services for building intelligent applications.

### Program Outcomes (POs)

PO1: Engineering Knowledge

PO2: Design/Development of Solutions involves designing and querying capabilities

PO3: Modern Tool Usage is supported by applying administration tasks and exploring advanced features

PO4: Lifelong Learning

### Subject: Data Structures and Algorithms

### Course Outcomes (Cos)

CO1: Specific, measurable learning expectations for an individual course.

CO2: To state what students will be able to do after completing a particular course.

CO3: A CO for a web development course might be: "Learn and use knowledge of web publishing and technologies"

### Program Outcomes (POs)

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PO1: Broader skills, knowledge, and attitudes that graduates are expected to have at the end of their degree program.

PO2: To outline the overall competencies gained through the entire program.

PO3: A PO for a computer science program might be: "Apply knowledge of web development to design and publish a website individually and as a team member".

### **Subject: Organizational Behaviour**

#### **Course Outcomes (Cos)**

CO1: Identify organizational theories and principles, and examine the challenges of organizational behavior.

CO2: Analyse how personality, values, perception, and motivation influence individual behaviour in the workplace.

CO3: Assess the impact of organizational factors like structure, culture, and change on behaviour.

CO4: Outline the elements of group behavior, including dynamics, communication, and leadership.

CO5: Understand the dynamics of human behavior and apply management principles to real-world situations.

CO6: Develop and demonstrate workplace competencies such as communication, critical thinking, and problem-solving.

#### **Program Outcomes (POs)**

PO1: Domain Knowledge: Understand and apply knowledge in core business disciplines.

PO2: Communication Skills: Develop verbal, presentation, and reporting skills.

PO3: Leadership and Team Skills: Build leadership abilities and work effectively in teams.

PO4: Problem-Solving and Decision Making: Apply logical reasoning and analytical skills to solve business problems.

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**Subject: Software Engineering**

**Course Outcomes (Cos)**

CO1: Statements that specify what students are expected to know and be able to do after a course is completed.

CO2: Each CO is mapped to one or more POs, showing how a specific course contributes to the overall program objectives.

CO3: The attainment of POs is assessed indirectly or directly, based on the evidence of students meeting the individual COs within their courses.

CO4: This mapping ensures that the curriculum is designed to systematically build the skills required to meet the program's overarching goals.

**Program Outcomes (POs)**

PO1: Statements that describe the knowledge, skills, and attitudes that graduates of a specific engineering program should have acquired.

PO2: Broad and applicable to the entire degree program.

**Subject: Banking Insurance**

**Course Outcomes (Cos)**

CO1: Explain the functions and working of Indian banks and insurance companies.

CO2: Understand the regulatory framework for banks and insurance companies.

CO3: Recognize the impact of reforms in the banking and insurance sector.

CO4: Identify and analyze various types of insurance policies.

CO5: Determine and manage the risks involved in the insurance industry.

**Program Outcomes (POs)**

PO1: Understand the principles and concepts of banking, insurance, accounting, and finance.

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PO2: Analyse and interpret financial statements and apply accounting knowledge to business problems.

PO3: Effectively communicate both orally and in writing with stakeholders.

PO4: Apply critical thinking and problem-solving skills to real-world situations in the banking and insurance sectors.

**Subject: Retail Management**

**Course Outcomes (Cos)**

CO1: Define retailing, its role in industrialized societies, and the impact of key market trends.

CO2: Apply frameworks to develop high-level retail marketing strategies, including the "retail mix" (product, price, promotion, place, people).

CO3: Understand and implement standard operating procedures (SOPs) for store safety, security, hygiene, and inventory management.

CO4: Analyze the consumer decision-making process, customer demographics, and lifestyle factors to tailor marketing strategies.

CO5: Explore the use of information systems, supply chain management, and customer relationship management (CRM) systems in retail operations.

**Program Outcomes (POs)**

PO1: Ability to apply management theories, principles, and frameworks to solve complex, real-world business problems.

PO2: Proficiency in analytical reasoning, synthesizing data from diverse sources, and making data-driven decisions.

PO3: Strong written and oral communication skills, effective in various professional and cross-cultural contexts.

PO4: Strong written and oral communication skills, effective in various professional and cross-cultural contexts.

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**Course BCA**

**Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise**

**Semester – VI**

**Academic Year 2021-22**

**Subject: Element of Commercial Portal (HTML5)**

**Course Outcomes (Cos)**

CO1: Ability to apply management theories, principles, and frameworks to solve complex, real-world business problems.

CO2: Proficiency in analytical reasoning, synthesizing data from diverse sources, and making data-driven decisions.

CO3: Strong written and oral communication skills, effective in various professional and cross-cultural contexts.

CO4: Capability to work effectively in diverse teams and demonstrate leadership qualities to achieve organizational goals.

CO5: An understanding of ethical, social, and environmental issues in business and the ability to act with integrity.

CO6: Recognition of the need for continuous self-paced learning and personal development to adapt to evolving industry demands.

**Program Outcomes (POs)**

PO1: Define retailing, its role in industrialized societies, and the impact of key market trends.

PO2: Apply frameworks to develop high-level retail marketing strategies, including the "retail mix" (product, price, promotion, place, people).

PO3: Understand and implement standard operating procedures (SOPs) for store safety, security, hygiene, and inventory management.

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PO4: Analyse the consumer decision-making process, customer demographics, and lifestyle factors to tailor marketing strategies.

### **Subject: Android 9**

#### **Course Outcomes (Cos)**

CO1: Students learn to apply OS concepts like processes, memory management, and file systems through practical exposure to the Android 9 environment.

CO2: Students can design, develop, test, and debug applications specifically tailored for the features and constraints of the Android 9 API level using the Android SDK and tools like Android Studio.

CO3: Students can compare and contrast the features and architecture of Android 9 with other mobile operating systems like iOS, contributing to a broader understanding of different platforms.

CO4: Students gain experience in creating, selecting, and applying appropriate techniques and resources (like emulators for Android 9) for mobile application development.

#### **Program Outcomes (POs)**

PO1: Students learn to identify, formulate, and analyse complex engineering problems (e.g., performance issues on a specific Android version).

PO2: The ability to design solutions for complex problems, such as creating a functional application that meets specific needs on the Android 9 platform.

PO3: Using the Android SDK, emulators, and Java/Kotlin programming languages for development helps students achieve competency in using modern engineering tools.

PO4: Managing the development lifecycle of an app from conception to deployment (through a marketplace) can address outcomes related to project management.

### **Subject: Business Law -III**

#### **Course Outcomes (Cos)**

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CO1: Understand and apply the essentials of a valid contract.

CO2: Identify the remedies available for breach of contract

CO3: Explain the rights and duties of partners in a partnership

CO4: Differentiate between a sale and an agreement to sell.

Program Outcomes (POs)

PO1: Broad, overarching abilities a student will have upon graduating from a program. They are typically achieved through the combined learning from multiple courses.

PO2: Apply legal and management principles to solve business problems.

PO3: Develop professional skills like legal reasoning, drafting, and pleading.

PO4: Communicate effectively in both formal and informal contexts.

**Subject: Project**

**Course Outcomes (Cos)**

CO1: Specific learning objectives for an individual course, detailing the knowledge, skills, and abilities students should demonstrate upon completion.

CO2: To provide a clear framework for teaching and learning, and to help in evaluating the learning process for that specific course.

CO3: After completing a "Principles of Political Science" course, a student can "discuss the social contract theory" (CO 3), which is a specific, measurable outcome.

**Program Outcomes (POs)**

PO1: Broad statements of the knowledge, skills, and attitudes a graduate should have at the end of their entire academic program.

PO2: To define the overall competencies of a graduate, ensuring the program aligns with professional and societal needs.

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PO3: A common PO is "Problem Analysis," which states that graduates should be able to "identify, formulate, review research literature, and analyse complex engineering problems".

**Subject: Software Testing**

**Course Outcomes (Cos)**

CO1: Apply white-box and black-box testing techniques to identify defects

CO2: Develop test cases using boundary value analysis and equivalence partitioning

CO3: Analyse software defects and articulate their causes

**Program Outcomes (POs)**

PO1: "Apply knowledge of mathematics, science, and engineering fundamentals to solve complex engineering problems"

PO2: "Analyze and design software systems with an understanding of their ethical implications".

PO3: "Communicate technical concepts effectively through written and oral presentations"

**Subject: Services Marketing**

**Course Outcomes (Cos)**

CO1: Students can identify the core concepts of marketing and the unique role of services marketing within a business.

CO2: Students can develop marketing strategies for services, including the 7 Ps (Product, Price, Place, Promotion, People, Process, and Physical Evidence).

CO3: Students can effectively communicate the unique marketing mixes and selling propositions for different service offerings

CO4: Students can understand the global nature of services marketing and how to use digital tools like social media and email in a service context.

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### Program Outcomes (POs)

PO1: A student will gain specific knowledge about the services sector of marketing.

PO2: Students develop verbal, presentation, and reporting skills through discussing and presenting service marketing cases.

PO3: Students can analyse and interpret data to make informed business decisions related to services.

PO4: Students may learn to work in teams to develop marketing plans for a service, fostering leadership and team skills.

### Subject: Export Management

### Course Outcomes (Cos)

CO1: Explain the basic concepts, objectives, types, and the overall framework of export trade.

CO2: Understand the key functions, processes, and procedures involved in export and import operations and the ability to prepare and handle foreign trade documents.

CO3: Understand the legal aspects, foreign trade regulations, and the roles of various trade promotion councils and government bodies in export management.

CO4: Formulate strategies for selecting a product for export, identifying potential international markets, and finding genuine foreign buyers.

CO5: Grasp the concepts of foreign exchange mechanisms, international banking, and the logistics involved in global shipping and supply chain management.

CO6: Analyse current domestic and international business trends and evaluate various market entry strategies and challenges.

### Program Outcomes (POs)

PO1: Apply management theories and practices to analyse and solve complex national and global business problems.

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PO2: Foster analytical and critical thinking skills for data-based decision-making in a global context.

PO3: Understand the functioning of national and global business environments, with the ability to identify aspects of global business and cross-cultural understanding.

PO4: Develop effective oral and written communication skills, especially in business applications, using appropriate technology.

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Sant Ravidas Shikshan Sanstha's

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Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – I

Academic Year 2023-24

Subject: Financial Accounting – I

Course Outcomes (Cos)

CO1: Understand the theoretical framework of accounting and to prepare financial statements

CO2: Explain and determine depreciation and value of inventory

CO3: Learn accounting for hire purchase transactions, leases, branches and departments

CO4: Understand the concepts of partnership firm and prepare accounts for dissolution of a Partnership firm

CO5: Develop the skill of preparation of trading and profit and loss account and balance sheet using computerized accounting.

Program Outcomes (POs)

PO1: After completing three years for Bachelors in program, students will gain thorough fundamental knowledge of Commerce and Finance.

PO2 : PO 3: PO 4: PO 5: The students can acquire knowledge of Commercial Laws relevant for enterprises and their amendments.

PO3: All-inclusive structure of the course offers a number of value based and job oriented courses; and, ensures that students trained are up-to-date in knowledge.

PO4: It helps students to acquire conceptual knowledge of financial accounting and to impart skills for recording various kinds of business transactions and for preparing Accounts of corporate sectors

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PO5: The commerce and Finance focused curriculum offers specialization and elective courses. The practical exposure in these courses would equip the student to face the modern-day challenges in the field of commerce and business.

**Subject: Industrial Economics**

**Course Outcomes (Cos)**

CO1: To describe the basic relationship between Industrial and economic development.

CO2: To understand the industrial structure policies finance and management structures.

CO3: Sociologists are concerned with many topics, ranging from demographic trends to discrimination and inequalities to industrialization and democracy.

CO4: We create theories to explain the similarities, differences, and trends we see, and these theories are oftentimes based on statistical data.

**Program Outcomes (POs)**

PO1: Provides knowledge about the industrial development and Employment chances created and highlights the inter linkages between industrialisation and Agriculture industrialisation and productivity and industrialisation and foreign trade.

PO2: Explain the role of industrial policy and financial matters with regard to the industrial sickness and capacity utilisation in industry.

PO3: Gives an overview of different management systems and the rationalization of industries.

**Subject: Business Statistics**

**Course Outcomes (Cos)**

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CO1: To understand the basic concepts in Probability and Theoretical Distribution.

CO2: To apply statistical testing of hypothesis in decision making.

CO3: To estimate simple linear regression models using OLS technique.

**Program Outcomes (POs)**

PO1: To know the average value of any variable and to know the average deviation from the mean value of given variable  
PO2: To understand the concept of probability and to understand the probable occurrence of any given event satisfying a particular law of probability.

PO3: To carry over the testing of hypothesis procedure to find the validity and the representative character of a particular sample derived from a given population.

PO4: To understand the average movement in the values of a given group of variables over a given time period. Helps in identifying the overall movement in the whole sale price index cost of living index and the movement in the changes in the human development values.

PO5: To understand the practical relationship between two or more variables and to estimate and forecast the values of some strategic variables and the growth rate of economic and other social variables

**Subject: Operative System – I**

**Course Outcomes (Cos)**

CO1: Describe the fundamental concepts of operating systems, including their structure, services, and types.

CO2: Explain process management concepts like process creation, scheduling, synchronization, and inter-process communication.

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CO3: Explain process management concepts like process creation, scheduling, synchronization, and inter-process communication.

CO4: Describe file system concepts, including file organization, directory structures, and disk scheduling.

CO5: Understand and apply different synchronization mechanisms to solve classic problems like the producer-consumer problem.

**Program Outcomes (POs)**

PO1: attics, computer science, and relevant domains to solve computing problems.

PO2: **Problem Analysis:** Identifying, formulating, and analyzing complex computing problems using fundamental principles.

PO3: **Design/Development of Solutions:** Designing and evaluating solutions for complex computing problems, considering various constraints.

PO4: **Conduct Investigations of Complex Problems:** Conducting research-based investigations, including designing experiments, analyzing data, and synthesizing information.

PO5: **Modern Tool Usage:** Utilizing modern computing tools and techniques for various tasks.

**Subject: Business communication**

**Course Outcomes (Cos)**

CO1: Students should be able to explain the fundamentals of communication, including sender, receiver, message, channel, feedback, and potential barriers.

Students should be able to communicate effectively with individuals from diverse cultural backgrounds.

CO2: Students should be able to write clear, concise, and professional business documents like emails, memos, reports, and proposals.

CO3: Students should be able to deliver presentations, participate in meetings, and engage in effective interpersonal communication in a business setting.

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CO4: Students should be able to tailor their communication style to different audiences, situations, and media (e.g., formal vs. informal, digital vs. in-person).

CO5: Students should be able to recognize and interpret nonverbal cues (body language, facial expressions, etc.) and use them effectively in communication.

CO6: Students should be able to actively listen to and understand the perspectives of others in business settings.

**Program Outcomes (POs)**

**PO1: Effective Communication:**

Graduates should be able to communicate effectively in both written and oral forms, adapting their style to different audiences and situations.

**PO2: Critical Thinking and Problem Solving:**

Graduates should be able to analyze business situations, identify problems, and develop effective solutions.

**PO3: Business Acumen:**

Graduates should possess a strong understanding of business principles, practices, and the overall business environment.

**PO4: Teamwork and Collaboration:**

Graduates should be able to work effectively in teams, contributing to shared goals and collaborating with others.

**PO5: Ethical Reasoning and Responsibility:**

Graduates should be able to make ethical business decisions and understand their social responsibilities.

**Subject: In office automation tools**

**Course Outcomes (Cos)**

CO1: Creating, formatting, and managing documents using word processing software like Microsoft Word.

CO2: Using spreadsheet software like Microsoft Excel for data entry, calculation, analysis, and creating charts.

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CO3: Developing and delivering presentations using presentation software such as Microsoft PowerPoint.

CO4: Utilizing email and other communication tools effectively.

CO5: Understanding database concepts and using tools for basic database operations (depending on the specific course).

### **Program Outcomes (POs)**

**PO1: Enhanced Communication Skills:** Students will be able to communicate effectively using various tools and formats.

**PO2: Problem-Solving:** Students will be able to apply their knowledge of office automation tools to solve practical problems.

**PO3: Information Technology Application:** Students will be able to use technology effectively in a work environment.

**PO4: Analytical Skills:** Students will be able to analyze data and present it effectively.

**PO5: Teamwork and Collaboration:** Students may develop skills in working with others using these tools.

### **Subject: Basic web Technology**

### **Course Outcomes (Cos)**

CO1: Create well-structured static web pages using HTML, incorporating various elements such as text, images, links, and tables.

CO2: Implement cascading style sheets (CSS) to control the presentation and layout of web pages, utilizing inline, embedded, and external stylesheets

CO3: Develop interactive web pages using JavaScript for client-side data validation, dynamic content manipulation, and enhanced user experiences.

CO4: Create and validate XML documents using DTD (Document Type Definition) or XML Schema for structured data representation.

CO5: Create and validate XML documents using DTD (Document Type Definition) or XML Schema for structured data representation.

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CO6: Understand the basics of database connectivity (e.g., JDBC) and perform operations like creating, inserting, updating, and deleting data in database tables from a web application.

**Program Outcomes (POs)**

PO1: **Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals, and computer science principles to the solution of complex computing problems.

PO2: **Problem Analysis:** Identify, formulate, research literature, and analyze complex computing problems, reaching substantiated conclusions using principles of mathematics, computing sciences, and relevant engineering disciplines.

PO3: **Design/Development of Solutions:** Design solutions for complex computing problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4: **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex computing activities with an understanding of the limitations.

PO5: **Communication:** Communicate effectively on complex computing activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

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Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – II

Academic Year 2023-24

Subject: Accountancy – II

Course Outcomes (Cos)

CO1: Understand the theoretical knowledge and real-time application of accounting. CO3 CO4 CO5 Construct BEP through the application of CVP analysis.

CO2: Demonstrate appropriate accounting tools and techniques with problems related to accounting data in real time scenario

CO3: Apply costing techniques and cost-profit analysis in major decision-making processes in the organization.

CO4: Outline the learning through the preparation of necessary financial statements for the decision making

Program Outcomes (POs)

PO1: To provide an adequate basic understanding of Management Education among the students.

PO2: To prepare students to exploit opportunities being newly created in the Management Profession

PO3: To train the students in communication skills effectively.

PO4: To develop appropriate skills in the students so as to make them competent and provide themselves with self-employment

PO5: To understand finance and other core business content

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### Subject: Industrial Organization

#### Course Outcomes (Cos)

CO1: Define and explain key concepts related to industrial organization, such as market structures, pricing strategies, and competitive behavior.

CO2: Apply economic principles and models to analyze the behavior of firms in different market structures.

CO3: Analyze the dynamics of specific industries, including factors influencing competition, innovation, and regulation.

CO4: Evaluate the effectiveness of different business strategies in various market contexts.

CO5: Understand the role of government regulations and policies in shaping industrial organization.

#### Program Outcomes (POs)

- **PO1: Computational Knowledge:** Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge to solve complex computing problems.

#### **PO2: Problem Analysis:**

Identify, formulate, research literature, and analyze complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.

#### **PO3: Design/Development of Solutions:**

Design solutions for complex problems and design, develop, and evaluate computer-based systems, processes, components, or programs to meet desired needs.

#### **PO4: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations. **PO5: Ethics and Professionalism:**

Understand and commit to professional ethics and responsibilities and norms of computing practice.

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**Subject: Mathematics**

**Course Outcomes (Cos)**

CO1: COs might include the ability to understand and apply concepts like sets, relations, functions, matrices, mathematical logic, and group theory.

CO2: COs may focus on developing analytical skills to solve real-world problems using mathematical methodologies.

CO3: Students might learn to apply mathematical logic to solve problems and understand its role in computer science.

CO4: Some math courses might focus on calculus, with COs including understanding limits, continuity, derivatives, and their applications.

CO5: Students may learn to solve simple first-order and higher-order linear differential equations.

CO6: COs could cover the ability to evaluate and apply concepts related to 3D geometry.

**Program Outcomes (POs)**

**PO1: Applying Mathematical Knowledge:**

A PO might be the ability to apply mathematical knowledge to become competent professionals, potentially in the field of computer applications.

**PO2: Problem Solving and Modeling:**

Another PO could involve applying mathematical concepts and computational techniques to solve and model problems in computer science.

**PO3: Data Analysis:**

A BCA program might aim to develop skills in analyzing data using mathematical and statistical tools.

**PO4: Ethical and Professional Conduct:**

A PO could emphasize the importance of ethical principles and responsibilities in the context of computing, potentially drawing on mathematical reasoning.

**PO5: Lifelong Learning:**

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A BCA program might encourage students to engage in independent and lifelong learning, including the continued development of mathematical skills.

**Subject: Programming in C**

**Course Outcomes (Cos)**

CO1: Grasp the basics of computer programming concepts, including C character sets, identifiers, keywords, data types, operators, and control structures.

CO2: Utilize C's features to implement procedural programming paradigms, including functions, arrays, pointers, and structures.

CO3: Design, write, and debug C programs to solve various computational problems.

CO4: Implement basic data structures like arrays and linked lists using C, and apply them in program development.

CO5: Understand and implement file input/output operations in C for data persistence.

**Program Outcomes (POs)**

**PO1: Problem Analysis:** Identify, formulate, and analyze complex computing problems, reaching substantiated conclusions using principles of mathematics and computer science.

**PO2: Design/Development of Solutions:**

Design and evaluate solutions for complex computing problems and design and evaluate systems, components, or processes that meet specified needs.

**PO3: Modern Tool Usage:**

Create, select, and apply appropriate techniques, resources, and modern computing tools to complex computing activities.

**PO4: Professional Ethics:**

Understand and commit to professional ethics and responsibilities and norms of computing practice

**Subject: operating system**

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### Course Outcomes (Cos)

CO1: Students will gain knowledge about different types of operating systems and their functionalities.

CO2: Students will learn about process concepts, scheduling algorithms, and inter-process communication.

CO3: Students will understand the concept of deadlocks and various techniques to prevent, detect, and resolve them.

CO4: Students will learn about different memory management techniques (paging, segmentation, virtual memory) and file system structures.

CO5: Students will explore the practical applications of OS concepts in various real-world scenarios.

### Program Outcomes (POs)

PO1: **Computing Fundamentals:** Apply knowledge of mathematics, statistics, and computer science to solve complex problems.

PO2: **Problem Analysis:** Identify, formulate, and analyze complex computing problems using fundamental principles.

PO3: **Design and Development:** Design and develop solutions for complex computing problems, considering factors like public health and safety.

PO4: **Modern Tool Usage:** Utilize modern computing tools and techniques for various computing activities.

PO5: **Ethical Practices:** Understand and commit to professional ethics and cyber regulations.

### Subject: Industrial Economics

### Course Outcomes (Cos)

CO1: Students should be able to explain the basic concepts of the World Wide Web, including the client-server model, URLs, HTTP, and different types of websites.

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CO2: Students should be able to create well-structured and semantic web pages using HTML, including different elements, attributes, and forms.

CO3: Students should be able to apply CSS to style web pages, including selectors, properties, and layout techniques like Flexbox or Grid

CO4: Students should be able to write basic JavaScript code to add interactivity and dynamic behavior to web pages.

CO5: Students should be able to integrate HTML, CSS, and JavaScript to create simple, functional websites.

**Program Outcomes (POs)**

**PO1: Fundamental Computer Knowledge:** Understanding the basic concepts of computer hardware and software.

**PO2: Problem Analysis and Solving:** Ability to analyze and define the requirements for a web development project and develop appropriate solutions.

**PO3: Design and Development:** Designing and developing web pages and applications using appropriate technologies.

**PO4: Database Management:** Understanding how to integrate databases with web applications.

**PO5: Communication Skills:** Effectively communicating technical information related to web development

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Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – III

Academic Year 2023-24

Subject: Principle of Management

Course Outcomes (Cos)

CO1: Students will be able to define management, explain its core functions (planning, organizing, leading, controlling), and understand different management theories.

CO2: Students will be able to apply these principles to real-world business scenarios, including decision-making, communication, and motivation.

CO3: Students will be able to analyze complex management problems and develop appropriate solutions.

CO4: Students will develop essential management skills like leadership, teamwork, and communication.

CO5: Students will gain an understanding of ethical considerations and social responsibility in management.

Program Outcomes (POs)

**PO1: Applying Fundamental Principles:** Students will be able to apply fundamental principles of mathematics, computing, and management to identify and solve problems.

**PO2: Developing Professional Skills:** Students will develop professional skills such as communication, teamwork, and project management.

**PO3: Understanding Business Environment:** Students will gain an understanding of the business environment and its impact on computing and management.

**PO4: Demonstrating Ethical and Social Responsibility:**

Students will demonstrate awareness of ethical issues and social responsibilities related to computing and management.

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**PO5: Lifelong Learning:**

Students will develop the ability to engage in continuous learning and professional development.

**Subject: OPPS using C ++**

**Course Outcomes (Cos)**

**CO1:** Comprehend core Object-Oriented Programming (OOP) principles such as encapsulation, inheritance, polymorphism, and abstraction.

**CO2:** Effectively implement OOP concepts using C++ language features, including classes, objects, constructors, destructors, member functions, access specifiers, and operator overloading.

**CO3:** Design and develop robust and efficient object-oriented programs in C++ to solve real-world problems.

**CO4:** Demonstrate proficiency in using advanced C++ features like templates, exception handling, and file I/O for building complex applications.

**CO5:** Identify and resolve errors in C++ programs, and effectively test and validate the functionality of object-oriented solutions.

**Program Outcomes (POs)**

**PO1: Computational Knowledge:** Apply knowledge of computing fundamentals, computer science, and mathematics to solve complex computing problems.

**PO2: Problem Analysis:** Identify, formulate, and analyze complex computing problems, reaching substantiated conclusions using principles of mathematics, computer science, and relevant domain disciplines.

**PO3: Design/Development of Solutions:** Design and evaluate solutions for complex computing problems and design and evaluate systems, components, or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

**PO4: Conduct Investigations of Complex Computing Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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**PO5: Modern Tool Usage:** Create, select, adapt, and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations

**Subject: Business law -I**

**Course Outcomes (Cos)**

CO1: Students gain a general understanding of the legal principles governing business transactions.

CO2: Students learn about the formation, validity, and breach of contracts.

CO3: Students learn about the legal aspects of the sale and purchase of goods.

CO4: Students gain knowledge of negotiable instruments like cheques and promissory notes.

CO5: Students learn about the formation and basic legal aspects of companies, partnerships, and limited liability partnerships.

**Program Outcomes (POs)**

PO1: **Effective Communication:** Students learn to communicate effectively in both formal and informal settings.

PO2: **Problem Analysis and Solving:** Students develop analytical skills and the ability to solve business-related problems.

PO3: **Ethical Decision Making:** Students are trained to apply ethical principles in business practices.

PO4: **Teamwork and Collaboration:** Students learn to work effectively in teams.

PO5: **Adaptability and Continuous Learning:** Students are encouraged to adapt to changing business environments and embrace lifelong learning.

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**Subject: DBMS**

**Course Outcomes (Cos)**

CO1: Describe the fundamental concepts of DBMS, including data models, schemas, and instances.

CO2: Explain the principles of database design, including entity-relationship modeling and normalization.

CO3: Explain the principles of database design, including entity-relationship modeling and normalization.

CO4: Design and implement database schemas using different data models.

CO5: Apply SQL (Structured Query Language) for data manipulation and retrieval.

CO6: Understand and apply database transaction management concepts.

**Program Outcomes (POs)**

**PO1: Apply knowledge of computing fundamentals:** COs related to SQL, database design, and normalization directly apply computing knowledge.

**PO2: Identify, formulate, and solve complex computing problems:** DBMS skills are essential for analysing and solving data-related problems in various domains.

**PO3: Design and evaluate solutions for complex computing problems:** COs related to database design and normalization enable students to design efficient and effective database solutions.

**PO4: Create, select, adapt and apply appropriate techniques:** Students learn to choose appropriate database technologies and techniques for specific applications

**PO5: Understand and commit to professional ethics'** knowledge can be applied to ensure data security and privacy, promoting ethical practices.

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### Subject: E-Business Essentials

#### Course Outcomes (Cos)

- CO1: Understand the fundamental concepts and principles of e-commerce.
- CO2: Identify and differentiate various e-commerce business models.
- CO3: Analyze the technical aspects of e-commerce, including website development and payment systems.
- CO4: Develop and implement digital marketing strategies.
- CO5: Understand the legal and ethical considerations of e-business.
- CO6: Evaluate the security and privacy issues in e-commerce.

#### Program Outcomes (POs)

- PO1:(**Computational Knowledge**): Apply knowledge of computing fundamentals, data structures, and algorithms to solve problems.
- PO2: (**Design/Development of Solutions**): Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- PO3: (**Modern Tool Usage**): Use current techniques, skills, and tools necessary for computing practice.
- PO4: (**Professional Ethics**): Understand and commit to professional ethics and social responsibilities.

### Subject: Data Structures and Algorithms

#### Course Outcomes (Cos)

- CO1: Apply knowledge of computing fundamentals, mathematics, and domain-specific knowledge to solve complex computing problems.
- CO2: Identify, formulate, research literature, and analyze complex computing problems reaching substantiated conclusions using principles of mathematics, computing sciences, and relevant domain disciplines.
- CO3: Design and evaluate solutions for complex computing problems, and design and develop systems, components, or processes that meet specified needs

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with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

CO4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**Program Outcomes (POs)**

**PO1 Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern computing tools including prediction and modeling to complex computing activities with an understanding of the limitations.

**PO2: Professional Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the computing practice.

**PO3: Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Subject: DBMS using Oracle**

**Course Outcomes (Cos)**

CO1: This involves comprehending the core principles of RDBMS, including data models, schema, instances, and the advantages of DBMS over traditional file systems.

CO2: This outcome focuses on mastering SQL commands for data definition (DDL), data manipulation (DML), data control (DCL), and transaction control (TCL). Students should be able to write and execute queries, insert, update, delete, and manage data effectively within an Oracle environment.

CO3: This includes the ability to retrieve complex data using different types of subqueries (correlated, non-correlated) and various join operations (inner, outer, self-joins) to combine data from multiple tables.

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CO4: This outcome involves learning the fundamentals of PL/SQL, including variables, control structures, procedures, functions, and triggers, to develop robust database applications.

**Program Outcomes (POs)**

**PO1 Critical Thinking and Problem Solving:** Ability to identify, analyze, and solve complex computing problems by applying knowledge of computing fundamentals, mathematics, and relevant domain disciplines.

**PO2: Effective Communication:** Ability to communicate effectively, both orally and in writing, with diverse audiences, including technical and non-technical stakeholders.

**PO3: Modern Tool Usage:** Proficiency in selecting and applying appropriate modern computing tools, techniques, and skills necessary for designing and developing software solutions.

**PO4: Individual and Team Work:** Ability to function effectively as an individual and as a member or leader in diverse teams, including multidisciplinary settings.

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Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – IV

Academic Year 2023-24

Subject: Principle of Management

Course Outcomes (Cos)

Subject: Data Structures and Algorithms

Course Outcomes (Cos)

CO1: Helps in applying cost accounting methods for evaluation purpose.

CO2: This will help the students in preparing external reports based on cost and to Identify cost classification based on how cost responds to changes in production levels and how these changes affect managerial decision making

Program Outcomes (POs)

PO1: It facilitates to know the mechanism of maintaining 'Single and Double Column Cashbook'

PO2: This course benefits students in finding early step employability in MSMEs in Accounts.

PO3: It develops confidence amongst students for the preparation of professional courses like CA, CMA and CS.

Subject: Java Programming

Course Outcomes (Cos)

CO1: Understanding syntax, data types, operators, control flow statements, and basic object-oriented principles.

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CO2: Applying concepts like classes, objects, inheritance, polymorphism, and encapsulation in Java.

CO3: Working with packages, interfaces, exception handling, and multithreading to build robust applications.

CO4: Creating user interfaces using AWT or Swing and potentially exploring basic web development with servlets or JSPs.

CO5: Evaluating the efficiency of algorithms and choosing appropriate data structures for specific tasks.

**Program Outcomes (POs)**

**PO1 Computational Knowledge:** Applying knowledge of computing fundamentals, data structures, and algorithms to solve computational problems.

**PO2: Problem Analysis:** Identifying, analyzing, and defining computing requirements for a given problem.

**PO3: Design/Development of Solutions:** Designing and implementing solutions for complex computing problems using appropriate algorithms, data structures, and programming paradigms.

**PO4: Modern Tool Usage:** Selecting and applying modern computing tools, techniques, and resources to address computational tasks effectively.

**PO5: Professional Ethics:** Understanding and adhering to ethical principles and professional responsibilities in the field of computing.

**Subject: Data Structures and Algorithms**

**Course Outcomes (Cos)**

CO1: Students will be able to explain the purpose and function of Management Information Systems (MIS) and Decision Support Systems (DSS) in organizations, including their different components and how they support various business processes.

CO2: Students will be able to analyze the information needs of an organization and identify how MIS and DSS can be used to address those needs effectively.

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CO3: Students will be able to design basic DSS solutions, understand the different types of DSS models and algorithms, and evaluate the effectiveness of existing DSS implementations.

CO4: Students will be able to apply the concepts of MIS and DSS in practical scenarios, such as analyzing data, creating reports, and supporting decision-making processes.

CO5: Students will be able to recognize the ethical implications of using information systems, including issues related to data privacy, security, and responsible use of information.

### **Program Outcomes (POs)**

PO1: : **Disciplinary Knowledge:** Students will demonstrate a solid understanding of computer science principles and their application to information systems and decision-making.

- **PO2: Communication Skills:** Students will be able to effectively communicate technical information related to MIS and DSS to both technical and non-technical audiences.
- **PO3: Critical Thinking and Problem-Solving:** Students will be able to analyze complex problems, identify information requirements, and design and evaluate DSS solutions.
- **PO4: Research Skills:** Students will be able to conduct research on MIS and DSS topics, analyze data, and draw conclusions to support decision-making.
- **PO5: Teamwork and Leadership:** Students will be able to collaborate effectively in teams to design and implement MIS and DSS solutions.

**Subject: Business Law -II**

### **Course Outcomes (Cos)**

CO1: To help the students to understand the concept of Consent, Free Consent, Classification of contracts, Modes of Discharge of Contracts, Breach of Contract and Remedies against the breach

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CO2: . 2. To help the students to understand the various provisions related to Member of a Company, Modes of Acquiring & Cessation of Membership, Rules regarding Director, Qualification & Disqualification, Legal position of Director. Legal provisions relating to Company Meetings, i.e. Annual General Meeting, Extra-ordinary General Meeting, Board Meeting

**Program Outcomes (POs)**

PO1: Demonstrate an understanding of the Legal Environment of Business.

PO2: Apply basic legal knowledge to business transactions.

PO3: Communicate effectively using standard business and legal terminology.

**Subject: Entrepreneurship Development**

**Course Outcomes (Cos)**

CO1: Understanding the entrepreneurial process and its various stages.

CO2: Identifying and evaluating business opportunities.

CO3: Developing a business plan with market analysis, financial projections, and operational strategies.

CO4: Understanding the legal and regulatory aspects of starting and running a business.

CO5: Developing essential skills like communication, teamwork, and problem-solving relevant to entrepreneurship.

**Program Outcomes (POs)**

PO1 **Computational Knowledge:** Apply knowledge of computing fundamentals, mathematics, and statistics appropriate to the discipline.

PO2: **Problem Analysis:** Identify, analyze, research literature, and solve complex computing problems by applying principles of algorithms, data structures, and relevant computing theory.

PO3: **Problem Analysis:** Identify, analyze, research literature, and solve complex computing problems by applying principles of algorithms, data structures, and relevant computing theory.

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**PO4: Design/Development of Solutions:** Design, implement, and evaluate computer-based systems, processes, components, or programs to meet desired needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

**PO5: Problem Analysis:** Identify, analyze, research literature, and solve complex computing problems by applying principles of algorithms, data structures, and relevant computing theory.

**Subject: PC Maintenance**

**Course Outcomes (Cos)**

**CO1:** Students will be able to identify and explain the functions of various hardware components like the CPU, RAM, motherboard, storage devices, and peripherals.

**CO2:** Hands-on experience in assembling and disassembling a computer system, including proper connection and cable management.

**CO3:** Students will learn to diagnose and resolve common hardware problems, such as identifying faulty components and implementing solutions.

**CO4:** Understanding how to install and configure operating systems and other essential software.

**Program Outcomes (POs)**

**PO1 Engineering Knowledge:** Applying fundamental computing knowledge to solve problems.

**PO2: Problem Analysis:** Identifying, analyzing, and solving complex computing problems.

**PO3: Design/Development of Solutions:** Designing, developing, and evaluating computer-based systems

**PO4: Conduct Investigations of Complex Problems:** Using research methods to analyze and interpret data.

**PO5: Modern Tool Usage:** Utilizing current technologies and tools for computing practice

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**Subject: Advance Networking**

**Course Outcomes (Cos)**

CO1: Students will be able to describe and differentiate various network architectures (e.g., LAN, WAN, MAN, wireless) and their components.

CO2: Students will be able to explain and apply key network protocols (e.g., TCP/IP, UDP, HTTP, DNS) and their functionalities.

CO3: Students will be able to design, configure, and implement small to medium-sized network solutions using appropriate technologies and tools.

CO4: Students will be able to diagnose and resolve common network problems using various troubleshooting techniques and tools.

CO5: Students will be able to implement basic security measures to protect network resources and data

CO6: Students will be able to grasp advanced concepts like virtualization, cloud networking, and software-defined networking (SDN).

**Program Outcomes (POs)**

PO1: **Individual and Team Work:** Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

PO2: **Problem Analysis:** Identify, analyze, research literature, and define computing requirements appropriate to its solution.

PO3: **Design/Development of Solutions:** Design, implement, and evaluate a computing-based system, process, component, or program to meet desired needs.

PO4: **Modern Tool Usage:** Use current techniques, skills, and tools necessary for computing practice.

PO5: **Professional Ethics:** Understand and commit to professional ethics and cyber regulations.

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Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – V

Academic Year 2023-24

Subject: Management Accounting

Course Outcomes (Cos)

Subject: Data Structures and Algorithms

Course Outcomes (Cos)

CO1: Students learn the fundamental concepts and principles of management accounting, such as cost accounting, budgeting, and variance analysis

CO2: Graduates can apply accounting principles and techniques to perform specific tasks, such as creating budgets, analyzing financial statements, and preparing reports for internal use.

CO3: Students learn to analyze and interpret both quantitative and qualitative data to provide insights for internal decision-making.

CO4: A key outcome is the ability to use accounting information to support strategic planning and decision-making, a primary function of management accounting.

CO5: Courses may include specific outcomes like learning how to set up computerized accounting books or demonstrate knowledge of various tax issues.

Program Outcomes (POs)

PO1: Graduates can apply knowledge from various business disciplines, such as accounting, finance, and management, to solve complex business problems.

PO2: Students develop analytical skills to make informed business decisions and solve problems, a core function of management accounting.

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PO3: Graduates are equipped with the communication and presentation skills needed for professional roles.

PO4: The program provides proficiency in using modern business tools, such as accounting software like TALLY.

**Subject: SQL-2017**

**Course Outcomes (Cos)**

CO1: Understand the principles of relational databases and the role of SQL as a standard language for data manipulation and retrieval.

CO2: Design and implement database schemas using T-SQL, including creating tables, indexes, stored procedures, triggers, and views.

CO3: Query data effectively using various SQL commands, including joins, subqueries, and functions.

CO4: Apply data management and administration tasks, such as backup, restore, security configurations, and performance tuning using tools like SQL Server Management Studio (SSMS).

CO5: Explore advanced features like JSON support, in-memory OLTP, or machine learning services for building intelligent applications.

**Program Outcomes (POs)**

PO1: Engineering Knowledge

PO2: Design/Development of Solutions involves designing and querying capabilities

PO3: Modern Tool Usage is supported by applying administration tasks and exploring advanced features

PO4: Lifelong Learning

**Subject: Data Structures and Algorithms**

**Course Outcomes (Cos)**

CO1: Specific, measurable learning expectations for an individual course.

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CO2: To state what students will be able to do after completing a particular course.

CO3: A CO for a web development course might be: "Learn and use knowledge of web publishing and technologies"

### **Program Outcomes (POs)**

PO1: Broader skills, knowledge, and attitudes that graduates are expected to have at the end of their degree program.

PO2: To outline the overall competencies gained through the entire program.

PO3: A PO for a computer science program might be: "Apply knowledge of web development to design and publish a website individually and as a team member".

### **Subject: Organizational Behaviour**

### **Course Outcomes (Cos)**

CO1: Identify organizational theories and principles, and examine the challenges of organizational behavior.

CO2: Analyse how personality, values, perception, and motivation influence individual behaviour in the workplace.

CO3: Assess the impact of organizational factors like structure, culture, and change on behaviour.

CO4: Outline the elements of group behavior, including dynamics, communication, and leadership.

CO5: Understand the dynamics of human behavior and apply management principles to real-world situations.

CO6: Develop and demonstrate workplace competencies such as communication, critical thinking, and problem-solving.

### **Program Outcomes (POs)**

PO1: Domain Knowledge: Understand and apply knowledge in core business disciplines.

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PO2: Communication Skills: Develop verbal, presentation, and reporting skills.

PO3: Leadership and Team Skills: Build leadership abilities and work effectively in teams.

PO4: Problem-Solving and Decision Making: Apply logical reasoning and analytical skills to solve business problems.

**Subject: Software Engineering**

**Course Outcomes (Cos)**

CO1: Statements that specify what students are expected to know and be able to do after a course is completed.

CO2: Each CO is mapped to one or more POs, showing how a specific course contributes to the overall program objectives.

CO3: The attainment of POs is assessed indirectly or directly, based on the evidence of students meeting the individual COs within their courses.

CO4: This mapping ensures that the curriculum is designed to systematically build the skills required to meet the program's overarching goals.

**Program Outcomes (POs)**

PO1: Statements that describe the knowledge, skills, and attitudes that graduates of a specific engineering program should have acquired.

PO2: Broad and applicable to the entire degree program.

**Subject: Banking Insurance**

**Course Outcomes (Cos)**

CO1: Explain the functions and working of Indian banks and insurance companies.

CO2: Understand the regulatory framework for banks and insurance companies.

CO3: Recognize the impact of reforms in the banking and insurance sector.

CO4: Identify and analyze various types of insurance policies.

CO5: Determine and manage the risks involved in the insurance industry.

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### **Program Outcomes (POs)**

PO1: Understand the principles and concepts of banking, insurance, accounting, and finance.

PO2: Analyse and interpret financial statements and apply accounting knowledge to business problems.

PO3: Effectively communicate both orally and in writing with stakeholders.

PO4: Apply critical thinking and problem-solving skills to real-world situations in the banking and insurance sectors.

### **Subject: Retail Management**

### **Course Outcomes (Cos)**

CO1: Define retailing, its role in industrialized societies, and the impact of key market trends.

CO2: Apply frameworks to develop high-level retail marketing strategies, including the "retail mix" (product, price, promotion, place, people).

CO3: Understand and implement standard operating procedures (SOPs) for store safety, security, hygiene, and inventory management.

CO4: Analyze the consumer decision-making process, customer demographics, and lifestyle factors to tailor marketing strategies.

CO5: Explore the use of information systems, supply chain management, and customer relationship management (CRM) systems in retail operations.

### **Program Outcomes (POs)**

PO1: Ability to apply management theories, principles, and frameworks to solve complex, real-world business problems.

PO2: Proficiency in analytical reasoning, synthesizing data from diverse sources, and making data-driven decisions.

PO3: Strong written and oral communication skills, effective in various professional and cross-cultural contexts.

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PO4: Strong written and oral communication skills, effective in various professional and cross-cultural contexts.

Course BCA

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – VI

Academic Year 2023-24

Subject: Management Accounting

Subject: Element of Commercial Portal (HTML5)

Course Outcomes (Cos)

CO1: Ability to apply management theories, principles, and frameworks to solve complex, real-world business problems.

CO2: Proficiency in analytical reasoning, synthesizing data from diverse sources, and making data-driven decisions.

CO3: Strong written and oral communication skills, effective in various professional and cross-cultural contexts.

CO4: Capability to work effectively in diverse teams and demonstrate leadership qualities to achieve organizational goals.

CO5: An understanding of ethical, social, and environmental issues in business and the ability to act with integrity.

CO6: Recognition of the need for continuous self-paced learning and personal development to adapt to evolving industry demands.

Program Outcomes (POs)

PO1: Define retailing, its role in industrialized societies, and the impact of key market trends.

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PO2: Apply frameworks to develop high-level retail marketing strategies, including the "retail mix" (product, price, promotion, place, people).

PO3: Understand and implement standard operating procedures (SOPs) for store safety, security, hygiene, and inventory management.

PO4: Analyse the consumer decision-making process, customer demographics, and lifestyle factors to tailor marketing strategies.

### **Subject: Android 9**

### **Course Outcomes (Cos)**

CO1: Students learn to apply OS concepts like processes, memory management, and file systems through practical exposure to the Android 9 environment.

CO2: Students can design, develop, test, and debug applications specifically tailored for the features and constraints of the Android 9 API level using the Android SDK and tools like Android Studio.

CO3: Students can compare and contrast the features and architecture of Android 9 with other mobile operating systems like iOS, contributing to a broader understanding of different platforms.

CO4: Students gain experience in creating, selecting, and applying appropriate techniques and resources (like emulators for Android 9) for mobile application development.

### **Program Outcomes (POs)**

PO1: Students learn to identify, formulate, and analyse complex engineering problems (e.g., performance issues on a specific Android version).

PO2: The ability to design solutions for complex problems, such as creating a functional application that meets specific needs on the Android 9 platform.

PO3: Using the Android SDK, emulators, and Java/Kotlin programming languages for development helps students achieve competency in using modern engineering tools.

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PO4: Managing the development lifecycle of an app from conception to deployment (through a marketplace) can address outcomes related to project management.

**Subject: Business Law -III**

**Course Outcomes (Cos)**

CO1: Understand and apply the essentials of a valid contract.

CO2: Identify the remedies available for breach of contract

CO3: Explain the rights and duties of partners in a partnership

CO4: Differentiate between a sale and an agreement to sell.

**Program Outcomes (POs)**

PO1: Broad, overarching abilities a student will have upon graduating from a program. They are typically achieved through the combined learning from multiple courses.

PO2: Apply legal and management principles to solve business problems.

PO3: Develop professional skills like legal reasoning, drafting, and pleading.

PO4: Communicate effectively in both formal and informal contexts.

**Subject: Project**

**Course Outcomes (Cos)**

CO1: Specific learning objectives for an individual course, detailing the knowledge, skills, and abilities students should demonstrate upon completion.

CO2: To provide a clear framework for teaching and learning, and to help in evaluating the learning process for that specific course.

CO3: After completing a "Principles of Political Science" course, a student can "discuss the social contract theory" (CO 3), which is a specific, measurable outcome.

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### **Program Outcomes (POs)**

PO1: Broad statements of the knowledge, skills, and attitudes a graduate should have at the end of their entire academic program.

PO2: To define the overall competencies of a graduate, ensuring the program aligns with professional and societal needs.

PO3: A common PO is "Problem Analysis," which states that graduates should be able to "identify, formulate, review research literature, and analyse complex engineering problems".

### **Subject: Software Testing**

#### **Course Outcomes (Cos)**

CO1: Apply white-box and black-box testing techniques to identify defects

CO2: Develop test cases using boundary value analysis and equivalence partitioning

CO3: Analyse software defects and articulate their causes

### **Program Outcomes (POs)**

PO1: "Apply knowledge of mathematics, science, and engineering fundamentals to solve complex engineering problems"

PO2: "Analyze and design software systems with an understanding of their ethical implications".

PO3: "Communicate technical concepts effectively through written and oral presentations"

### **Subject: Services Marketing**

#### **Course Outcomes (Cos)**

CO1: Students can identify the core concepts of marketing and the unique role of services marketing within a business.

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CO2: Students can develop marketing strategies for services, including the 7 Ps (Product, Price, Place, Promotion, People, Process, and Physical Evidence).

CO3: Students can effectively communicate the unique marketing mixes and selling propositions for different service offerings

CO4: Students can understand the global nature of services marketing and how to use digital tools like social media and email in a service context.

### **Program Outcomes (POs)**

PO1: A student will gain specific knowledge about the services sector of marketing.

PO2: Students develop verbal, presentation, and reporting skills through discussing and presenting service marketing cases.

PO3: Students can analyse and interpret data to make informed business decisions related to services.

PO4: Students may learn to work in teams to develop marketing plans for a service, fostering leadership and team skills.

Subject: Export Management

### **Course Outcomes (Cos)**

CO1: Explain the basic concepts, objectives, types, and the overall framework of export trade.

CO2: Understand the key functions, processes, and procedures involved in export and import operations and the ability to prepare and handle foreign trade documents.

CO3: Understand the legal aspects, foreign trade regulations, and the roles of various trade promotion councils and government bodies in export management.

CO4: Formulate strategies for selecting a product for export, identifying potential international markets, and finding genuine foreign buyers.

CO5: Grasp the concepts of foreign exchange mechanisms, international banking, and the logistics involved in global shipping and supply chain management.

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CO6: Analyse current domestic and international business trends and evaluate various market entry strategies and challenges.

**Program Outcomes (POs)**

PO1: Apply management theories and practices to analyse and solve complex national and global business problems.

PO2: Foster analytical and critical thinking skills for data-based decision-making in a global context.

PO3: Understand the functioning of national and global business environments, with the ability to identify aspects of global business and cross-cultural understanding.

PO4: Develop effective oral and written communication skills, especially in business applications, using appropriate technology.

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Course BCS

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – I

Academic Year 2021 -22

Subject: BCS

Subject: Communication Skill in English

Course Outcomes (Cos)

CO1: Write different types of texts, such as paragraphs, essays, and letters.

CO2: Apply various writing styles, like narrating, describing, and arguing

CO3: Read and understand texts and listen to spoken input to grasp content and structure.

CO4: Summarize facts, ideas, and opinions clearly.

Program Outcomes (POs)

PO1: Clearly communicate ideas and concepts both orally and in writing.

PO2: Understand and grasp academic subjects included in the program.

PO3: Develop the ability to learn independently and pursue personal interests.

PO4: Integrate language proficiency, intercultural competency, critical thinking, and digital skills for the globalized work environment.

Subject: Programming in C

Course Outcomes (Cos)

CO1: Understand and trace the execution of C programs.

CO2: Write C code for a given algorithm.

CO3: Use C language data types and operators correctly in programs.

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CO4: Implement functions for modular programming.

CO5: Apply C programming constructs like control structures, loops, arrays, structures, and pointers to solve computational problems.

CO6: Understand and apply file handling in C.

CO7: Develop the logic needed to create programs and applications in C.

**Program Outcomes (POs)**

PO1: Ability to apply programming skills to design and develop solutions.

PO2: Ability to learn and switch to other programming languages after mastering basic C programming constructs.

PO3: Gain knowledge and skills in programming.

PO4: Ability to develop program logic.

PO5: Understand fundamental programming concepts

**Subject: DBMS**

**Course Outcomes (Cos)**

CO1: Understand what databases are, their importance, and how they are used.

CO2: Write SQL commands to retrieve and manipulate data, and become familiar with a commercial database system like Oracle.

CO3: Apply principles like the Entity-Relationship (ER) model and normalization to create the logical design of a database.

CO4: Grasp the basic issues related to transactions, which are sequences of operations performed as a single logical unit of work.

**Program Outcomes (POs)**

PO1: Students can use language effectively in formal and informal settings.

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PO2: Students can analyse a problem and develop effective solutions, which is a core skill for any technical program.

PO3: Students can work with others to complete projects. While not explicitly listed, this is a common PO for most programs.

PO4: Students understand and can apply ethical principles in their professional work.

### **Subject: Operating System**

#### **Course Outcomes (Cos)**

CO1: Differentiate between system and application software, and explain the evolution of OS.

CO2: Grasp device and memory management, and implement file management concepts.

CO3: Implement inter-process communication and design solutions for synchronization problems.

CO4: Simulate and implement OS concepts like scheduling, deadlock management, and memory management.

#### **Program Outcomes (POs)**

PO1: Prepare students for roles in the IT industry, such as software programmer, system administrator, or web designer.

PO2: Develop programming, networking, and modern IT techniques.

PO3: Analyse and solve problems related to computer systems.

PO4: Gain knowledge of organization and management principles within an IT context.

### **Subject: Indian Knowledge System**

#### **Course Outcomes (Cos)**

CO1: Specific, measurable learning expectations for a single course.

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CO2: "Upon completion of a course on the *Yoga Sutras*, students will be able to explain the core philosophical concepts of *dhyana* and *samadhi* as described in the text".

CO3: To guide the course content, teaching methods, and assessments, ensuring students meet the course's goals.

### **Program Outcomes (POs)**

PO1: Broad statements about the skills and attributes students will possess upon graduating from the entire program.

PO2: Familiarity with the nuances of language in formal and informal expressions.

PO3: Knowledge of Indian social sciences, performing arts, and literature to become responsible citizens.

PO4: The ability to think critically, analyze, and apply concepts in depth.

### **Subject: Office Organization and Management**

#### **Course Outcomes (Cos)**

CO1: The meaning, scope, necessity, and principles of effective office management.

CO2: Apply appropriate management techniques (planning, organizing, staffing, leading, and controlling) to manage a business office efficiently.

CO3: Evaluate and establish various records and information management systems (electronic and paper) to ensure organization, security, and accessibility of data.

CO4: Operate and provide support related to the use, maintenance, and procurement of essential office equipment and information technologies.

CO5: Organize and coordinate meetings, conferences, and special events, including the preparation of all related documentation and travel arrangements.

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CO6: Demonstrate effective written and oral communication, interpersonal, and client service skills to facilitate information flow and support organizational goals.

### **Program Outcomes (POs)**

PO1: The ability to communicate effectively, both orally and in writing, with diverse stakeholders using various technological tools.

PO2: The ability to foster analytical and critical thinking skills to identify, analyse, and solve business problems using data-based decision-making.

PO3: The ability to lead others, contribute effectively to a team environment, and manage conflicts in the achievement of organizational goals.

PO4: The ability to understand, analyse, and apply ethical and legal aspects of business and professional practices.

PO5: The ability to utilize current information and data management technologies to streamline work processes and improve organizational efficiency.

### **Subject: Skill Enhancement (HTML & CSS)**

#### **Course Outcomes (Cos)**

CO1: Create well-formed, semantically correct HTML documents.

CO2: Apply CSS to control the visual presentation of web pages, including layout, typography, colors, and responsive design.

CO3: Ensure web pages adapt and display effectively across various devices and screen sizes.

CO4: Apply knowledge of frameworks like Bootstrap or preprocessors like Sass/Less for efficient styling.

CO5: Identify and resolve common errors in web page structure and styling.

CO6: Design and develop web pages that are usable by individuals with disabilities, adhering to accessibility guidelines.

#### **Program Outcomes (POs)**

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PO1: Demonstrate competence in applying knowledge and skills in web development technologies.

PO2: Analyse and solve technical problems related to web development.

PO3: Apply design principles to create effective and user-friendly web interfaces.

PO4: Effectively communicate technical information, both written and oral, to diverse audiences.

PO5: Recognize the need for and engage in continuous learning and adaptation to new technologies in the field of web development.

### **Subject: Health and Wellness**

#### **Course Outcomes (Cos)**

CO1: Apprehend the concept of health and wellness, and distinguish between physical, mental, emotional, and social dimensions of health.

CO2: Apply practical techniques and tools for managing stress, enhancing emotional resilience, and implementing mind-body practices like meditation and yoga in daily life.

CO3: Appreciate the critical impact of nutrition, sleep hygiene, and fitness in maintaining holistic health.

CO4: Analyze lifestyle choices and identify the behavioral, environmental, and genetic risk factors associated with chronic diseases.

CO5: Develop an understanding of the physiological basis of diseases and the role of physical activity and diet in prevention and management

#### **Program Outcomes (POs)**

PO1: Demonstrate competency in assessing health status, identifying community health problems, and designing appropriate programmatic strategies to meet the needs of specific populations.

PO2: Apply health behavior theories to real-world health programs and conduct a needs assessment for specific populations.

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PO3: Communicate effectively with clients, peers, and other healthcare professionals to promote holistic well-being.

PO4: Design, implement, and evaluate effective fitness or health programs and manage related administrative tasks.

PO5: Promote health education and preventive care strategies in community or workplace settings.

**Course BCS**

**Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise**

**Semester – II**

**Academic Year 2021 -22**

**Subject: BCS**

**Subject: Ability Enhancement Courses-II (Marathi)**

**Course Outcomes (Cos)**

CO1: Enhance Foundational Skills - Improve basic language skills (reading, writing, speaking, and listening).

CO2: Apply Grammatical Rules - Understand and apply the rules of Marathi grammar effectively in communication.

CO3: Develop Creative Writing - Develop and enrich creative writing skills, such as essay writing or other literary forms.

CO4: Improve Oral Communication - Enhance conversational skills and the ability to communicate effectively in different contexts.

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CO5: Utilize Modern Media - Gain an introduction to audio-visual media and learn writing/presentation skills for these platforms, including social media (blogs, Facebook, Twitter, etc.).

### **Program Outcomes (POs)**

PO1/PSO1: Communication Skills - Develop proficiency in both formal and informal Marathi communication skills (speaking, listening, reading, and writing).

PO2/PSO2: Critical Thinking & Appreciation - Cultivate an interest in and the ability to critically appreciate Marathi literature, including various genres and historical periods.

PO3/PSO3: Language Application - Understand the importance of the Marathi language in day-to-day life and its use in administrative or professional contexts.

PO4/PSO4: Cultural & Social Awareness - Understand the relationship between literature and real life, and gain insights into the social and cultural values expressed in Marathi texts.

PO5/PSO5: Career Readiness - Avail job opportunities in fields like translation, media, teaching, and other areas where strong language skills are required.

### **Subject: Programming in C++**

#### **Course Outcomes (Cos)**

CO1: Students will be able to explain core C++ concepts such as data types, variables, operators, control structures (if-else, loops), and functions.

CO2: Students will be able to apply OOP concepts including classes, objects, inheritance, polymorphism, and encapsulation in C++ programs.

CO3: Students will be able to implement and use basic data structures (arrays, linked lists, stacks, queues) and fundamental algorithms in C++.

CO4: Students will be able to perform input/output operations using cin and cout, and manage data persistence through file handling in C++.

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CO5: Students will be able to write, compile, debug, and execute C++ programs to solve given problems.

### **Program Outcomes (POs)**

PO1: Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

### **Subject: Advanced DBMS**

### **Course Outcomes (Cos)**

CO1: various advanced database architectures, including parallel, distributed, and object-oriented databases.

CO2: Apply query processing and optimization techniques in complex database environments.

CO3: Evaluate and implement advanced transaction processing, concurrency control (e.g., locking, two-phase locking, optimistic methods), and recovery mechanisms.

CO4: Manipulate and query data using languages and techniques for modern database types, such as XML, NoSQL, and object-oriented queries.

CO5: Understand concepts of data warehousing, data mining, and big data management within the context of enterprise applications.

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CO6: Design and model database applications using advanced techniques like Enhanced Entity-Relationship (EER) models and advanced normalization.

### **Program Outcomes (POs)**

PO1: Assignments focusing on documentation and presentations help address

PO2: Through the application of advanced database knowledge and tools.

PO3: Assignments focusing on documentation and presentations help address

PO4: More comprehensive list of typical POs can be found on the Vel Tech University [veltech.edu.in](http://veltech.edu.in) website.

### **Subject: Linux Operating System**

#### **Course Outcomes (Cos)**

CO1: Install, configure, and manage server services, users, groups, and file services.

CO2: Understand and implement security policies and measures to protect a Linux server.

CO3: Create, modify, and delete user and group accounts, and manage permissions.

CO4: Understand the concepts of virtualization in a Linux environment.

CO5: Set up and manage file sharing services, such as NFS or Samba.

CO6: Use the command line to perform common administrative tasks, manage system resources, and troubleshoot issues.

### **Program Outcomes (POs)**

PO1: Apply knowledge of scientific and engineering principles to solve problems in computer science and IT.

PO2: Design and analyse solutions to problems using a variety of technologies, including operating systems like Linux.

PO3: Implement and test software solutions that leverage the capabilities of an operating system.

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PO4: Understand fundamental concepts of operating systems, such as process management, memory management, and file systems, and be able to apply them.

**Subject: Generic Open Elective (Fundamental of e-Commerce)**

**Course Outcomes (Cos)**

CO1: Analyze the impact of e-commerce on traditional business models and strategy.

CO2: Describe the major types of e-commerce, including B2B, B2C, C2C, and m-commerce models

CO3: Explain the key technological infrastructure and components required for building an e-commerce presence, such as internet technologies, web development tools, and hosting options.

CO4: Identify and assess the key security threats and legal/ethical issues in the e-commerce environment (e.g., data privacy, cyber laws, digital signatures).

CO5: Evaluate the role and efficiency of various electronic payment systems and logistics within e-business operations.

**Program Outcomes (POs)**

PO1: **Enhance domain knowledge:** The ability to understand and explain core concepts in business, commerce, and the specific dynamics of the e-commerce environment.

PO2: **Problem analysis and decision-making:** The ability to analyze business problems in a digital context and make data-based decisions.

PO3: **Technical and practical skills:** The ability to utilize relevant information technology, tools, and software necessary for modern business practices.

PO4: **Ethical and social responsibility:** An understanding of the ethical, legal, and social issues related to business and technology, and the ability to apply moral behavior in professional contexts.

**Subject: Vocational Skill Courses (Java Script)**

**Course Outcomes (Cos)**

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CO1: Understand the core concepts of JavaScript programming, including variables, data types, operators, and control structures.

CO2: Build dynamic and interactive web pages using JavaScript objects and by applying different event-handling mechanisms.

CO3: Implement client-side form validation using JavaScript and regular expressions.

CO4: Utilize functions, arrays, and strings effectively to solve specific problems within web development.

CO5: Learn about browser history, cookies, and local storage to manage and manipulate browser data.

CO6: Use modern development tools and debugging techniques to test and troubleshoot JavaScript code.

### **Program Outcomes (POs)**

PO1: These can include applying disciplinary knowledge to solve problems

PO2: Analysing complex issues, and designing solutions. Programs also aim to develop skills in using modern tools

PO3: Ethical practice and a commitment to lifelong learning are also key components of program outcomes in IT fields.

PO4: Programs also aim to develop skills in using modern tools, effective communication, and teamwork

### **Subject: Value Education Courses (Constitution of India)**

#### **Course Outcomes (Cos)**

**CO1: Understand the making of the Indian Constitution:** Students will gain a foundational understanding of how the constitution was created and its historical context.

**CO2: Identify Fundamental Rights and Duties:** Students will be able to identify and explain the fundamental rights and duties guaranteed by the Constitution to its citizens.

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**CO3: Examine federalism and Centre-State relations:** Students will be able to analyse the relationship between the central government and state governments as outlined in the constitution.

**CO4: Understand the structure of government:** Students will be able to describe the structures of government at both the national and state levels.

**CO5: Explain the role of the judiciary:** Students will be able to explain the functions and powers of the Supreme Court and High Courts in India.

### **Program Outcomes (POs)**

**PO1: Demonstrate citizenship:** Graduates will exhibit behavior and actions that denote good citizenship and social responsibility.

**PO2: Develop critical thinking:** Students will develop critical and analytical skills to understand and analyze problems, including those arising from social, political, and legal contexts.

**PO3: Inculcate human values:** The program aims to inculcate human values which leads to a transformation in behaviour and promotes a sense of responsibility

**PO4: Improve communication skills:** Students will improve their communication skills, both formal and informal, in their professional and personal lives

### **Subject: Co-Curricular Courses (Yoga Education)**

#### **Course Outcomes (Cos)**

**CO1:** Popularize yoga and its therapeutic and preventive values among the masses.

**CO2:** Enable students to use yogic practices to promote positive health, leading to physical fitness, mental soundness, emotional balance, and spiritual development.

**CO3:** Foster personality development, including self-discipline, leadership qualities, social competence, and ethical values.

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CO4: Train students to be effective yoga practitioners, wellness instructors, or therapists, opening up various employment opportunities.

CO5: Create awareness and provide the skills to evaluate and contribute to research advances in the field of yoga.

**Program Outcomes (POs)**

PO1: Explain the fundamental philosophy, history, and different schools of yoga (e.g., Ashtanga Yoga, Hatha Yoga).

PO2: Perform various *asanas* (postures), *pranayama* (breathing techniques), *mudras*, and meditation techniques correctly and safely.

PO3: Understand and apply the principles of yoga to manage stress, improve concentration, and adopt a healthy lifestyle.

PO4: Understand the basic systems of the human body and the effects of yogic exercises on them.

**Course BCS**

**Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise**

**Semester – III**

**Academic Year 2021 -22**

**Subject: BCS**

**Subject: Fundamental of PHP**

**Course Outcomes (Cos)**

CO1: Explain the principles of yoga therapy and its effects on the different systems of the body.

CO2: Understand the impact of yogic practices on mental and emotional well-being.

CO3: Identify and describe various diseases, their causes, and the potential application of yogic techniques for management.

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### Program Outcomes (POs)

PO1: Develop software solutions to problems across a range of application domains through analysis and design.

PO2: Identify, formulate, and solve complex computing problems using fundamental principles of mathematics and computing sciences.

PO3: Understand professional, ethical, legal, security, and social issues related to the development and deployment of technology.

**Subject: Data Structure**

### Course Outcomes (Cos)

CO1: Implement various data structures (like linked lists, stacks, queues, trees) in a high-level programming language.

CO2: Analyze the time and space complexity of different algorithms and data structures.

CO3: Choose the most appropriate data structure for a given problem.

CO4: Apply data structures for efficient problem-solving in areas like searching, sorting, and graph traversal

### Program Outcomes (POs)

PO1: **Problem-solving:** The ability to analyze a complex computational problem and to define and address the computing requirements appropriate for its solution.

PO2: **Design:** The ability to design, implement, and evaluate a computational-based solution to meet a variety of public and organizational needs.

PO3: **Communication:** The ability to communicate effectively to a range of audiences

PO4: **Professionalism:** The ability to apply professional knowledge and ethical principles.

**Subject: Web Technologies-I**

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### Course Outcomes (Cos)

CO1: Create static and dynamic web pages using HTML, CSS, and JavaScript.

CO2: Design and implement server-side applications using technologies like Servlets, JSP, or PHP.

CO3: Connect web applications to databases and perform data manipulation using SQL.

CO4: Apply web development frameworks and architectures (e.g., MVC) to build robust web applications.

CO5: Implement client-side scripting with validation and interactive elements.

### Program Outcomes (POs)

PO1: **(Engineering Knowledge):** Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (This would encompass the theoretical underpinnings of web technologies).

PO2: **PO2 (Problem Analysis):** Identify, formulate, review literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (This relates to analyzing web development challenges).

PO3: **PO3 (Design/Development of Solutions):** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (Directly applicable to designing web applications).

PO4: **PO4 (Modern Tool Usage):** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of the limitations. (This covers proficiency in web development tools and platforms).

**Subject: Fundamental of Data Science**

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### Course Outcomes (Cos)

CO1: Evaluate and analyse data using various techniques and tools.

CO2: Generate visualizations to represent data patterns and insights.

CO3: Write programs using control structures and functions to manipulate and process data.

CO4: Grasp and apply fundamental data science principles like data reduction and data visualization.

### Program Outcomes (POs)

PO1: Possess a strong understanding of the fundamental concepts and theories of data science.

PO2: Develop the ability to model and solve problems using appropriate data science theories and methods.

PO3: Understand and apply advanced theories and methods to design solutions for complex data science problems.

PO4: Communicate effectively with both technical and non-technical audiences, which includes writing reports, giving presentations, and providing clear instructions.

PO5: Function effectively as an individual and as a member or leader in diverse teams and multidisciplinary settings.

### Subject: **Environmental Studies**

### Course Outcomes (Cos)

CO1: Specific, measurable learning objectives that students are expected to achieve at the end of a single course.

CO2: A CO for a course on "Ecosystem Dynamics" might be: "Students will be able to describe the flow of energy and matter in a given ecosystem."

CO3: To detail the specific learning that takes place within a course.

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### Program Outcomes (POs)

PO1: Broader statements about the capabilities and competencies graduates of a specific program should have after graduation.

PO2: A PO could be: "Graduates will be able to analyse environmental problems and develop sustainable solutions."

PO3: To define the overall goals of the degree program and provide a standard for graduate accomplishment.

Subject: **NSS**

### Course Outcomes (Cos)

CO1: A single course.

CO2: To define the specific learning expectations for that course.

CO3: "Classify and explain different imaging techniques for medical application" (from a specific course).

CO4: Achieved through assessments within that specific course, like assignments, tests, and labs.

### Program Outcomes (POs)

PO1: The entire degree program.

PO2: To state the overall skills, knowledge, and attitudes graduates should possess upon completion.

PO3: "Effective Communication: The program makes the students familiar with nuances and usage of language in formal and informal expressions of life".

PO4: Assessed through the cumulative achievement of all the courses within the program.

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**Subject: Generic Elective**

**Course Outcomes (Cos)**

CO1: Statements that describe what students are expected to know, understand, and be able to do by the time they graduate from a program.

CO2: They are wide-ranging and encompass skills, knowledge, and behaviors acquired throughout the entire degree.

CO3: Applying fundamental knowledge of science and engineering.

CO4: Using modern tools and techniques to solve problems.

**Program Outcomes (POs)**

PO1: Statements that describe the specific knowledge, skills, and attitudes a student is expected to have after completing a single course, including generic electives.

PO2: They are specific to the content of an individual course and are often more detailed and measurable.

PO3: Understanding the impact of industrialization in *Hard Times* by Dickens (CO 1).

PO4: Learning to develop GUI applications in Android using XML (CO 4).

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Course BCS

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – IV

Academic Year 2021 -22

Subject: BCS

Subject: **Advanced PHP**

Course Outcomes (Cos)

**CO1: Design and develop dynamic, database-driven web applications:** using advanced PHP concepts and frameworks (e.g., Laravel, Symfony).

**CO2: Implement secure and robust web applications:** by applying best practices for authentication, authorization, and data validation in PHP.

**CO3: Utilize advanced PHP features:** such as object-oriented programming (OOP), design patterns, and exception handling for building scalable and maintainable code.

**CO4: Integrate and interact with external APIs and services:** using PHP, including RESTful services and third-party libraries.

Program Outcomes (POs)

**PO1: Apply knowledge of computing fundamentals and specialized computing concepts:** to solve complex problems in software development.

**PO2: Design and implement software solutions:** that meet specified requirements and adhere to industry standards.

**PO3: Analyze and evaluate the performance of software systems:** and propose optimization strategies.

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PO4: **Communicate effectively:** with technical and non-technical stakeholders in a professional environment.

### **Subject: Software Engineering**

#### **Course Outcomes (Cos)**

CO1: Develop complex, secure, and scalable dynamic web applications using advanced PHP concepts.

CO2: Apply Object-Oriented Programming (OOP) principles (classes, objects, inheritance, interfaces, traits, namespaces) in PHP to build well-structured applications.

CO3: Integrate server-side PHP with various databases (e.g., MySQL), performing advanced queries, creation, updates, and data retrieval operations.

CO4: Implement web application security best practices, including protection against common vulnerabilities like XSS, SQL Injection, and CSRF.

#### **Program Outcomes (POs)**

PO1: Engineering Knowledge: Apply knowledge of mathematics, algorithms, computer science, and software engineering principles to solve complex problems.

PO2: Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems, reaching substantiated conclusions using first principles of mathematics and computer science.

PO3: Design/Development of Solutions: Design solutions for complex software engineering problems or develop a software application using modern tools, components, or processes to meet specific needs with appropriate consideration for public health, safety, and cultural aspects.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and methods, including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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### Subject: **Web Technologies-II**

#### Course Outcomes (Cos)

CO1: Design and develop robust and responsive web applications using advanced front-end and back-end technologies.

CO2: Implement multi-tier architectures (e.g., three-tier using servlets and JSP) for dynamic web applications.

CO3: Apply server-side programming features, such as Java Server Pages (JSP), Servlets, or frameworks like Struts/Hibernate, to create dynamic content and manage user sessions.

CO4: Integrate web applications with various databases using connectivity methods like JDBC, and perform operations such as storing and retrieving data.

#### Program Outcomes (POs)

PO1: **Engineering Knowledge:** Applying fundamental knowledge to solve complex problems.

PO2: **Problem Analysis:** Identifying, analyzing, and solving complex problems using scientific principles.

PO3: **Modern Tool Usage:** Using current techniques and tools in the field.

PO4: **Individual and Team Work:** Functioning effectively both individually and in teams.

### Subject: **Statistics for Data Science**

#### Course Outcomes (Cos)

CO1: Read, understand, and trace the execution of programs written in a specific language, such as C.

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CO2: Write code for a given algorithm.

CO3: Implement C code using specific data types and operators.

CO4: Write and implement functions to complete a program.

### **Program Outcomes (POs)**

**PO1: Apply statistical and mathematical concepts:** Graduates will be able to use concepts like linear algebra, calculus, and probability to solve data science problems.

**PO2: Process and analyze data:** Students will learn to visualize, process, and analyze data using various statistical methods.

**PO3: Conduct research:** They will be able to apply scientific research methodologies to solve problems.

**PO4: Solve real-world problems:** Graduates should be able to translate statistical knowledge into solutions for practical, real-world issues.

### **Subject: Fundamental of Big Data**

### **Course Outcomes (Cos)**

CO1: Define and explain the concept of Big Data, its characteristics (the 5 Vs: Volume, Variety, Velocity, Veracity, and Value), and the associated challenges and solutions.

CO2: Understand the architecture and components of the Hadoop ecosystem (HDFS, MapReduce, Pig, Hive, Spark).

CO3: Apply data preprocessing and data mining techniques for data analysis.

CO4: Develop simple Big Data solutions using distributed processing frameworks like Hadoop MapReduce or Spark.

CO5: Analyze the fundamental tools and methods of data analysis and statistics as applied to large datasets.

### **Program Outcomes (POs)**

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PO1: Program Outcomes for a degree program

PO2: Big Data program often include the ability to apply mathematical

PO3: design data-driven solutions, and effectively use modern Big Data tools and platforms.

PO4: Other POs may cover effective communication about data activities, the capacity for lifelong learning in data science, and an understanding of professional ethics, including data privacy and security.

### **Subject: Modern Indian Language**

#### **Course Outcomes (Cos)**

CO1: Acquiring specific language skills for daily use and for specific purposes, including rhetorical ability and vocabulary development.

CO2: Analysing and interpreting specific texts, including prose and poetry, and understanding concepts of communication, prose, and poetry.

CO3: Understanding basic linguistic concepts, theories, and various sub-disciplines of linguistics.

CO4: Applying learned concepts, such as applying translation skills from English to Hindi, understanding official letter writing, or using journalistic skills.

CO5: Developing specific skills like enhancing proficiency in reading and writing, and developing an interest in literature.

#### **Program Outcomes (POs)**

PO1: **Critical and analytical skills:** Ability to critically analyze literary texts using different theoretical perspectives and to understand the socio-cultural and historical contexts of literature.

PO2: **Communication skills:** Ability to communicate effectively and clearly, both orally and in writing, using appropriate literary terminology and concepts.

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**PO3: Cultural and historical awareness:** Understanding of diverse literary genres, periods, and movements, fostering a global perspective through awareness of diverse cultural representations

**PO4: Literary appreciation:** A thorough study of various literary genres and the ability to develop a literary research attitude.

**PO5: Intercultural competency:** The ability to integrate language proficiency, intercultural skills, technology, and critical thinking for globalized work environments.

### Course BCS

### Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

#### Semester – V

#### Academic Year 2021 -22

#### Subject: BCS

#### Subject: **Advanced PHP**

#### Course Outcomes (Cos)

CO1: Students will be able to design, implement, and test complex Java applications, including those with graphical user interfaces (GUIs) using frameworks like Swing or JavaFX.

CO2: Students will gain proficiency in advanced topics such as concurrency (multithreading), reflection, generics, lambda expressions, and streams for efficient and robust programming.

CO3: Students will be able to connect Java applications to databases using JDBC and perform various database operations like querying, insertion, updating, and deletion.

CO4: Students will learn to build dynamic web applications using Java Enterprise Edition (JEE) technologies like Servlets, JSP, and potentially frameworks like Spring or Hibernate.

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**Program Outcomes (POs)**

**PO1: Engineering Knowledge:** The ability to apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Advanced Java provides specialized engineering knowledge for software development.)

**PO2: Problem Analysis:** The ability to identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Advanced Java equips students to analyze and solve complex software problems.)

**PO3: Design/Development of Solutions:** The ability to design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (Advanced Java skills are crucial for designing and developing robust software solutions.)

**PO4: Modern Tool Usage:** The ability to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. (Advanced Java involves the use of modern development tools and environments.)

**Subject: Advance PHP**

**Course Outcomes (Cos)**

**CO1:** Develop complex web applications using advanced PHP features like object-oriented programming (OOP), traits, and namespaces.

**CO2:** Implement secure and robust web applications by applying best practices in security, error handling, and exception management.

**CO3:** Integrate PHP applications with various databases (e.g., MySQL, PostgreSQL) and utilize advanced database interaction techniques (e.g., ORM, prepared statements).

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CO4: Design and implement RESTful APIs and consume external APIs using PHP.

CO5: Optimize PHP application performance through caching, profiling, and efficient code practices.

### **Program Outcomes (POs)**

**PO1: (Engineering Knowledge):** Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: (Problem Analysis):** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: (Design/Development of Solutions):** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

**PO4: PO4 (Conduct Investigations of Complex Problems):** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

### **Subject: Software Engineering**

### **Course Outcomes (Cos)**

CO1: Statements that describe the specific knowledge, skills, and abilities a student gains from completing a particular course.

CO2: After completing an introductory programming course, a CO might be: "The student will be able to write simple programs using a specific programming language."

CO3: They provide clear learning goals for a single course and serve as the building blocks for achieving the program's overall goals.

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### **Program Outcomes (POs)**

PO1: Broader statements of what a graduate should be capable of doing by the time they have completed the entire program.

PO2: Apply engineering fundamentals to complex problems

PO3: Communicate effectively

### **Subject: Basic Data Science**

#### **Course Outcomes (Cos)**

CO1: Understand and apply various deep learning architectures like CNNs.

CO2: Analyze and differentiate various searching and sorting algorithms.

CO3: Use optimization techniques in Data Analytics and related areas.

CO4: Implement intrusion detection systems based on anomaly and misuse patterns.

### **Program Outcomes (POs)**

PO1: Handle big data, clean, and process it effectively.

PO2: Use appropriate models for analysis and derive business insights from results

PO3: Apply computing theory in different software and languages

PO4: Perform well in a group and develop professional presentation skills.

### **Subject: Artificial Intelligence**

#### **Course Outcomes (Cos)**

CO1: Ability to design and build a neural network for a specific task.

CO2: Knowledge of how to use a particular AI programming library.

CO3: Skill in evaluating and comparing the performance of different AI models

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CO4: This mapping process helps ensure that the AI curriculum is aligned with the desired learning objectives for graduates.

**Program Outcomes (POs)**

PO1: Ability to analyze and solve complex problems using AI methodologies.

PO2: Competence in ethical considerations and responsible development of AI systems.

PO3: Skill in collaborating with others on AI-related projects.

PO4: A strong foundation in computational thinking and data analysis.

**Subject: Internet of Things**

**Course Outcomes (Cos)**

CO1: Knowing the fundamental structure and design principles of an IoT system.

CO2: Working with components like sensors, actuators, and microcontrollers.

CO3: Understanding and analysing protocols such as MQTT and CoAP.

CO4: Creating simple IoT applications using sensors and microcontrollers.

CO5: Applying cloud computing and data analytics to handle data from IoT devices.

**Program Outcomes (POs)**

PO1: Applying knowledge from science, mathematics, and engineering principles.

PO2: Analysing complex problems to investigate and interpret information.

PO3: Designing a system, component, or process to meet desired needs.

PO4: Conducting investigations of complex problems by designing and executing experiments.

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PO5: Using modern tools for engineering practice.

### **Subject: Website Hosting using WordPress**

#### **Course Outcomes (Cos)**

CO1: Identify and differentiate various types of website hosting (e.g., shared, VPS, dedicated, managed WordPress hosting) and their suitability for different WordPress projects.

CO2: Select and configure a suitable hosting plan for a WordPress website based on project requirements and budget.

CO3: Install and set up WordPress on a chosen hosting environment, including database creation and configuration.

CO4: Manage WordPress installations through hosting control panels (e.g., cPanel, Plesk) or managed hosting dashboards.

CO5: Manage WordPress installations through hosting control panels (e.g., cPanel, Plesk) or managed hosting dashboards.

#### **Program Outcomes (POs)**

PO1: Design, develop, and deploy: functional and visually appealing websites using content management systems like WordPress.

PO2: Apply best practices: in website development, including responsive design, user experience (UX) principles, and accessibility standards.

PO3: Implement effective digital marketing strategies: to promote websites and online businesses, including SEO, social media marketing, and content marketing.

PO4: Manage and maintain: website infrastructure, including hosting, domain names, and security protocols.

PO5: Analyze website performance data: and make data-driven decisions for optimization and improvement.

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Course BCS

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – V

Academic Year 2021 -22

Subject: BCS

Subject: **JAVA Web Frameworks**

Course Outcomes (Cos)

CO1: Understand and apply core concepts of a specific Java Web Framework: This includes grasping the architectural patterns (e.g., MVC), component lifecycles, and configuration mechanisms of frameworks like Spring, Struts, or JSF.

CO2: Develop and deploy web applications using the chosen framework: Students should be able to build functional web applications, handling user input, data persistence, and presentation logic within the framework's structure.

CO3: Implement data access and integration: This involves utilizing features like Object-Relational Mapping (ORM) (e.g., Hibernate with Spring) to interact with databases and integrating with other services or APIs.

CO4: Design and implement secure and scalable web applications: Students should understand and apply security principles, authentication, and authorization mechanisms within the framework, and consider scalability aspects in their design.

CO5: Utilize framework-specific tools and best practices: This includes using development tools, debugging techniques, and adhering to coding standards and design patterns promoted by the framework.

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**Program Outcomes (POs)**

PO1: Engineering Knowledge: Ability to apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Applying framework concepts to solve web development challenges).

PO2: Problem Analysis: Ability to identify, formulate, review literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Analyzing web application requirements and selecting appropriate framework features).

PO3: Design/Development of Solutions: Ability to design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (Designing and developing web applications using Java frameworks).

PO4: Conduct Investigations of Complex Problems: Ability to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. (Troubleshooting and optimizing web applications built with frameworks).

**Subject: Distributed Database Management System****Course Outcomes (Cos)**

CO1: Apply principles to design, develop, and implement a distributed database system.

CO2: Understand and manage distributed transactions, including concepts like the two-phase commit (2PC) protocol and distributed concurrency control.

CO3: Implement strategies for data replication (copying data across multiple sites) and fragmentation (splitting data and distributing it).

CO4: Analyse how queries are executed across multiple nodes in a distributed environment.

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CO5: Understand and apply mechanisms for handling failures in a distributed system.

### **Program Outcomes (POs)**

PO1: Understand and apply mechanisms for handling failures in a distributed system.

PO2: The ability to analyze and solve complex technical problems, such as designing a DDBMS that meets specific performance and availability requirements.

PO3: The ability to design and develop solutions to complex problems, such as building a robust distributed application.

PO4: The ability to effectively communicate technical information, both orally and in writing, to technical and non-technical audiences.

PO5: The ability to act in a professional and ethical manner, considering the implications of data privacy and security in a distributed system.

### **Subject: Software Quality Assurance & Testing**

### **Course Outcomes (Cos)**

CO1: Comprehend the fundamental concepts of software quality, standards (like ISO 9000:2000), and assurance principles.

CO2: Construct test cases using various black-box and white-box testing strategies and techniques (e.g., boundary value analysis, equivalence partitioning, decision tables).

CO3: Apply appropriate testing methodologies and strategies across the software development life cycle (SDLC), including unit, integration, system, and acceptance testing.

CO4: Utilize modern software testing tools (both manual and automated, like Selenium) to plan, design, and execute tests effectively.

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CO5: Analyze and manage defects, including identifying, reporting, prioritizing, and tracking bugs using defect management tools.

### **Program Outcomes (POs)**

PO1: Software Quality Assurance or Software Engineering program are broader goals that align with general professional competencies

PO2: Upon graduation, students are expected to demonstrate various abilities

PO3: Including applying foundational knowledge from computing, mathematics, and science to complex software engineering and quality assurance issues

PO4: They should be able to identify, analyse, and solve problems using scientific and engineering principles.

### **Subject: Advance Data Science**

### **Course Outcomes (Cos)**

CO1: Understand and apply advanced deep learning algorithms like CNN, RNN, LSTM, and BERT.

CO2: Develop and evaluate predictive models using various attribute selection methods.

CO3: Analyze and interpret large-scale datasets using advanced statistical techniques and tools.

CO4: Understand and apply data mining and machine learning techniques to specific domains like cybersecurity or healthcare analytics.

CO5: Generate visualizations and communicate findings from complex datasets.

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### **Program Outcomes (POs)**

PO1: Apply advanced data science and analytical techniques to solve complex, real-world problems in various fields.

PO2: Develop and implement innovative solutions for data-driven challenges.

PO3: Demonstrate strong teamwork, leadership, and decision-making skills

PO4: Effectively communicate findings to both technical and non-technical audiences.

### **Subject: Machine Learning**

### **Course Outcomes (Cos)**

CO1: Understanding and applying concepts like CNNs for image classification or BERT for text processing.

CO2: Understanding predictive modelling steps and using various attribute selection methods.

CO3: Applying mathematical concepts to solve complex data science problems.

CO4: Applying data mining techniques to identify and analyze security threats.

CO5: Using data analytics to improve decision-making and operational efficiency in healthcare.

### **Program Outcomes (POs)**

PO1: Applying advanced data science techniques to solve real-world problems

PO2: Demonstrating mastery of both technical and business aspects of data science.

PO3: Exhibiting teamwork, leadership, and strong decision-making abilities.

PO4: Communicating findings effectively and presenting results clearly.

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**Subject: Digital Marketing**

**Course Outcomes (Cos)**

CO1: Understanding the foundational concepts, theories, and principles of marketing.

CO2: Developing strategies for different digital marketing activities, including segmentation, targeting, and positioning.

CO3: Applying knowledge of advertising theories and creating compelling advertising messages for different media.

CO4: Analysing and selecting appropriate media platforms for advertising campaigns.

**Program Outcomes (POs)**

PO1: Critical Thinking and Problem-Solving: Applying logical reasoning to analyze problems and devise solutions for digital marketing challenges.

PO2: Communication and Presentation: Effectively communicating complex digital marketing ideas both in writing and orally to various stakeholders.

PO3: Technology and Digital Literacy: Competence in using digital tools and technologies for business operations and management.

PO4: Business Acumen: Demonstrating technical competence in core business functions and understanding their application in a digital context.

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Course BCS

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – I

Academic Year 2022 -23

Subject: BCS

Subject: Communication Skill in English

Course Outcomes (Cos)

CO1: Write different types of texts, such as paragraphs, essays, and letters.

CO2: Apply various writing styles, like narrating, describing, and arguing

CO3: Read and understand texts and listen to spoken input to grasp content and structure.

CO4: Summarize facts, ideas, and opinions clearly.

Program Outcomes (POs)

PO1: Clearly communicate ideas and concepts both orally and in writing.

PO2: Understand and grasp academic subjects included in the program.

PO3: Develop the ability to learn independently and pursue personal interests.

PO4: Integrate language proficiency, intercultural competency, critical thinking, and digital skills for the globalized work environment.

Subject: Programming in C

Course Outcomes (Cos)

CO1: Understand and trace the execution of C programs.

CO2: Write C code for a given algorithm.

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CO3: Use C language data types and operators correctly in programs.

CO4: Implement functions for modular programming.

CO5: Apply C programming constructs like control structures, loops, arrays, structures, and pointers to solve computational problems.

CO6: Understand and apply file handling in C.

CO7: Develop the logic needed to create programs and applications in C.

**Program Outcomes (POs)**

PO1: Ability to apply programming skills to design and develop solutions.

PO2: Ability to learn and switch to other programming languages after mastering basic C programming constructs.

PO3: Gain knowledge and skills in programming.

PO4: Ability to develop program logic.

PO5: Understand fundamental programming concepts

**Subject: DBMS**

**Course Outcomes (Cos)**

CO1: Understand what databases are, their importance, and how they are used.

CO2: Write SQL commands to retrieve and manipulate data, and become familiar with a commercial database system like Oracle.

CO3: Apply principles like the Entity-Relationship (ER) model and normalization to create the logical design of a database.

CO4: Grasp the basic issues related to transactions, which are sequences of operations performed as a single logical unit of work.

**Program Outcomes (POs)**

PO1: Students can use language effectively in formal and informal settings.

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PO2: Students can analyse a problem and develop effective solutions, which is a core skill for any technical program.

PO3: Students can work with others to complete projects. While not explicitly listed, this is a common PO for most programs.

PO4: Students understand and can apply ethical principles in their professional work.

### **Subject: Operating System**

#### **Course Outcomes (Cos)**

CO1: Differentiate between system and application software, and explain the evolution of OS.

CO2: Grasp device and memory management, and implement file management concepts.

CO3: Implement inter-process communication and design solutions for synchronization problems.

CO4: Simulate and implement OS concepts like scheduling, deadlock management, and memory management.

#### **Program Outcomes (POs)**

PO1: Prepare students for roles in the IT industry, such as software programmer, system administrator, or web designer.

PO2: Develop programming, networking, and modern IT techniques.

PO3: Analyse and solve problems related to computer systems.

PO4: Gain knowledge of organization and management principles within an IT context.

### **Subject: Indian Knowledge System**

#### **Course Outcomes (Cos)**

CO1: Specific, measurable learning expectations for a single course.

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CO2: "Upon completion of a course on the *Yoga Sutras*, students will be able to explain the core philosophical concepts of *dhyana* and *samadhi* as described in the text".

CO3: To guide the course content, teaching methods, and assessments, ensuring students meet the course's goals.

### **Program Outcomes (POs)**

PO1: Broad statements about the skills and attributes students will possess upon graduating from the entire program.

PO2: Familiarity with the nuances of language in formal and informal expressions.

PO3: Knowledge of Indian social sciences, performing arts, and literature to become responsible citizens.

PO4: The ability to think critically, analyze, and apply concepts in depth.

### **Subject: Office Organization and Management**

#### **Course Outcomes (Cos)**

CO1: The meaning, scope, necessity, and principles of effective office management.

CO2: Apply appropriate management techniques (planning, organizing, staffing, leading, and controlling) to manage a business office efficiently.

CO3: Evaluate and establish various records and information management systems (electronic and paper) to ensure organization, security, and accessibility of data.

CO4: Operate and provide support related to the use, maintenance, and procurement of essential office equipment and information technologies.

CO5: Organize and coordinate meetings, conferences, and special events, including the preparation of all related documentation and travel arrangements.

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CO6: Demonstrate effective written and oral communication, interpersonal, and client service skills to facilitate information flow and support organizational goals.

### **Program Outcomes (POs)**

PO1: The ability to communicate effectively, both orally and in writing, with diverse stakeholders using various technological tools.

PO2: The ability to foster analytical and critical thinking skills to identify, analyse, and solve business problems using data-based decision-making.

PO3: The ability to lead others, contribute effectively to a team environment, and manage conflicts in the achievement of organizational goals.

PO4: The ability to understand, analyse, and apply ethical and legal aspects of business and professional practices.

PO5: The ability to utilize current information and data management technologies to streamline work processes and improve organizational efficiency.

### **Subject: Skill Enhancement (HTML & CSS)**

#### **Course Outcomes (Cos)**

CO1: Create well-formed, semantically correct HTML documents.

CO2: Apply CSS to control the visual presentation of web pages, including layout, typography, colors, and responsive design.

CO3: Ensure web pages adapt and display effectively across various devices and screen sizes.

CO4: Apply knowledge of frameworks like Bootstrap or preprocessors like Sass/Less for efficient styling.

CO5: Identify and resolve common errors in web page structure and styling.

CO6: Design and develop web pages that are usable by individuals with disabilities, adhering to accessibility guidelines.

#### **Program Outcomes (POs)**

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PO1: Demonstrate competence in applying knowledge and skills in web development technologies.

PO2: Analyse and solve technical problems related to web development.

PO3: Apply design principles to create effective and user-friendly web interfaces.

PO4: Effectively communicate technical information, both written and oral, to diverse audiences.

PO5: Recognize the need for and engage in continuous learning and adaptation to new technologies in the field of web development.

**Subject: Health and Wellness**

**Course Outcomes (Cos)**

CO1: Apprehend the concept of health and wellness, and distinguish between physical, mental, emotional, and social dimensions of health.

CO2: Apply practical techniques and tools for managing stress, enhancing emotional resilience, and implementing mind-body practices like meditation and yoga in daily life.

CO3: Appreciate the critical impact of nutrition, sleep hygiene, and fitness in maintaining holistic health.

CO4: Analyze lifestyle choices and identify the behavioral, environmental, and genetic risk factors associated with chronic diseases.

CO5: Develop an understanding of the physiological basis of diseases and the role of physical activity and diet in prevention and management

**Program Outcomes (POs)**

PO1: Demonstrate competency in assessing health status, identifying community health problems, and designing appropriate programmatic strategies to meet the needs of specific populations.

PO2: Apply health behavior theories to real-world health programs and conduct a needs assessment for specific populations.

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PO3: Communicate effectively with clients, peers, and other healthcare professionals to promote holistic well-being.

PO4: Design, implement, and evaluate effective fitness or health programs and manage related administrative tasks.

PO5: Promote health education and preventive care strategies in community or workplace settings.

**Course BCS**

**Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise**

**Semester – II**

**Academic Year 2022 -23**

**Subject: BCS**

**Subject: Ability Enhancement Courses-II (Marathi)**

**Course Outcomes (Cos)**

CO1: Enhance Foundational Skills - Improve basic language skills (reading, writing, speaking, and listening).

CO2: Apply Grammatical Rules - Understand and apply the rules of Marathi grammar effectively in communication.

CO3: Develop Creative Writing - Develop and enrich creative writing skills, such as essay writing or other literary forms.

CO4: Improve Oral Communication - Enhance conversational skills and the ability to communicate effectively in different contexts.

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CO5: Utilize Modern Media - Gain an introduction to audio-visual media and learn writing/presentation skills for these platforms, including social media (blogs, Facebook, Twitter, etc.).

### **Program Outcomes (POs)**

PO1/PSO1: Communication Skills - Develop proficiency in both formal and informal Marathi communication skills (speaking, listening, reading, and writing).

PO2/PSO2: Critical Thinking & Appreciation - Cultivate an interest in and the ability to critically appreciate Marathi literature, including various genres and historical periods.

PO3/PSO3: Language Application - Understand the importance of the Marathi language in day-to-day life and its use in administrative or professional contexts.

PO4/PSO4: Cultural & Social Awareness - Understand the relationship between literature and real life, and gain insights into the social and cultural values expressed in Marathi texts.

PO5/PSO5: Career Readiness - Avail job opportunities in fields like translation, media, teaching, and other areas where strong language skills are required.

### **Subject: Programming in C++**

#### **Course Outcomes (Cos)**

CO1: Students will be able to explain core C++ concepts such as data types, variables, operators, control structures (if-else, loops), and functions.

CO2: Students will be able to apply OOP concepts including classes, objects, inheritance, polymorphism, and encapsulation in C++ programs.

CO3: Students will be able to implement and use basic data structures (arrays, linked lists, stacks, queues) and fundamental algorithms in C++.

CO4: Students will be able to perform input/output operations using cin and cout, and manage data persistence through file handling in C++.

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CO5: Students will be able to write, compile, debug, and execute C++ programs to solve given problems.

### **Program Outcomes (POs)**

PO1: Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

### **Subject: Advanced DBMS**

### **Course Outcomes (Cos)**

CO1: various advanced database architectures, including parallel, distributed, and object-oriented databases.

CO2: Apply query processing and optimization techniques in complex database environments.

CO3: Evaluate and implement advanced transaction processing, concurrency control (e.g., locking, two-phase locking, optimistic methods), and recovery mechanisms.

CO4: Manipulate and query data using languages and techniques for modern database types, such as XML, NoSQL, and object-oriented queries.

CO5: Understand concepts of data warehousing, data mining, and big data management within the context of enterprise applications.

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CO6: Design and model database applications using advanced techniques like Enhanced Entity-Relationship (EER) models and advanced normalization.

### **Program Outcomes (POs)**

PO1: Assignments focusing on documentation and presentations help address

PO2: Through the application of advanced database knowledge and tools.

PO3: Assignments focusing on documentation and presentations help address

PO4: More comprehensive list of typical POs can be found on the Vel Tech University [veltech.edu.in](http://veltech.edu.in) website.

### **Subject: Linux Operating System**

#### **Course Outcomes (Cos)**

CO1: Install, configure, and manage server services, users, groups, and file services.

CO2: Understand and implement security policies and measures to protect a Linux server.

CO3: Create, modify, and delete user and group accounts, and manage permissions.

CO4: Understand the concepts of virtualization in a Linux environment.

CO5: Set up and manage file sharing services, such as NFS or Samba.

CO6: Use the command line to perform common administrative tasks, manage system resources, and troubleshoot issues.

### **Program Outcomes (POs)**

PO1: Apply knowledge of scientific and engineering principles to solve problems in computer science and IT.

PO2: Design and analyse solutions to problems using a variety of technologies, including operating systems like Linux.

PO3: Implement and test software solutions that leverage the capabilities of an operating system.

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PO4: Understand fundamental concepts of operating systems, such as process management, memory management, and file systems, and be able to apply them.

**Subject: Generic Open Elective (Fundamental of e-Commerce)**

**Course Outcomes (Cos)**

CO1: Analyze the impact of e-commerce on traditional business models and strategy.

CO2: Describe the major types of e-commerce, including B2B, B2C, C2C, and m-commerce models

CO3: Explain the key technological infrastructure and components required for building an e-commerce presence, such as internet technologies, web development tools, and hosting options.

CO4: Identify and assess the key security threats and legal/ethical issues in the e-commerce environment (e.g., data privacy, cyber laws, digital signatures).

CO5: Evaluate the role and efficiency of various electronic payment systems and logistics within e-business operations.

**Program Outcomes (POs)**

PO1: **Enhance domain knowledge:** The ability to understand and explain core concepts in business, commerce, and the specific dynamics of the e-commerce environment.

PO2: **Problem analysis and decision-making:** The ability to analyze business problems in a digital context and make data-based decisions.

PO3: **Technical and practical skills:** The ability to utilize relevant information technology, tools, and software necessary for modern business practices.

PO4: **Ethical and social responsibility:** An understanding of the ethical, legal, and social issues related to business and technology, and the ability to apply moral behavior in professional contexts.

**Subject: Vocational Skill Courses (Java Script)**

**Course Outcomes (Cos)**

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CO1: Understand the core concepts of JavaScript programming, including variables, data types, operators, and control structures.

CO2: Build dynamic and interactive web pages using JavaScript objects and by applying different event-handling mechanisms.

CO3: Implement client-side form validation using JavaScript and regular expressions.

CO4: Utilize functions, arrays, and strings effectively to solve specific problems within web development.

CO5: Learn about browser history, cookies, and local storage to manage and manipulate browser data.

CO6: Use modern development tools and debugging techniques to test and troubleshoot JavaScript code.

### **Program Outcomes (POs)**

PO1: These can include applying disciplinary knowledge to solve problems

PO2: Analysing complex issues, and designing solutions. Programs also aim to develop skills in using modern tools

PO3: Ethical practice and a commitment to lifelong learning are also key components of program outcomes in IT fields.

PO4: Programs also aim to develop skills in using modern tools, effective communication, and teamwork

### **Subject: Value Education Courses (Constitution of India)**

#### **Course Outcomes (Cos)**

CO1: **Understand the making of the Indian Constitution:** Students will gain a foundational understanding of how the constitution was created and its historical context.

CO2: **Identify Fundamental Rights and Duties:** Students will be able to identify and explain the fundamental rights and duties guaranteed by the Constitution to its citizens.

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**CO3: Examine federalism and Centre-State relations:** Students will be able to analyse the relationship between the central government and state governments as outlined in the constitution.

**CO4: Understand the structure of government:** Students will be able to describe the structures of government at both the national and state levels.

**CO5: Explain the role of the judiciary:** Students will be able to explain the functions and powers of the Supreme Court and High Courts in India.

### **Program Outcomes (POs)**

**PO1: Demonstrate citizenship:** Graduates will exhibit behavior and actions that denote good citizenship and social responsibility.

**PO2: Develop critical thinking:** Students will develop critical and analytical skills to understand and analyze problems, including those arising from social, political, and legal contexts.

**PO3: Inculcate human values:** The program aims to inculcate human values which leads to a transformation in behaviour and promotes a sense of responsibility

**PO4: Improve communication skills:** Students will improve their communication skills, both formal and informal, in their professional and personal lives

### **Subject: Co-Curricular Courses (Yoga Education)**

#### **Course Outcomes (Cos)**

**CO1:** Popularize yoga and its therapeutic and preventive values among the masses.

**CO2:** Enable students to use yogic practices to promote positive health, leading to physical fitness, mental soundness, emotional balance, and spiritual development.

**CO3:** Foster personality development, including self-discipline, leadership qualities, social competence, and ethical values.

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CO4: Train students to be effective yoga practitioners, wellness instructors, or therapists, opening up various employment opportunities.

CO5: Create awareness and provide the skills to evaluate and contribute to research advances in the field of yoga.

**Program Outcomes (POs)**

PO1: Explain the fundamental philosophy, history, and different schools of yoga (e.g., Ashtanga Yoga, Hatha Yoga).

PO2: Perform various *asanas* (postures), *pranayama* (breathing techniques), *mudras*, and meditation techniques correctly and safely.

PO3: Understand and apply the principles of yoga to manage stress, improve concentration, and adopt a healthy lifestyle.

PO4: Understand the basic systems of the human body and the effects of yogic exercises on them.

**Course BCS**

**Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise**

**Semester – III**

**Academic Year 2022 -23**

**Subject: BCS**

**Subject: Fundamental of PHP**

**Course Outcomes (Cos)**

CO1: Explain the principles of yoga therapy and its effects on the different systems of the body.

CO2: Understand the impact of yogic practices on mental and emotional well-being.

CO3: Identify and describe various diseases, their causes, and the potential application of yogic techniques for management.

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### Program Outcomes (POs)

PO1: Develop software solutions to problems across a range of application domains through analysis and design.

PO2: Identify, formulate, and solve complex computing problems using fundamental principles of mathematics and computing sciences.

PO3: Understand professional, ethical, legal, security, and social issues related to the development and deployment of technology.

**Subject: Data Structure**

### Course Outcomes (Cos)

CO1: Implement various data structures (like linked lists, stacks, queues, trees) in a high-level programming language.

CO2: Analyze the time and space complexity of different algorithms and data structures.

CO3: Choose the most appropriate data structure for a given problem.

CO4: Apply data structures for efficient problem-solving in areas like searching, sorting, and graph traversal

### Program Outcomes (POs)

PO1: **Problem-solving:** The ability to analyze a complex computational problem and to define and address the computing requirements appropriate for its solution.

PO2: **Design:** The ability to design, implement, and evaluate a computational-based solution to meet a variety of public and organizational needs.

PO3: **Communication:** The ability to communicate effectively to a range of audiences

PO4: **Professionalism:** The ability to apply professional knowledge and ethical principles.

**Subject: Web Technologies-I**

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### Course Outcomes (Cos)

CO1: Create static and dynamic web pages using HTML, CSS, and JavaScript.

CO2: Design and implement server-side applications using technologies like Servlets, JSP, or PHP.

CO3: Connect web applications to databases and perform data manipulation using SQL.

CO4: Apply web development frameworks and architectures (e.g., MVC) to build robust web applications.

CO5: Implement client-side scripting with validation and interactive elements.

### Program Outcomes (POs)

PO1: **(Engineering Knowledge):** Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (This would encompass the theoretical underpinnings of web technologies).

PO2: **PO2 (Problem Analysis):** Identify, formulate, review literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (This relates to analyzing web development challenges).

PO3: **PO3 (Design/Development of Solutions):** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (Directly applicable to designing web applications).

PO4: **PO4 (Modern Tool Usage):** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of the limitations. (This covers proficiency in web development tools and platforms).

**Subject: Fundamental of Data Science**

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### Course Outcomes (Cos)

CO1: Evaluate and analyse data using various techniques and tools.

CO2: Generate visualizations to represent data patterns and insights.

CO3: Write programs using control structures and functions to manipulate and process data.

CO4: Grasp and apply fundamental data science principles like data reduction and data visualization.

### Program Outcomes (POs)

PO1: Possess a strong understanding of the fundamental concepts and theories of data science.

PO2: Develop the ability to model and solve problems using appropriate data science theories and methods.

PO3: Understand and apply advanced theories and methods to design solutions for complex data science problems.

PO4: Communicate effectively with both technical and non-technical audiences, which includes writing reports, giving presentations, and providing clear instructions.

PO5: Function effectively as an individual and as a member or leader in diverse teams and multidisciplinary settings.

### Subject: **Environmental Studies**

### Course Outcomes (Cos)

CO1: Specific, measurable learning objectives that students are expected to achieve at the end of a single course.

CO2: A CO for a course on "Ecosystem Dynamics" might be: "Students will be able to describe the flow of energy and matter in a given ecosystem."

CO3: To detail the specific learning that takes place within a course.

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### Program Outcomes (POs)

PO1: Broader statements about the capabilities and competencies graduates of a specific program should have after graduation.

PO2: A PO could be: "Graduates will be able to analyse environmental problems and develop sustainable solutions."

PO3: To define the overall goals of the degree program and provide a standard for graduate accomplishment.

Subject: **NSS**

### Course Outcomes (Cos)

CO1: A single course.

CO2: To define the specific learning expectations for that course.

CO3: "Classify and explain different imaging techniques for medical application" (from a specific course).

CO4: Achieved through assessments within that specific course, like assignments, tests, and labs.

### Program Outcomes (POs)

PO1: The entire degree program.

PO2: To state the overall skills, knowledge, and attitudes graduates should possess upon completion.

PO3: "Effective Communication: The program makes the students familiar with nuances and usage of language in formal and informal expressions of life".

PO4: Assessed through the cumulative achievement of all the courses within the program.

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**Subject: Generic Elective**

**Course Outcomes (Cos)**

CO1: Statements that describe what students are expected to know, understand, and be able to do by the time they graduate from a program.

CO2: They are wide-ranging and encompass skills, knowledge, and behaviors acquired throughout the entire degree.

CO3: Applying fundamental knowledge of science and engineering.

CO4: Using modern tools and techniques to solve problems.

**Program Outcomes (POs)**

PO1: Statements that describe the specific knowledge, skills, and attitudes a student is expected to have after completing a single course, including generic electives.

PO2: They are specific to the content of an individual course and are often more detailed and measurable.

PO3: Understanding the impact of industrialization in *Hard Times* by Dickens (CO 1).

PO4: Learning to develop GUI applications in Android using XML (CO 4).

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Course BCS

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – IV

Academic Year 2022 -23

Subject: BCS

Subject: **Advanced PHP**

Course Outcomes (Cos)

**CO1: Design and develop dynamic, database-driven web applications:** using advanced PHP concepts and frameworks (e.g., Laravel, Symfony).

**CO2: Implement secure and robust web applications:** by applying best practices for authentication, authorization, and data validation in PHP.

**CO3: Utilize advanced PHP features:** such as object-oriented programming (OOP), design patterns, and exception handling for building scalable and maintainable code.

**CO4: Integrate and interact with external APIs and services:** using PHP, including RESTful services and third-party libraries.

Program Outcomes (POs)

**PO1: Apply knowledge of computing fundamentals and specialized computing concepts:** to solve complex problems in software development.

**PO2: Design and implement software solutions:** that meet specified requirements and adhere to industry standards.

**PO3: Analyze and evaluate the performance of software systems:** and propose optimization strategies.

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PO4: **Communicate effectively:** with technical and non-technical stakeholders in a professional environment.

### **Subject: Software Engineering**

#### **Course Outcomes (Cos)**

CO1: Develop complex, secure, and scalable dynamic web applications using advanced PHP concepts.

CO2: Apply Object-Oriented Programming (OOP) principles (classes, objects, inheritance, interfaces, traits, namespaces) in PHP to build well-structured applications.

CO3: Integrate server-side PHP with various databases (e.g., MySQL), performing advanced queries, creation, updates, and data retrieval operations.

CO4: Implement web application security best practices, including protection against common vulnerabilities like XSS, SQL Injection, and CSRF.

#### **Program Outcomes (POs)**

PO1: Engineering Knowledge: Apply knowledge of mathematics, algorithms, computer science, and software engineering principles to solve complex problems.

PO2: Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems, reaching substantiated conclusions using first principles of mathematics and computer science.

PO3: Design/Development of Solutions: Design solutions for complex software engineering problems or develop a software application using modern tools, components, or processes to meet specific needs with appropriate consideration for public health, safety, and cultural aspects.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and methods, including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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**Subject: Web Technologies-II**

**Course Outcomes (Cos)**

CO1: Design and develop robust and responsive web applications using advanced front-end and back-end technologies.

CO2: Implement multi-tier architectures (e.g., three-tier using servlets and JSP) for dynamic web applications.

CO3: Apply server-side programming features, such as Java Server Pages (JSP), Servlets, or frameworks like Struts/Hibernate, to create dynamic content and manage user sessions.

CO4: Integrate web applications with various databases using connectivity methods like JDBC, and perform operations such as storing and retrieving data.

**Program Outcomes (POs)**

PO1: **Engineering Knowledge:** Applying fundamental knowledge to solve complex problems.

PO2: **Problem Analysis:** Identifying, analyzing, and solving complex problems using scientific principles.

PO3: **Modern Tool Usage:** Using current techniques and tools in the field.

PO4: **Individual and Team Work:** Functioning effectively both individually and in teams.

**Subject: Statistics for Data Science**

**Course Outcomes (Cos)**

CO1: Read, understand, and trace the execution of programs written in a specific language, such as C.

CO2: Write code for a given algorithm.

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CO3: Implement C code using specific data types and operators.

CO4: Write and implement functions to complete a program.

Program Outcomes (POs)

**PO1: Apply statistical and mathematical concepts:** Graduates will be able to use concepts like linear algebra, calculus, and probability to solve data science problems.

**PO2: Process and analyze data:** Students will learn to visualize, process, and analyze data using various statistical methods.

**PO3: Conduct research:** They will be able to apply scientific research methodologies to solve problems.

**PO4: Solve real-world problems:** Graduates should be able to translate statistical knowledge into solutions for practical, real-world issues.

**Subject: Fundamental of Big Data**

Course Outcomes (Cos)

CO1: Define and explain the concept of Big Data, its characteristics (the 5 Vs: Volume, Variety, Velocity, Veracity, and Value), and the associated challenges and solutions.

CO2: Understand the architecture and components of the Hadoop ecosystem (HDFS, MapReduce, Pig, Hive, Spark).

CO3: Apply data preprocessing and data mining techniques for data analysis.

CO4: Develop simple Big Data solutions using distributed processing frameworks like Hadoop MapReduce or Spark.

CO5: Analyze the fundamental tools and methods of data analysis and statistics as applied to large datasets.

Program Outcomes (POs)

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PO1: Program Outcomes for a degree program

PO2: Big Data program often include the ability to apply mathematical

PO3: design data-driven solutions, and effectively use modern Big Data tools and platforms.

PO4: Other POs may cover effective communication about data activities, the capacity for lifelong learning in data science, and an understanding of professional ethics, including data privacy and security.

### **Subject: Modern Indian Language**

#### **Course Outcomes (Cos)**

CO1: Acquiring specific language skills for daily use and for specific purposes, including rhetorical ability and vocabulary development.

CO2: Analysing and interpreting specific texts, including prose and poetry, and understanding concepts of communication, prose, and poetry.

CO3: Understanding basic linguistic concepts, theories, and various sub-disciplines of linguistics.

CO4: Applying learned concepts, such as applying translation skills from English to Hindi, understanding official letter writing, or using journalistic skills.

CO5: Developing specific skills like enhancing proficiency in reading and writing, and developing an interest in literature.

#### **Program Outcomes (POs)**

PO1: **Critical and analytical skills:** Ability to critically analyze literary texts using different theoretical perspectives and to understand the socio-cultural and historical contexts of literature.

PO2: **Communication skills:** Ability to communicate effectively and clearly, both orally and in writing, using appropriate literary terminology and concepts.

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**PO3: Cultural and historical awareness:** Understanding of diverse literary genres, periods, and movements, fostering a global perspective through awareness of diverse cultural representations

**PO4: Literary appreciation:** A thorough study of various literary genres and the ability to develop a literary research attitude.

**PO5: Intercultural competency:** The ability to integrate language proficiency, intercultural skills, technology, and critical thinking for globalized work environments.

**Course BCS**

**Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise**

**Semester – V**

**Academic Year 2022 -23**

**Subject: BCS**

**Subject: **Advanced PHP****

**Course Outcomes (Cos)**

CO1: Students will be able to design, implement, and test complex Java applications, including those with graphical user interfaces (GUIs) using frameworks like Swing or JavaFX.

CO2: Students will gain proficiency in advanced topics such as concurrency (multithreading), reflection, generics, lambda expressions, and streams for efficient and robust programming.

CO3: Students will be able to connect Java applications to databases using JDBC and perform various database operations like querying, insertion, updating, and deletion.

CO4: Students will learn to build dynamic web applications using Java Enterprise Edition (JEE) technologies like Servlets, JSP, and potentially frameworks like Spring or Hibernate.

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**Program Outcomes (POs)**

**PO1: Engineering Knowledge:** The ability to apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Advanced Java provides specialized engineering knowledge for software development.)

**PO2: Problem Analysis:** The ability to identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Advanced Java equips students to analyze and solve complex software problems.)

**PO3: Design/Development of Solutions:** The ability to design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (Advanced Java skills are crucial for designing and developing robust software solutions.)

**PO4: Modern Tool Usage:** The ability to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. (Advanced Java involves the use of modern development tools and environments.)

**Subject: Advance PHP****Course Outcomes (Cos)**

CO1: Develop complex web applications using advanced PHP features like object-oriented programming (OOP), traits, and namespaces.

CO2: Implement secure and robust web applications by applying best practices in security, error handling, and exception management.

CO3: Integrate PHP applications with various databases (e.g., MySQL, PostgreSQL) and utilize advanced database interaction techniques (e.g., ORM, prepared statements).

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CO4: Design and implement RESTful APIs and consume external APIs using PHP.

CO5: Optimize PHP application performance through caching, profiling, and efficient code practices.

### **Program Outcomes (POs)**

**PO1: (Engineering Knowledge):** Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: (Problem Analysis):** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: (Design/Development of Solutions):** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

**PO4: PO4 (Conduct Investigations of Complex Problems):** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

### **Subject: Software Engineering**

### **Course Outcomes (Cos)**

CO1: Statements that describe the specific knowledge, skills, and abilities a student gains from completing a particular course.

CO2: After completing an introductory programming course, a CO might be: "The student will be able to write simple programs using a specific programming language."

CO3: They provide clear learning goals for a single course and serve as the building blocks for achieving the program's overall goals.

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### **Program Outcomes (POs)**

PO1: Broader statements of what a graduate should be capable of doing by the time they have completed the entire program.

PO2: Apply engineering fundamentals to complex problems

PO3: Communicate effectively

### **Subject: Basic Data Science**

#### **Course Outcomes (Cos)**

CO1: Understand and apply various deep learning architectures like CNNs.

CO2: Analyze and differentiate various searching and sorting algorithms.

CO3: Use optimization techniques in Data Analytics and related areas.

CO4: Implement intrusion detection systems based on anomaly and misuse patterns.

### **Program Outcomes (POs)**

PO1: Handle big data, clean, and process it effectively.

PO2: Use appropriate models for analysis and derive business insights from results

PO3: Apply computing theory in different software and languages

PO4: Perform well in a group and develop professional presentation skills.

### **Subject: Artificial Intelligence**

#### **Course Outcomes (Cos)**

CO1: Ability to design and build a neural network for a specific task.

CO2: Knowledge of how to use a particular AI programming library.

CO3: Skill in evaluating and comparing the performance of different AI models

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CO4: This mapping process helps ensure that the AI curriculum is aligned with the desired learning objectives for graduates.

### **Program Outcomes (POs)**

PO1: Ability to analyze and solve complex problems using AI methodologies.

PO2: Competence in ethical considerations and responsible development of AI systems.

PO3: Skill in collaborating with others on AI-related projects.

PO4: A strong foundation in computational thinking and data analysis.

### **Subject: Internet of Things**

### **Course Outcomes (Cos)**

CO1: Knowing the fundamental structure and design principles of an IoT system.

CO2: Working with components like sensors, actuators, and microcontrollers.

CO3: Understanding and analysing protocols such as MQTT and CoAP.

CO4: Creating simple IoT applications using sensors and microcontrollers.

CO5: Applying cloud computing and data analytics to handle data from IoT devices.

### **Program Outcomes (POs)**

PO1: Applying knowledge from science, mathematics, and engineering principles.

PO2: Analysing complex problems to investigate and interpret information.

PO3: Designing a system, component, or process to meet desired needs.

PO4: Conducting investigations of complex problems by designing and executing experiments.

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PO5: Using modern tools for engineering practice.

### **Subject: Website Hosting using WordPress**

#### **Course Outcomes (Cos)**

CO1: Identify and differentiate various types of website hosting (e.g., shared, VPS, dedicated, managed WordPress hosting) and their suitability for different WordPress projects.

CO2: Select and configure a suitable hosting plan for a WordPress website based on project requirements and budget.

CO3: Install and set up WordPress on a chosen hosting environment, including database creation and configuration.

CO4: Manage WordPress installations through hosting control panels (e.g., cPanel, Plesk) or managed hosting dashboards.

CO5: Manage WordPress installations through hosting control panels (e.g., cPanel, Plesk) or managed hosting dashboards.

#### **Program Outcomes (POs)**

PO1: Design, develop, and deploy: functional and visually appealing websites using content management systems like WordPress.

PO2: Apply best practices: in website development, including responsive design, user experience (UX) principles, and accessibility standards.

PO3: Implement effective digital marketing strategies: to promote websites and online businesses, including SEO, social media marketing, and content marketing.

PO4: Manage and maintain: website infrastructure, including hosting, domain names, and security protocols.

PO5: Analyze website performance data: and make data-driven decisions for optimization and improvement.

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Course BCS

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – V

Academic Year 2022 -23

Subject: BCS

Subject: **JAVA Web Frameworks**

Course Outcomes (Cos)

CO1: Understand and apply core concepts of a specific Java Web Framework: This includes grasping the architectural patterns (e.g., MVC), component lifecycles, and configuration mechanisms of frameworks like Spring, Struts, or JSF.

CO2: Develop and deploy web applications using the chosen framework: Students should be able to build functional web applications, handling user input, data persistence, and presentation logic within the framework's structure.

CO3: Implement data access and integration: This involves utilizing features like Object-Relational Mapping (ORM) (e.g., Hibernate with Spring) to interact with databases and integrating with other services or APIs.

CO4: Design and implement secure and scalable web applications: Students should understand and apply security principles, authentication, and authorization mechanisms within the framework, and consider scalability aspects in their design.

CO5: Utilize framework-specific tools and best practices: This includes using development tools, debugging techniques, and adhering to coding standards and design patterns promoted by the framework.

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**Program Outcomes (POs)**

PO1: Engineering Knowledge: Ability to apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Applying framework concepts to solve web development challenges).

PO2: Problem Analysis: Ability to identify, formulate, review literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Analyzing web application requirements and selecting appropriate framework features).

PO3: Design/Development of Solutions: Ability to design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (Designing and developing web applications using Java frameworks).

PO4: Conduct Investigations of Complex Problems: Ability to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. (Troubleshooting and optimizing web applications built with frameworks).

**Subject: Distributed Database Management System****Course Outcomes (Cos)**

CO1: Apply principles to design, develop, and implement a distributed database system.

CO2: Understand and manage distributed transactions, including concepts like the two-phase commit (2PC) protocol and distributed concurrency control.

CO3: Implement strategies for data replication (copying data across multiple sites) and fragmentation (splitting data and distributing it).

CO4: Analyse how queries are executed across multiple nodes in a distributed environment.

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CO5: Understand and apply mechanisms for handling failures in a distributed system.

### **Program Outcomes (POs)**

PO1: Understand and apply mechanisms for handling failures in a distributed system.

PO2: The ability to analyze and solve complex technical problems, such as designing a DDBMS that meets specific performance and availability requirements.

PO3: The ability to design and develop solutions to complex problems, such as building a robust distributed application.

PO4: The ability to effectively communicate technical information, both orally and in writing, to technical and non-technical audiences.

PO5: The ability to act in a professional and ethical manner, considering the implications of data privacy and security in a distributed system.

### **Subject: Software Quality Assurance & Testing**

### **Course Outcomes (Cos)**

CO1: Comprehend the fundamental concepts of software quality, standards (like ISO 9000:2000), and assurance principles.

CO2: Construct test cases using various black-box and white-box testing strategies and techniques (e.g., boundary value analysis, equivalence partitioning, decision tables).

CO3: Apply appropriate testing methodologies and strategies across the software development life cycle (SDLC), including unit, integration, system, and acceptance testing.

CO4: Utilize modern software testing tools (both manual and automated, like Selenium) to plan, design, and execute tests effectively.

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CO5: Analyze and manage defects, including identifying, reporting, prioritizing, and tracking bugs using defect management tools.

### **Program Outcomes (POs)**

PO1: Software Quality Assurance or Software Engineering program are broader goals that align with general professional competencies

PO2: Upon graduation, students are expected to demonstrate various abilities

PO3: Including applying foundational knowledge from computing, mathematics, and science to complex software engineering and quality assurance issues

PO4: They should be able to identify, analyse, and solve problems using scientific and engineering principles.

### **Subject: Advance Data Science**

### **Course Outcomes (Cos)**

CO1: Understand and apply advanced deep learning algorithms like CNN, RNN, LSTM, and BERT.

CO2: Develop and evaluate predictive models using various attribute selection methods.

CO3: Analyze and interpret large-scale datasets using advanced statistical techniques and tools.

CO4: Understand and apply data mining and machine learning techniques to specific domains like cybersecurity or healthcare analytics.

CO5: Generate visualizations and communicate findings from complex datasets.

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### **Program Outcomes (POs)**

PO1: Apply advanced data science and analytical techniques to solve complex, real-world problems in various fields.

PO2: Develop and implement innovative solutions for data-driven challenges.

PO3: Demonstrate strong teamwork, leadership, and decision-making skills

PO4: Effectively communicate findings to both technical and non-technical audiences.

### **Subject: Machine Learning**

### **Course Outcomes (Cos)**

CO1: Understanding and applying concepts like CNNs for image classification or BERT for text processing.

CO2: Understanding predictive modelling steps and using various attribute selection methods.

CO3: Applying mathematical concepts to solve complex data science problems.

CO4: Applying data mining techniques to identify and analyze security threats.

CO5: Using data analytics to improve decision-making and operational efficiency in healthcare.

### **Program Outcomes (POs)**

PO1: Applying advanced data science techniques to solve real-world problems

PO2: Demonstrating mastery of both technical and business aspects of data science.

PO3: Exhibiting teamwork, leadership, and strong decision-making abilities.

PO4: Communicating findings effectively and presenting results clearly.

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**Subject: Digital Marketing**

**Course Outcomes (Cos)**

CO1: Understanding the foundational concepts, theories, and principles of marketing.

CO2: Developing strategies for different digital marketing activities, including segmentation, targeting, and positioning.

CO3: Applying knowledge of advertising theories and creating compelling advertising messages for different media.

CO4: Analysing and selecting appropriate media platforms for advertising campaigns.

**Program Outcomes (POs)**

PO1: Critical Thinking and Problem-Solving: Applying logical reasoning to analyze problems and devise solutions for digital marketing challenges.

PO2: Communication and Presentation: Effectively communicating complex digital marketing ideas both in writing and orally to various stakeholders.

PO3: Technology and Digital Literacy: Competence in using digital tools and technologies for business operations and management.

PO4: Business Acumen: Demonstrating technical competence in core business functions and understanding their application in a digital context.

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Course BCS

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – I

Academic Year 2023 -24

Subject: BCS

Subject: Communication Skill in English

Course Outcomes (Cos)

CO1: Write different types of texts, such as paragraphs, essays, and letters.

CO2: Apply various writing styles, like narrating, describing, and arguing

CO3: Read and understand texts and listen to spoken input to grasp content and structure.

CO4: Summarize facts, ideas, and opinions clearly.

Program Outcomes (POs)

PO1: Clearly communicate ideas and concepts both orally and in writing.

PO2: Understand and grasp academic subjects included in the program.

PO3: Develop the ability to learn independently and pursue personal interests.

PO4: Integrate language proficiency, intercultural competency, critical thinking, and digital skills for the globalized work environment.

Subject: Programming in C

Course Outcomes (Cos)

CO1: Understand and trace the execution of C programs.

CO2: Write C code for a given algorithm.

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CO3: Use C language data types and operators correctly in programs.

CO4: Implement functions for modular programming.

CO5: Apply C programming constructs like control structures, loops, arrays, structures, and pointers to solve computational problems.

CO6: Understand and apply file handling in C.

CO7: Develop the logic needed to create programs and applications in C.

**Program Outcomes (POs)**

PO1: Ability to apply programming skills to design and develop solutions.

PO2: Ability to learn and switch to other programming languages after mastering basic C programming constructs.

PO3: Gain knowledge and skills in programming.

PO4: Ability to develop program logic.

PO5: Understand fundamental programming concepts

**Subject: DBMS**

**Course Outcomes (Cos)**

CO1: Understand what databases are, their importance, and how they are used.

CO2: Write SQL commands to retrieve and manipulate data, and become familiar with a commercial database system like Oracle.

CO3: Apply principles like the Entity-Relationship (ER) model and normalization to create the logical design of a database.

CO4: Grasp the basic issues related to transactions, which are sequences of operations performed as a single logical unit of work.

**Program Outcomes (POs)**

PO1: Students can use language effectively in formal and informal settings.

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## Sant Ravidas Shikshan Sanstha's

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PO2: Students can analyse a problem and develop effective solutions, which is a core skill for any technical program.

PO3: Students can work with others to complete projects. While not explicitly listed, this is a common PO for most programs.

PO4: Students understand and can apply ethical principles in their professional work.

### **Subject: Operating System**

#### **Course Outcomes (Cos)**

CO1: Differentiate between system and application software, and explain the evolution of OS.

CO2: Grasp device and memory management, and implement file management concepts.

CO3: Implement inter-process communication and design solutions for synchronization problems.

CO4: Simulate and implement OS concepts like scheduling, deadlock management, and memory management.

#### **Program Outcomes (POs)**

PO1: Prepare students for roles in the IT industry, such as software programmer, system administrator, or web designer.

PO2: Develop programming, networking, and modern IT techniques.

PO3: Analyse and solve problems related to computer systems.

PO4: Gain knowledge of organization and management principles within an IT context.

### **Subject: Indian Knowledge System**

#### **Course Outcomes (Cos)**

CO1: Specific, measurable learning expectations for a single course.

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CO2: "Upon completion of a course on the *Yoga Sutras*, students will be able to explain the core philosophical concepts of *dhyana* and *samadhi* as described in the text".

CO3: To guide the course content, teaching methods, and assessments, ensuring students meet the course's goals.

### **Program Outcomes (POs)**

PO1: Broad statements about the skills and attributes students will possess upon graduating from the entire program.

PO2: Familiarity with the nuances of language in formal and informal expressions.

PO3: Knowledge of Indian social sciences, performing arts, and literature to become responsible citizens.

PO4: The ability to think critically, analyze, and apply concepts in depth.

### **Subject: Office Organization and Management**

#### **Course Outcomes (Cos)**

CO1: The meaning, scope, necessity, and principles of effective office management.

CO2: Apply appropriate management techniques (planning, organizing, staffing, leading, and controlling) to manage a business office efficiently.

CO3: Evaluate and establish various records and information management systems (electronic and paper) to ensure organization, security, and accessibility of data.

CO4: Operate and provide support related to the use, maintenance, and procurement of essential office equipment and information technologies.

CO5: Organize and coordinate meetings, conferences, and special events, including the preparation of all related documentation and travel arrangements.

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CO6: Demonstrate effective written and oral communication, interpersonal, and client service skills to facilitate information flow and support organizational goals.

### **Program Outcomes (POs)**

PO1: The ability to communicate effectively, both orally and in writing, with diverse stakeholders using various technological tools.

PO2: The ability to foster analytical and critical thinking skills to identify, analyse, and solve business problems using data-based decision-making.

PO3: The ability to lead others, contribute effectively to a team environment, and manage conflicts in the achievement of organizational goals.

PO4: The ability to understand, analyse, and apply ethical and legal aspects of business and professional practices.

PO5: The ability to utilize current information and data management technologies to streamline work processes and improve organizational efficiency.

### **Subject: Skill Enhancement (HTML & CSS)**

### **Course Outcomes (Cos)**

CO1: Create well-formed, semantically correct HTML documents.

CO2: Apply CSS to control the visual presentation of web pages, including layout, typography, colors, and responsive design.

CO3: Ensure web pages adapt and display effectively across various devices and screen sizes.

CO4: Apply knowledge of frameworks like Bootstrap or preprocessors like Sass/Less for efficient styling.

CO5: Identify and resolve common errors in web page structure and styling.

CO6: Design and develop web pages that are usable by individuals with disabilities, adhering to accessibility guidelines.

### **Program Outcomes (POs)**

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PO1: Demonstrate competence in applying knowledge and skills in web development technologies.

PO2: Analyse and solve technical problems related to web development.

PO3: Apply design principles to create effective and user-friendly web interfaces.

PO4: Effectively communicate technical information, both written and oral, to diverse audiences.

PO5: Recognize the need for and engage in continuous learning and adaptation to new technologies in the field of web development.

### **Subject: Health and Wellness**

#### **Course Outcomes (Cos)**

CO1: Apprehend the concept of health and wellness, and distinguish between physical, mental, emotional, and social dimensions of health.

CO2: Apply practical techniques and tools for managing stress, enhancing emotional resilience, and implementing mind-body practices like meditation and yoga in daily life.

CO3: Appreciate the critical impact of nutrition, sleep hygiene, and fitness in maintaining holistic health.

CO4: Analyze lifestyle choices and identify the behavioral, environmental, and genetic risk factors associated with chronic diseases.

CO5: Develop an understanding of the physiological basis of diseases and the role of physical activity and diet in prevention and management

#### **Program Outcomes (POs)**

PO1: Demonstrate competency in assessing health status, identifying community health problems, and designing appropriate programmatic strategies to meet the needs of specific populations.

PO2: Apply health behavior theories to real-world health programs and conduct a needs assessment for specific populations.

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PO3: Communicate effectively with clients, peers, and other healthcare professionals to promote holistic well-being.

PO4: Design, implement, and evaluate effective fitness or health programs and manage related administrative tasks.

PO5: Promote health education and preventive care strategies in community or workplace settings.

**Course BCS**

**Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise**

**Semester – II**

**Academic Year 2023 -24**

**Subject: BCS**

**Subject: Ability Enhancement Courses-II (Marathi)**

**Course Outcomes (Cos)**

CO1: Enhance Foundational Skills - Improve basic language skills (reading, writing, speaking, and listening).

CO2: Apply Grammatical Rules - Understand and apply the rules of Marathi grammar effectively in communication.

CO3: Develop Creative Writing - Develop and enrich creative writing skills, such as essay writing or other literary forms.

CO4: Improve Oral Communication - Enhance conversational skills and the ability to communicate effectively in different contexts.

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CO5: Utilize Modern Media - Gain an introduction to audio-visual media and learn writing/presentation skills for these platforms, including social media (blogs, Facebook, Twitter, etc.).

### **Program Outcomes (POs)**

PO1/PSO1: Communication Skills - Develop proficiency in both formal and informal Marathi communication skills (speaking, listening, reading, and writing).

PO2/PSO2: Critical Thinking & Appreciation - Cultivate an interest in and the ability to critically appreciate Marathi literature, including various genres and historical periods.

PO3/PSO3: Language Application - Understand the importance of the Marathi language in day-to-day life and its use in administrative or professional contexts.

PO4/PSO4: Cultural & Social Awareness - Understand the relationship between literature and real life, and gain insights into the social and cultural values expressed in Marathi texts.

PO5/PSO5: Career Readiness - Avail job opportunities in fields like translation, media, teaching, and other areas where strong language skills are required.

### **Subject: Programming in C++**

#### **Course Outcomes (Cos)**

CO1: Students will be able to explain core C++ concepts such as data types, variables, operators, control structures (if-else, loops), and functions.

CO2: Students will be able to apply OOP concepts including classes, objects, inheritance, polymorphism, and encapsulation in C++ programs.

CO3: Students will be able to implement and use basic data structures (arrays, linked lists, stacks, queues) and fundamental algorithms in C++.

CO4: Students will be able to perform input/output operations using cin and cout, and manage data persistence through file handling in C++.

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CO5: Students will be able to write, compile, debug, and execute C++ programs to solve given problems.

### **Program Outcomes (POs)**

PO1: Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

### **Subject: Advanced DBMS**

### **Course Outcomes (Cos)**

CO1: various advanced database architectures, including parallel, distributed, and object-oriented databases.

CO2: Apply query processing and optimization techniques in complex database environments.

CO3: Evaluate and implement advanced transaction processing, concurrency control (e.g., locking, two-phase locking, optimistic methods), and recovery mechanisms.

CO4: Manipulate and query data using languages and techniques for modern database types, such as XML, NoSQL, and object-oriented queries.

CO5: Understand concepts of data warehousing, data mining, and big data management within the context of enterprise applications.

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CO6: Design and model database applications using advanced techniques like Enhanced Entity-Relationship (EER) models and advanced normalization.

### **Program Outcomes (POs)**

PO1: Assignments focusing on documentation and presentations help address

PO2: Through the application of advanced database knowledge and tools.

PO3: Assignments focusing on documentation and presentations help address

PO4: More comprehensive list of typical POs can be found on the Vel Tech University [veltech.edu.in](http://veltech.edu.in) website.

### **Subject: Linux Operating System**

#### **Course Outcomes (Cos)**

CO1: Install, configure, and manage server services, users, groups, and file services.

CO2: Understand and implement security policies and measures to protect a Linux server.

CO3: Create, modify, and delete user and group accounts, and manage permissions.

CO4: Understand the concepts of virtualization in a Linux environment.

CO5: Set up and manage file sharing services, such as NFS or Samba.

CO6: Use the command line to perform common administrative tasks, manage system resources, and troubleshoot issues.

### **Program Outcomes (POs)**

PO1: Apply knowledge of scientific and engineering principles to solve problems in computer science and IT.

PO2: Design and analyse solutions to problems using a variety of technologies, including operating systems like Linux.

PO3: Implement and test software solutions that leverage the capabilities of an operating system.

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PO4: Understand fundamental concepts of operating systems, such as process management, memory management, and file systems, and be able to apply them.

**Subject: Generic Open Elective (Fundamental of e-Commerce)**

**Course Outcomes (Cos)**

CO1: Analyze the impact of e-commerce on traditional business models and strategy.

CO2: Describe the major types of e-commerce, including B2B, B2C, C2C, and m-commerce models

CO3: Explain the key technological infrastructure and components required for building an e-commerce presence, such as internet technologies, web development tools, and hosting options.

CO4: Identify and assess the key security threats and legal/ethical issues in the e-commerce environment (e.g., data privacy, cyber laws, digital signatures).

CO5: Evaluate the role and efficiency of various electronic payment systems and logistics within e-business operations.

**Program Outcomes (POs)**

PO1: **Enhance domain knowledge:** The ability to understand and explain core concepts in business, commerce, and the specific dynamics of the e-commerce environment.

PO2: **Problem analysis and decision-making:** The ability to analyze business problems in a digital context and make data-based decisions.

PO3: **Technical and practical skills:** The ability to utilize relevant information technology, tools, and software necessary for modern business practices.

PO4: **Ethical and social responsibility:** An understanding of the ethical, legal, and social issues related to business and technology, and the ability to apply moral behavior in professional contexts.

**Subject: Vocational Skill Courses (Java Script)**

**Course Outcomes (Cos)**

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CO1: Understand the core concepts of JavaScript programming, including variables, data types, operators, and control structures.

CO2: Build dynamic and interactive web pages using JavaScript objects and by applying different event-handling mechanisms.

CO3: Implement client-side form validation using JavaScript and regular expressions.

CO4: Utilize functions, arrays, and strings effectively to solve specific problems within web development.

CO5: Learn about browser history, cookies, and local storage to manage and manipulate browser data.

CO6: Use modern development tools and debugging techniques to test and troubleshoot JavaScript code.

### **Program Outcomes (POs)**

PO1: These can include applying disciplinary knowledge to solve problems

PO2: Analysing complex issues, and designing solutions. Programs also aim to develop skills in using modern tools

PO3: Ethical practice and a commitment to lifelong learning are also key components of program outcomes in IT fields.

PO4: Programs also aim to develop skills in using modern tools, effective communication, and teamwork

### **Subject: Value Education Courses (Constitution of India)**

#### **Course Outcomes (Cos)**

CO1: **Understand the making of the Indian Constitution:** Students will gain a foundational understanding of how the constitution was created and its historical context.

CO2: **Identify Fundamental Rights and Duties:** Students will be able to identify and explain the fundamental rights and duties guaranteed by the Constitution to its citizens.

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**CO3: Examine federalism and Centre-State relations:** Students will be able to analyse the relationship between the central government and state governments as outlined in the constitution.

**CO4: Understand the structure of government:** Students will be able to describe the structures of government at both the national and state levels.

**CO5: Explain the role of the judiciary:** Students will be able to explain the functions and powers of the Supreme Court and High Courts in India.

### **Program Outcomes (POs)**

**PO1: Demonstrate citizenship:** Graduates will exhibit behavior and actions that denote good citizenship and social responsibility.

**PO2: Develop critical thinking:** Students will develop critical and analytical skills to understand and analyze problems, including those arising from social, political, and legal contexts.

**PO3: Inculcate human values:** The program aims to inculcate human values which leads to a transformation in behaviour and promotes a sense of responsibility

**PO4: Improve communication skills:** Students will improve their communication skills, both formal and informal, in their professional and personal lives

### **Subject: Co-Curricular Courses (Yoga Education)**

#### **Course Outcomes (Cos)**

**CO1:** Popularize yoga and its therapeutic and preventive values among the masses.

**CO2:** Enable students to use yogic practices to promote positive health, leading to physical fitness, mental soundness, emotional balance, and spiritual development.

**CO3:** Foster personality development, including self-discipline, leadership qualities, social competence, and ethical values.

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CO4: Train students to be effective yoga practitioners, wellness instructors, or therapists, opening up various employment opportunities.

CO5: Create awareness and provide the skills to evaluate and contribute to research advances in the field of yoga.

### **Program Outcomes (POs)**

PO1: Explain the fundamental philosophy, history, and different schools of yoga (e.g., Ashtanga Yoga, Hatha Yoga).

PO2: Perform various *asanas* (postures), *pranayama* (breathing techniques), *mudras*, and meditation techniques correctly and safely.

PO3: Understand and apply the principles of yoga to manage stress, improve concentration, and adopt a healthy lifestyle.

PO4: Understand the basic systems of the human body and the effects of yogic exercises on them.

### **Course BCS**

### **Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise**

#### **Semester – III**

#### **Academic Year 2023 -24**

#### **Subject: BCS**

#### **Subject: Fundamental of PHP**

#### **Course Outcomes (Cos)**

CO1: Explain the principles of yoga therapy and its effects on the different systems of the body.

CO2: Understand the impact of yogic practices on mental and emotional well-being.

CO3: Identify and describe various diseases, their causes, and the potential application of yogic techniques for management.

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### Program Outcomes (POs)

PO1: Develop software solutions to problems across a range of application domains through analysis and design.

PO2: Identify, formulate, and solve complex computing problems using fundamental principles of mathematics and computing sciences.

PO3: Understand professional, ethical, legal, security, and social issues related to the development and deployment of technology.

**Subject: Data Structure**

### Course Outcomes (Cos)

CO1: Implement various data structures (like linked lists, stacks, queues, trees) in a high-level programming language.

CO2: Analyze the time and space complexity of different algorithms and data structures.

CO3: Choose the most appropriate data structure for a given problem.

CO4: Apply data structures for efficient problem-solving in areas like searching, sorting, and graph traversal

### Program Outcomes (POs)

PO1: **Problem-solving:** The ability to analyze a complex computational problem and to define and address the computing requirements appropriate for its solution.

PO2: **Design:** The ability to design, implement, and evaluate a computational-based solution to meet a variety of public and organizational needs.

PO3: **Communication:** The ability to communicate effectively to a range of audiences

PO4: **Professionalism:** The ability to apply professional knowledge and ethical principles.

**Subject: Web Technologies-I**

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### Course Outcomes (Cos)

CO1: Create static and dynamic web pages using HTML, CSS, and JavaScript.

CO2: Design and implement server-side applications using technologies like Servlets, JSP, or PHP.

CO3: Connect web applications to databases and perform data manipulation using SQL.

CO4: Apply web development frameworks and architectures (e.g., MVC) to build robust web applications.

CO5: Implement client-side scripting with validation and interactive elements.

### Program Outcomes (POs)

PO1: **(Engineering Knowledge):** Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (This would encompass the theoretical underpinnings of web technologies).

PO2: **PO2 (Problem Analysis):** Identify, formulate, review literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (This relates to analyzing web development challenges).

PO3: **PO3 (Design/Development of Solutions):** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (Directly applicable to designing web applications).

PO4: **PO4 (Modern Tool Usage):** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of the limitations. (This covers proficiency in web development tools and platforms).

**Subject: Fundamental of Data Science**

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### Course Outcomes (Cos)

CO1: Evaluate and analyse data using various techniques and tools.

CO2: Generate visualizations to represent data patterns and insights.

CO3: Write programs using control structures and functions to manipulate and process data.

CO4: Grasp and apply fundamental data science principles like data reduction and data visualization.

### Program Outcomes (POs)

PO1: Possess a strong understanding of the fundamental concepts and theories of data science.

PO2: Develop the ability to model and solve problems using appropriate data science theories and methods.

PO3: Understand and apply advanced theories and methods to design solutions for complex data science problems.

PO4: Communicate effectively with both technical and non-technical audiences, which includes writing reports, giving presentations, and providing clear instructions.

PO5: Function effectively as an individual and as a member or leader in diverse teams and multidisciplinary settings.

### Subject: **Environmental Studies**

### Course Outcomes (Cos)

CO1: Specific, measurable learning objectives that students are expected to achieve at the end of a single course.

CO2: A CO for a course on "Ecosystem Dynamics" might be: "Students will be able to describe the flow of energy and matter in a given ecosystem."

CO3: To detail the specific learning that takes place within a course.

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### Program Outcomes (POs)

PO1: Broader statements about the capabilities and competencies graduates of a specific program should have after graduation.

PO2: A PO could be: "Graduates will be able to analyse environmental problems and develop sustainable solutions."

PO3: To define the overall goals of the degree program and provide a standard for graduate accomplishment.

Subject: **NSS**

### Course Outcomes (Cos)

CO1: A single course.

CO2: To define the specific learning expectations for that course.

CO3: "Classify and explain different imaging techniques for medical application" (from a specific course).

CO4: Achieved through assessments within that specific course, like assignments, tests, and labs.

### Program Outcomes (POs)

PO1: The entire degree program.

PO2: To state the overall skills, knowledge, and attitudes graduates should possess upon completion.

PO3: "Effective Communication: The program makes the students familiar with nuances and usage of language in formal and informal expressions of life".

PO4: Assessed through the cumulative achievement of all the courses within the program.

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**Subject: Generic Elective**

**Course Outcomes (Cos)**

CO1: Statements that describe what students are expected to know, understand, and be able to do by the time they graduate from a program.

CO2: They are wide-ranging and encompass skills, knowledge, and behaviors acquired throughout the entire degree.

CO3: Applying fundamental knowledge of science and engineering.

CO4: Using modern tools and techniques to solve problems.

**Program Outcomes (POs)**

PO1: Statements that describe the specific knowledge, skills, and attitudes a student is expected to have after completing a single course, including generic electives.

PO2: They are specific to the content of an individual course and are often more detailed and measurable.

PO3: Understanding the impact of industrialization in *Hard Times* by Dickens (CO 1).

PO4: Learning to develop GUI applications in Android using XML (CO 4).

**Course BCS**

**Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise**

**Semester – IV**

**Academic Year 2023 -24**

**Subject: BCS**

**Subject: Advanced PHP**

**Course Outcomes (Cos)**

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(Affiliated to Dr. B.A.M. University, Chh. Sambhajinagar)

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### Subject: **Data Structure**

#### Course Outcomes (Cos)

**CO1: Design and develop dynamic, database-driven web applications:** using advanced PHP concepts and frameworks (e.g., Laravel, Symfony).

**CO2: Implement secure and robust web applications:** by applying best practices for authentication, authorization, and data validation in PHP.

**CO3: Utilize advanced PHP features:** such as object-oriented programming (OOP), design patterns, and exception handling for building scalable and maintainable code.

**CO4: Integrate and interact with external APIs and services:** using PHP, including RESTful services and third-party libraries.

#### Program Outcomes (POs)

**PO1: Apply knowledge of computing fundamentals and specialized computing concepts:** to solve complex problems in software development.

**PO2: Design and implement software solutions:** that meet specified requirements and adhere to industry standards.

**PO3: Analyze and evaluate the performance of software systems:** and propose optimization strategies.

**PO4: Communicate effectively:** with technical and non-technical stakeholders in a professional environment.

### Subject: **Software Engineering**

#### Course Outcomes (Cos)

**CO1: Develop complex, secure, and scalable dynamic web applications using advanced PHP concepts.**

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CO2: Apply Object-Oriented Programming (OOP) principles (classes, objects, inheritance, interfaces, traits, namespaces) in PHP to build well-structured applications.

CO3: Integrate server-side PHP with various databases (e.g., MySQL), performing advanced queries, creation, updates, and data retrieval operations.

CO4: Implement web application security best practices, including protection against common vulnerabilities like XSS, SQL Injection, and CSRF.

### **Program Outcomes (POs)**

PO1: Engineering Knowledge: Apply knowledge of mathematics, algorithms, computer science, and software engineering principles to solve complex problems.

PO2: Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems, reaching substantiated conclusions using first principles of mathematics and computer science.

PO3: Design/Development of Solutions: Design solutions for complex software engineering problems or develop a software application using modern tools, components, or processes to meet specific needs with appropriate consideration for public health, safety, and cultural aspects.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and methods, including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

### **Subject: Web Technologies-II**

#### **Course Outcomes (Cos)**

CO1: Design and develop robust and responsive web applications using advanced front-end and back-end technologies.

CO2: Implement multi-tier architectures (e.g., three-tier using servlets and JSP) for dynamic web applications.

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CO3: Apply server-side programming features, such as Java Server Pages (JSP), Servlets, or frameworks like Struts/Hibernate, to create dynamic content and manage user sessions.

CO4: Integrate web applications with various databases using connectivity methods like JDBC, and perform operations such as storing and retrieving data.

### **Program Outcomes (POs)**

PO1: **Engineering Knowledge:** Applying fundamental knowledge to solve complex problems.

PO2: **Problem Analysis:** Identifying, analyzing, and solving complex problems using scientific principles.

PO3: **Modern Tool Usage:** Using current techniques and tools in the field.

PO4: **Individual and Team Work:** Functioning effectively both individually and in teams.

### **Subject: Statistics for Data Science**

#### **Course Outcomes (Cos)**

CO1: Read, understand, and trace the execution of programs written in a specific language, such as C.

CO2: Write code for a given algorithm.

CO3: Implement C code using specific data types and operators.

CO4: Write and implement functions to complete a program.

#### **Program Outcomes (POs)**

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**PO1: Apply statistical and mathematical concepts:** Graduates will be able to use concepts like linear algebra, calculus, and probability to solve data science problems.

**PO2: Process and analyze data:** Students will learn to visualize, process, and analyze data using various statistical methods.

**PO3: Conduct research:** They will be able to apply scientific research methodologies to solve problems.

**PO4: Solve real-world problems:** Graduates should be able to translate statistical knowledge into solutions for practical, real-world issues.

**Subject: Fundamental of Big Data**

**Course Outcomes (Cos)**

**CO1:** Define and explain the concept of Big Data, its characteristics (the 5 Vs: Volume, Variety, Velocity, Veracity, and Value), and the associated challenges and solutions.

**CO2:** Understand the architecture and components of the Hadoop ecosystem (HDFS, MapReduce, Pig, Hive, Spark).

**CO3:** Apply data preprocessing and data mining techniques for data analysis.

**CO4:** Develop simple Big Data solutions using distributed processing frameworks like Hadoop MapReduce or Spark.

**CO5:** Analyze the fundamental tools and methods of data analysis and statistics as applied to large datasets.

**Program Outcomes (POs)**

**PO1:** Program Outcomes for a degree program

**PO2:** Big Data program often include the ability to apply mathematical

**PO3:** design data-driven solutions, and effectively use modern Big Data tools and platforms.

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PO4: Other POs may cover effective communication about data activities, the capacity for lifelong learning in data science, and an understanding of professional ethics, including data privacy and security.

**Subject: Modern Indian Language**

**Course Outcomes (Cos)**

CO1: Acquiring specific language skills for daily use and for specific purposes, including rhetorical ability and vocabulary development.

CO2: Analysing and interpreting specific texts, including prose and poetry, and understanding concepts of communication, prose, and poetry.

CO3: Understanding basic linguistic concepts, theories, and various sub-disciplines of linguistics.

CO4: Applying learned concepts, such as applying translation skills from English to Hindi, understanding official letter writing, or using journalistic skills.

CO5: Developing specific skills like enhancing proficiency in reading and writing, and developing an interest in literature.

**Program Outcomes (POs)**

PO1: **Critical and analytical skills:** Ability to critically analyze literary texts using different theoretical perspectives and to understand the socio-cultural and historical contexts of literature.

PO2: **Communication skills:** Ability to communicate effectively and clearly, both orally and in writing, using appropriate literary terminology and concepts.

PO3: **Cultural and historical awareness:** Understanding of diverse literary genres, periods, and movements, fostering a global perspective through awareness of diverse cultural representations

PO4: **Literary appreciation:** A thorough study of various literary genres and the ability to develop a literary research attitude.

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**PO5: Intercultural competency:** The ability to integrate language proficiency, intercultural skills, technology, and critical thinking for globalized work environments.

### Course BCS

### Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

#### Semester – V

#### Academic Year 2023 -24

#### Subject: BCS

#### Subject: **Advanced PHP**

#### Course Outcomes (Cos)

CO1: Students will be able to design, implement, and test complex Java applications, including those with graphical user interfaces (GUIs) using frameworks like Swing or JavaFX.

CO2: Students will gain proficiency in advanced topics such as concurrency (multithreading), reflection, generics, lambda expressions, and streams for efficient and robust programming.

CO3: Students will be able to connect Java applications to databases using JDBC and perform various database operations like querying, insertion, updating, and deletion.

CO4: Students will learn to build dynamic web applications using Java Enterprise Edition (JEE) technologies like Servlets, JSP, and potentially frameworks like Spring or Hibernate.

#### Program Outcomes (POs)

**PO1: Engineering Knowledge:** The ability to apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Advanced Java provides specialized engineering knowledge for software development.)

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**PO2: Problem Analysis:** The ability to identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Advanced Java equips students to analyze and solve complex software problems.)

**PO3: Design/Development of Solutions:** The ability to design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (Advanced Java skills are crucial for designing and developing robust software solutions.)

**PO4: Modern Tool Usage:** The ability to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. (Advanced Java involves the use of modern development tools and environments.)

**Subject: Advance PHP****Course Outcomes (Cos)**

CO1: Develop complex web applications using advanced PHP features like object-oriented programming (OOP), traits, and namespaces.

CO2: Implement secure and robust web applications by applying best practices in security, error handling, and exception management.

CO3: Integrate PHP applications with various databases (e.g., MySQL, PostgreSQL) and utilize advanced database interaction techniques (e.g., ORM, prepared statements).

CO4: Design and implement RESTful APIs and consume external APIs using PHP.

CO5: Optimize PHP application performance through caching, profiling, and efficient code practices.

**Program Outcomes (POs)**

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**PO1: (Engineering Knowledge):** Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: (Problem Analysis):** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: (Design/Development of Solutions):** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

**PO4: PO4 (Conduct Investigations of Complex Problems):** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

### **Subject: Software Engineering**

#### **Course Outcomes (Cos)**

CO1: Statements that describe the specific knowledge, skills, and abilities a student gains from completing a particular course.

CO2: After completing an introductory programming course, a CO might be: "The student will be able to write simple programs using a specific programming language."

CO3: They provide clear learning goals for a single course and serve as the building blocks for achieving the program's overall goals.

#### **Program Outcomes (POs)**

PO1: Broader statements of what a graduate should be capable of doing by the time they have completed the entire program.

PO2: Apply engineering fundamentals to complex problems

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PO3: Communicate effectively

**Subject: Basic Data Science**

**Course Outcomes (Cos)**

CO1: Understand and apply various deep learning architectures like CNNs.

CO2: Analyze and differentiate various searching and sorting algorithms.

CO3: Use optimization techniques in Data Analytics and related areas.

CO4: Implement intrusion detection systems based on anomaly and misuse patterns.

**Program Outcomes (POs)**

PO1: Handle big data, clean, and process it effectively.

PO2: Use appropriate models for analysis and derive business insights from results

PO3: Apply computing theory in different software and languages

PO4: Perform well in a group and develop professional presentation skills.

**Subject: Artificial Intelligence**

**Course Outcomes (Cos)**

CO1: Ability to design and build a neural network for a specific task.

CO2: Knowledge of how to use a particular AI programming library.

CO3: Skill in evaluating and comparing the performance of different AI models

CO4: This mapping process helps ensure that the AI curriculum is aligned with the desired learning objectives for graduates.

**Program Outcomes (POs)**

PO1: Ability to analyze and solve complex problems using AI methodologies.

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PO2: Competence in ethical considerations and responsible development of AI systems.

PO3: Skill in collaborating with others on AI-related projects.

PO4: A strong foundation in computational thinking and data analysis.

**Subject: Internet of Things**

**Course Outcomes (Cos)**

CO1: Knowing the fundamental structure and design principles of an IoT system.

CO2: Working with components like sensors, actuators, and microcontrollers.

CO3: Understanding and analysing protocols such as MQTT and CoAP.

CO4: Creating simple IoT applications using sensors and microcontrollers.

CO5: Applying cloud computing and data analytics to handle data from IoT devices.

**Program Outcomes (POs)**

PO1: Applying knowledge from science, mathematics, and engineering principles.

PO2: Analysing complex problems to investigate and interpret information.

PO3: Designing a system, component, or process to meet desired needs.

PO4: Conducting investigations of complex problems by designing and executing experiments.

PO5: Using modern tools for engineering practice.

**Subject: Website Hosting using WordPress**

**Course Outcomes (Cos)**

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CO1: Identify and differentiate various types of website hosting (e.g., shared, VPS, dedicated, managed WordPress hosting) and their suitability for different WordPress projects.

CO2: Select and configure a suitable hosting plan for a WordPress website based on project requirements and budget.

CO3: Install and set up WordPress on a chosen hosting environment, including database creation and configuration.

CO4: Manage WordPress installations through hosting control panels (e.g., cPanel, Plesk) or managed hosting dashboards.

CO5: Manage WordPress installations through hosting control panels (e.g., cPanel, Plesk) or managed hosting dashboards.

### **Program Outcomes (POs)**

PO1: Design, develop, and deploy: functional and visually appealing websites using content management systems like WordPress.

PO2: Apply best practices: in website development, including responsive design, user experience (UX) principles, and accessibility standards.

PO3: Implement effective digital marketing strategies: to promote websites and online businesses, including SEO, social media marketing, and content marketing.

PO4: Manage and maintain: website infrastructure, including hosting, domain names, and security protocols.

PO5: Analyze website performance data: and make data-driven decisions for optimization and improvement.

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Course BCS

Course Outcomes (Cos) and Program Outcomes (POs) – Subject wise

Semester – V

Academic Year 2023 -24

Subject: BCS

Subject: **JAVA Web Frameworks**

Course Outcomes (Cos)

CO1: Understand and apply core concepts of a specific Java Web Framework: This includes grasping the architectural patterns (e.g., MVC), component lifecycles, and configuration mechanisms of frameworks like Spring, Struts, or JSF.

CO2: Develop and deploy web applications using the chosen framework: Students should be able to build functional web applications, handling user input, data persistence, and presentation logic within the framework's structure.

CO3: Implement data access and integration: This involves utilizing features like Object-Relational Mapping (ORM) (e.g., Hibernate with Spring) to interact with databases and integrating with other services or APIs.

CO4: Design and implement secure and scalable web applications: Students should understand and apply security principles, authentication, and authorization mechanisms within the framework, and consider scalability aspects in their design.

CO5: Utilize framework-specific tools and best practices: This includes using development tools, debugging techniques, and adhering to coding standards and design patterns promoted by the framework.

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**Program Outcomes (POs)**

PO1: Engineering Knowledge: Ability to apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Applying framework concepts to solve web development challenges).

PO2: Problem Analysis: Ability to identify, formulate, review literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Analyzing web application requirements and selecting appropriate framework features).

PO3: Design/Development of Solutions: Ability to design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (Designing and developing web applications using Java frameworks).

PO4: Conduct Investigations of Complex Problems: Ability to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. (Troubleshooting and optimizing web applications built with frameworks).

**Subject: Distributed Database Management System****Course Outcomes (Cos)**

CO1: Apply principles to design, develop, and implement a distributed database system.

CO2: Understand and manage distributed transactions, including concepts like the two-phase commit (2PC) protocol and distributed concurrency control.

CO3: Implement strategies for data replication (copying data across multiple sites) and fragmentation (splitting data and distributing it).

CO4: Analyse how queries are executed across multiple nodes in a distributed environment.

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CO5: Understand and apply mechanisms for handling failures in a distributed system.

### **Program Outcomes (POs)**

PO1: Understand and apply mechanisms for handling failures in a distributed system.

PO2: The ability to analyze and solve complex technical problems, such as designing a DDBMS that meets specific performance and availability requirements.

PO3: The ability to design and develop solutions to complex problems, such as building a robust distributed application.

PO4: The ability to effectively communicate technical information, both orally and in writing, to technical and non-technical audiences.

PO5: The ability to act in a professional and ethical manner, considering the implications of data privacy and security in a distributed system.

### **Subject: Software Quality Assurance & Testing**

### **Course Outcomes (Cos)**

CO1: Comprehend the fundamental concepts of software quality, standards (like ISO 9000:2000), and assurance principles.

CO2: Construct test cases using various black-box and white-box testing strategies and techniques (e.g., boundary value analysis, equivalence partitioning, decision tables).

CO3: Apply appropriate testing methodologies and strategies across the software development life cycle (SDLC), including unit, integration, system, and acceptance testing.

CO4: Utilize modern software testing tools (both manual and automated, like Selenium) to plan, design, and execute tests effectively.

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CO5: Analyze and manage defects, including identifying, reporting, prioritizing, and tracking bugs using defect management tools.

### **Program Outcomes (POs)**

PO1: Software Quality Assurance or Software Engineering program are broader goals that align with general professional competencies

PO2: Upon graduation, students are expected to demonstrate various abilities

PO3: Including applying foundational knowledge from computing, mathematics, and science to complex software engineering and quality assurance issues

PO4: They should be able to identify, analyse, and solve problems using scientific and engineering principles.

### **Subject: Advance Data Science**

### **Course Outcomes (Cos)**

CO1: Understand and apply advanced deep learning algorithms like CNN, RNN, LSTM, and BERT.

CO2: Develop and evaluate predictive models using various attribute selection methods.

CO3: Analyze and interpret large-scale datasets using advanced statistical techniques and tools.

CO4: Understand and apply data mining and machine learning techniques to specific domains like cybersecurity or healthcare analytics.

CO5: Generate visualizations and communicate findings from complex datasets.

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### **Program Outcomes (POs)**

PO1: Apply advanced data science and analytical techniques to solve complex, real-world problems in various fields.

PO2: Develop and implement innovative solutions for data-driven challenges.

PO3: Demonstrate strong teamwork, leadership, and decision-making skills

PO4: Effectively communicate findings to both technical and non-technical audiences.

### **Subject: Machine Learning**

### **Course Outcomes (Cos)**

CO1: Understanding and applying concepts like CNNs for image classification or BERT for text processing.

CO2: Understanding predictive modelling steps and using various attribute selection methods.

CO3: Applying mathematical concepts to solve complex data science problems.

CO4: Applying data mining techniques to identify and analyze security threats.

CO5: Using data analytics to improve decision-making and operational efficiency in healthcare.

### **Program Outcomes (POs)**

PO1: Applying advanced data science techniques to solve real-world problems

PO2: Demonstrating mastery of both technical and business aspects of data science.

PO3: Exhibiting teamwork, leadership, and strong decision-making abilities.

PO4: Communicating findings effectively and presenting results clearly.

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**Subject: Digital Marketing**

**Course Outcomes (Cos)**

CO1: Understanding the foundational concepts, theories, and principles of marketing.

CO2: Developing strategies for different digital marketing activities, including segmentation, targeting, and positioning.

CO3: Applying knowledge of advertising theories and creating compelling advertising messages for different media.

CO4: Analysing and selecting appropriate media platforms for advertising campaigns.

**Program Outcomes (POs)**

PO1: Critical Thinking and Problem-Solving: Applying logical reasoning to analyze problems and devise solutions for digital marketing challenges.

PO2: Communication and Presentation: Effectively communicating complex digital marketing ideas both in writing and orally to various stakeholders.

PO3: Technology and Digital Literacy: Competence in using digital tools and technologies for business operations and management.

PO4: Business Acumen: Demonstrating technical competence in core business functions and understanding their application in a digital context.