



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)

Re-Accredited "B+" Grade (CGPA 2.69) by NAAC, ISO 21001:2018 (Certified)

Affiliated to University of Mumbai

B.Sc. Computer Science

Program Specific Outcome

PSO1 : Ability to apply knowledge of computing, mathematics, and programming that may be relevant and appropriate to the domain.

PSO2: Ability to design, implement, and develop computer-based system, process, component, or program to meet desired needs

PSO3: Ability to communicate effectively in both written and oral forms and do effective presentation and prepare project reports.

PSO4: Ability to make responsible citizen through ethical and social practices with importance to sustainability in respective fields.



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Department	Semester	Course
Computer Science	I	Introduction to Programming with Python

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define and Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements	L1/L2	PO1 PSO1
CO2	Discuss and Implement proficiency in the handling of Operators, Arrays, and functions and modules	L2/L3	PO1 PO2 PSO2
CO3	Analyze and Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples , sets and strings	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	I	Linux Operating System

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Understand the history and basics of Linux, navigate the Linux shell, manage files, and use basic and advanced commands.set and manage environment variables and customize the command environment.	L1/L2	PO1 PSO1
CO2	Describe Linux file permissions and security settings, use networking tools like ping and ftp, and edit text files with tools like awk, sed, and vi, basic networking concepts and secure remote access using ssh.	L2/L3	PO1 PO2 PSO2
CO3	Create and manage basic scripts in Linux, use conditional and loop commands, and control processes, schedule jobs and run scripts automatically at boot.	L3/L6	PO2 PSO2



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Department	Semester	Course
Computer Science	I	Open Source Technologies

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand and articulate the principles and need for open-source software, compare different licensing models, and analyze the historical development and methodologies of open-source initiatives.	L2	PO1, PSO1, PSO4
CO2	Demonstrate proficiency in initiating, managing, and contributing to open-source projects, Understanding the ethical and social implications of open-source technologies.	L3, L4, L5, L6	PO2, PO4, PSO1, PSO3, PSO4
CO3	Analyze and evaluate the developmental models, licensing structures, commercial/non-commercial utilization of Open Source Technologies, encompassing operating systems, development tools, and case studies.	L4, L5	PO1, PSO1, PSO2, PSO4,



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Department	Semester	Course
Computer Science	I	Digital Signals And Architecture

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall and understand the logic gates, simplification of logic circuits and combinational circuits.	L1, L2	PO1 PSO1
CO2	Discuss and understand Memory system organization.	L2	PO1 PSO2
CO3	Analyze the basic concept of control unit and explain fundamentals of advanced computer architecture	L4	PO2 PSO3



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Department	Semester	Course
Computer Science	I	Discrete Mathematics

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall and describe the concepts of set, function and logic, recurrence relations & compute recurrence relations using different methods.	L1/L3	PO1 PSO1
CO2	Explain and demonstrate problems on permutations and combinations, counting principle, languages and regular expressions	L2/L3	PO1 PO2 PSO1
CO3	Define and evaluate the basic concepts of graphs and trees, problems on finite state automata and Turing Machine	L1/L3	PO1 PO2 PSO1



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Department	Semester	Course
Computer Science	I	Descriptive Statistics

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand and analyze various data types, distributions, and data presentations, measures of central tendency and partition values.	L2/L4	PO1 PSO1
CO2	Describe dispersion measures, interpretation of skewness and kurtosis measures using moments and quartiles,	L1/L3	PO1 PO2 PSO1
CO3	Understand correlation concepts, including types and interpretations, regression principles, , and utilize techniques like linear, multiple, and logistic regression for predictive modeling,	L2/L4	PO1 PO2 PSO1



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Department	Semester	Course
Computer Science	I	Soft Skills

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Understand the significance of soft skills, personality development, emotional intelligence, motivation, professional etiquette, and ethical values.	L1/L2	PO1 PO6 PSO4
CO2	Manage communication processes, including verbal and non-verbal elements, and compose impactful messages, Develop proficiency in employment communication, job interview preparation, and group discussion techniques.	L2/L3	PO3 PO4 PSO3 PSO4
CO3	Develop Academic and Professional Skills like presentations, fostering creativity, and capacity building, leadership, team building, decision making, negotiation, and stress and time management.	L2/L3	PO3 PO5 PSO2



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Department	Semester	Course
Computer Science	I	Introduction to Programming with Python – Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Identify and apply various control statement using suitable examples.	L1/L2	PO1 PO2 PSO1 PSO2
CO2	Explain functions and demonstrate different types of function arguments and implement recursion for problems, Lambda functions, carry out associativity of operators and manipulate arrays and demonstrate use of slicing and indexing for accessing elements from the array.	L2/L3	PO1 PO2 PSO2
CO3	Apply and analyze list, tuple, dictionary	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	I	Linux Operating System – Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Explore and install Linux - operating systems.	L2, L3, L4, L6	PO1, PO2, PO3, PO4, PO6, PSO1, PSO2, PSO3
CO2	Demonstrating practical Basic Commands file handling command, General purpose utility command, Network command	L2, L3, L4	PO1, PO2, PO3, PSO1, PSO2, PSO3
CO3	Experimenting Editors, working and managing with process, execute shell scripting command	L3, L4, L5, L6	PO2, PO3, PO4, PSO2



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Department	Semester	Course
Computer Science	I	Open Source Technologies – Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Explore and install open-source operating systems.	L2, L3, L4, L6	PO1, PO2, PO3, PO4, PO6, PSO1, PSO2, PSO3
CO2	Demonstrating practical usage of open source applications like LibreOffice, GIMP etc.	L2, L3, L4	PO1, PO2, PO3, PSO1, PSO2, PSO3
CO3	Experimenting with Shotcut Video Editing Tools, illustrating its capabilities for creating and editing multimedia content.	L3, L4, L5, L6	PO2, PO3, PO4, PSO2



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Department	Semester	Course
Computer Science	I	Practical Digital System and Architecture

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Analyze the basic components and architecture of digital systems through practical experiments, demonstrating comprehension through hands-on application.	L4	PO1 PSO1
CO2	Apply knowledge of digital logic design principles to construct and test combinational and sequential circuits. Evaluate the performance of various digital circuits and systems using simulation tools.	L3/L5	PO3, PO4, PSO1 PSO2
CO3	Design and implement digital circuits for real-world applications, integrating various digital components and systems. Analyze and troubleshoot digital system issues, proposing and implementing effective solutions.	L4/L6	PO1, PO3, PSO1 PSO2



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Department	Semester	Course
Computer Science	I	Practical Discrete Mathematics

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Identify and perform arithmetic operations on functions, relations and Recurrence Relation and examine visual representations using SCILAB	L1/L3/L4	PO2 PSO1 PSO2
CO2	Identify and analyze within each topic, such as Counting Principles, Permutations, Combinations, Languages and Grammars, Finite State Machines	L1/L3/L4	PO2 PSO1 PSO2
CO3	Understanding graph theory involves recognizing, analyzing, applying, and evaluating various graph types, properties, representations	L2/L3/L4	PO2 PSO1 PSO2



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Department	Semester	Course
Computer Science	I	Descriptive Statistics – Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Learn to use R for data input, arithmetic operations, and creating diagrams and graphs and interpreting frequency distributions, diagrams, and graphs to spot trends.	L1/L2	PO1 PO2 PSO1 PSO2
CO2	Learn to identify the typical or average values in data sets, such as mean, median, and mode. Explore how data is spread out from the average, including measures like range, quartile deviation, and standard deviation.	L1/L4	PO1 PO2 PSO2
CO3	Understand statistical measures like moments, skewness, and kurtosis Learn how to analyze relationships between different sets of data using correlation and regression techniques. Use R to compute summary statistics.	L2/L4	PO1 PO4 PSO1 PSO2



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Department	Semester	Course
Computer Science	II	Advanced Python Programming

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define and Interpret the commonly used operations involving file systems and regular expressions, Threads and date and time functions.	L1/L2	PO1 PSO1
CO2	Discuss the methods to carry out and manipulate SQL in Python, Exceptions handling, Networking and GUI concepts.	L2/L3	PO1 PO2 PSO2
CO3	Demonstrate and analyze the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	II	Database System

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Understand the basics of database management systems (DBMS), including their architecture, data models, and entity-relationship modeling. Explain how to use SQL commands to create, modify, and query databases and tables.	L1/L2	PO1 PSO1
CO2	Analyze database requirements and determine the entities involved in the system and their relationship to one another. understand the relational data model, including tables, keys, and constraints, relational algebra operations, SQL functions, table joins, and subqueries for database manipulation and querying.	L2/L4	PO1 PO2 PSO2
CO3	Handle data permissions. Describe the concept of database normalization, security, and protection mechanisms, including the roles of a DBA. Creating views, transaction control commands, and indexing techniques.	L1/L3/ L6	PO2 PSO2



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Department	Semester	Course
Computer Science	II	Design Analysis of Algorithm

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Describe the concepts of Algorithm and understanding of Different Asymptotic Notation with different data structures like array, LinkedList and stack with programs using different data structures.	L1 L2 L3	PO1 PSO1
CO2	Discuss the Recursion with different searching, String Algorithms and sorting techniques with their problem solving	L2 L2	PO1 PO2 PSO2
CO3	Apply and define method of Algorithm, classification of algorithms, Implement the different techniques like Divide and Conquer, Greedy And Dynamic Programming	L1, L2, L3	PO1, PO2, PSO2



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Department	Semester	Course
Computer Science	II	Introduction to OOPs using C++

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Describe OOPs concepts, Understand tokens, expressions, and control structures. Explain arrays and strings and create programs using them.	L1 L2 L3	PO1 PSO1
CO2	Define and Apply constructors, destructors, object manipulation, and polymorphism techniques.	L1 L2 L3	PO1, PO2 PSO2
CO3	Apply inheritance, Define pointers, and file handling, implement OOP solutions for real-life applications.	L1 L2 L3	PO1, PO2 PSO 2



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Department	Semester	Course
Computer Science	II	Calculus

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Define the basic concepts of calculus and will apply limits & derivatives to figure out how things change over time.	L1/L3	PO1, PO2, PSO1
CO2	Explain, calculate and interpret real-world problems by applying integration techniques to find areas under curves and solve differential equations.	L1/L3/L4	PO1, PO2, PSO1
CO3	Define and solve problems involving functions of multiple variables using partial derivatives.	L1/L3	PO1, PO2, PSO1



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Department	Semester	Course
Computer Science	II	Statistical Methods

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	understand the concepts of probability, random experiments and events, apply probability definitions and theorems, conditional probability and Bayes' theorem, random variables and their distributions.	L2/L3	PO1 PO2 PSO1
CO2	Define mathematical expectation and variance, analyze the expected outcomes and variability of random variables, apply standard probability distributions	L1/L4	PO1 PO2 PSO1
CO3	Framing the hypothesis, level of significance, computation of statistic, apply (ANOVA), the sign test and Wilcoxon's signed rank test	L2/L3	PO1 PO2 PSO1



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Department	Semester	Course
Computer Science	II	E-Commerce & Digital Marketing

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define e-commerce and e-business essentials, covering digital economy dynamics, electronic payments, and digital marketing for modern planning.	L1/L2	PO1 PSO1
CO2	Discuss the methods to carry out and manipulate across social media, email, mobile, and content strategies, optimizing campaigns in Digital marketing.	L2/L3	PO1 PO2 PSO2
CO3	Demonstrate expertise in SEO, SEM, and web analytics, optimizing websites, crafting effective campaigns, and analyzing data for strategic insights.	L1/L2/L3	PO1, PO2 PSO2



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Department	Semester	Course
Computer Science	II	Advanced Python Programming – Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Identify and apply various file operations, to demonstrate use of regular expression for suitable application, concept of threading and multitasking.	L1/L3	PO1 PO2 PSO1 PSO2
CO2	Discuss and breakdown into various database operation, exception handling, to design and experiment that demonstrates a. Different fonts and colors b. Different Layout Managers c. Event Handling To create application which uses date and time and server-client and exchange basic information.	L2/L3/L4/L6	PO1 PO2 PSO1 PSO2
CO3	Implement and Apply to concepts of OOP	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	II	Database System – Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Analyze database requirements and determine the entities involved in the system and their relationship to one another. Write simple queries to MySQL related to String, Maths and Date Functions. Create tables and insert/update/delete data, and query data in a relational DBMS using MySQL commands.	L4, L6	PO1, PO2, PSO1, PSO2
CO2	Execute various function like Date, math, String function...perform joins on tables using SQL	L2, L3, L4	PO1, PO2, PO3, PSO1, PSO2
CO3	Understand the normalization and its role in the database design process. Create View and Indexes and execute it.	L2, L6	PO1, PO2, PSO1, PSO2, PSO3



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Department	Semester	Course
Computer Science	II	Design and Analysis of Algorithm - Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Identify and apply various Operation on Array data structure like row-sum, column-sum, sum of diagonal elements, addition of two matrices , multiplication of two matrices	L1/L3	PO1 PO2 PSO1 PSO2
CO2	Discuss the operation on searching and sorting algorithms bubble, selection sort, and insertion sort and merge sort	L2/L3/L4/L6	PO1 PO2 PSO1 PSO2
CO3	Implement operation on recursion-factorial, fibonacci, tower of hanoi.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	II	Introduction to OOPs using C++ Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Develop in programming with classes, encompassing data members, member functions, branching, looping, arrays, and the scope resolution operator.	L3,L4	PO1, PO2 PO1, PO2
CO2	Demonstrate constructors, destructors, scope specifiers, and inheritance concepts through programs including single, multilevel, multiple, and hierarchical inheritance, alongside derived class constructors.	L3,L4	PO1, PO2 PO1, PO2
CO3	Demonstrate comprehensive understanding and application of advanced C++ features including friend functions, inline functions, this pointer, function overloading, function overriding, pointers, and file handling.	L3,L4	PO1, PO2 PO1, PO2



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Department	Semester	Course
Computer Science	II	Practical Calculus

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Apply the basics of calculus which will allow you to analyze functions, find critical points, and solve real-world problems effectively.	L3/L4	PO2 PSO1 PSO2
CO2	Analyze functions to determine critical points, integrate to find areas and lengths, and solve differential equations, enabling them to model real-world problems.	L2/L3/L4	PO2 PSO1 PSO2
CO3	Explain, apply and analyze complex systems, predict behavior, and solve real-world problems effectively using partial derivatives.	L2/L3/L4	PO2 PSO1 PSO2



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Department	Semester	Course
Computer Science	II	Statistical Methods– Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Learn about probability Conditional Probability and Independence and Bayes' theorem. describe and calculate probabilities for both discrete and continuous random variables, Calculating Expectations and Variance	L1/L2	PO1 PO2 PSO1
CO2	Understand distributions like t binomial and normal distributions Performing Large Sample Tests. Conducting Small Sample Tests. Learn how to perform one-way and two-way ANOVA to compare means across different groups.	L2/L3	PO1 PO2 PO4 PSO1
CO3	Understand Non-Parametric Tests	L3/L4	PO2 PSO1



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Department	Semester	Course
Computer Science	III	Linear Algebra

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Understand the concept of complex numbers, solving systems of linear equations, implementing vector operations, and applying vector space concepts to solve real-world problems, such as Support Vector Machines	L2/L3/L4	PO1 PO2 PSO1
CO2	Express clear understanding of the concept of a solution to a system of equations.	L2/L3/L4	PO1 PO2 PSO1
CO3	Understand the concepts of eigenvalue and eigenvector and find eigenvalues and corresponding eigenvectors for a square matrix	L2/L3/L4	PO1 PO2 PSO1



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Department	Semester	Course
Computer Science	III	Principles of Operating Systems

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define and discuss operating system fundamentals, including roles, operations, processes, threads, and computing environments, enabling effective system management and optimization.	L1/L2	PO1 PSO1
CO2	Discuss process synchronization, CPU scheduling, and deadlocks in operating systems, including critical-section problems, scheduling algorithms, and deadlock handle.	L2/L3	PO1 PO2 PSO2
CO3	Define and discuss main memory, virtual memory, mass-storage, and file system concepts for efficient operating system design and use.	L2/L3	PO1, PO2 PSO2



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Department	Semester	Course
Computer Science	III	Java Based Application Development

After completing the course, Students will be able to: -

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Explain history, Features of Java, Java Development Kit, Java Application Programming Interface, Java Virtual Machine Java Program Structure, Java Tokens.Introduction to predefined packages,Introduction, Pre-Defined Exceptions	L1 L2	PO1 PSO1
CO2	Discuss Swing- Features of the Java Foundation Classes,Swing API Components, JComponent Class, Windows, Dialog Boxes, and Panels, Labels, Buttons, Check Boxes, Menus, Toolbars,JDBC:Introduction, JDBC Architecture, JDBC Drivers, JDBC Connectivity Model, java.sql package	L2 L3	PO1 PO2 PSO2
CO3	Demonstrate Servlet Life Cycle, Types of Servlet, Servlet Configuration with Deployment Descriptor, Introduction to JSP , Comparison with Servlet, JSP Architecture, JSP Life Cycle	L3 L4	PO2 PSO2



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Department	Semester	Course
Computer Science	III	Web Technologies

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define and Interpret the Fundamental Elements of HTML and CSS	L1/L2	PO1 PSO1
CO2	To carry out and practice JavaScript and XML	L2/L3	PO1 PO2 PSO2
CO3	Demonstrate and analyze AJAX,PHP and Jquery	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	III	Advanced Database Management System

After completing the course, Students will be able to: -

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define and interpret the commonly used operations on PL/SQL like Control Structure, stored procedure, and functions.	L1 L2	PO1 PSO1
CO2	Discuss the methods collection and Records, Error Handling in PL/SQL with different types of SQL like static and dynamic SQL	L2 L3	PO1 PO2 PSO2
CO3	Demonstrate and analyze the concepts of Trigger,Package,Examples of transaction Management with crash Recovery	L3 L4	PO2 PSO2



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Department	Semester	Course
Computer	III	Data Structure

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Understand and implement Abstract Data types (ADT) and their application in linked structures, stacks, and queues with computational problems.	L2/L3	PO1 PSO1
CO2	Understand and implement advanced data structures such as doubly linked lists, various tree structures, and priority queues. ADTs, operations, advantages, and real-world applications like Huffman coding and heap operations.	L2/L3	PO1 PO2 PSO2
CO3	Recognize and Apply graphs and hashing techniques with respect to ADTs, operations, graph representations, traversals, shortest path algorithms, and efficient data retrieval using hashing.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	III	Green Technologies

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define and understand fundamentals of Green IT, focusing on its environmental impact, strategic alignment, and the business opportunities and challenges it presents.	L2	PO6, PSO4
CO2	Recognize data server virtualization, cloud computing, and smart meters, green business process management and the integration of green IT into enterprise architecture.	L1,L2	PO1
CO3	Explores the design and development of Green Information Systems (GIS), focusing on social impacts, ethical considerations, and stakeholder roles, as well as green compliance through protocols, standards, and audits.	L1, L2	PO6, PSO4



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Department	Semester	Course
Computer Science	III	Linear Algebra– Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Understanding Complex Numbers Operations, Exploring Vector Operations and Applying Vectors in Classification	L2/L3	PO1 PO2 PSO1 PSO2
CO2	Use support vector machines (SVM) to classify data based on vectors. Mastering Basic Matrix Operations. Matrix Transformation and Rank. Image Manipulation using Matrices.	L3/L4	PO1 PO2 PSO1 PSO2
CO3	Vector Projections and Orthogonal Complements, Eigenvalues and Eigenvectors. Implementing Page Rank Algorithm.	L1/L2L3	PO1 PO2 PSO1 PSO2



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Department	Semester	Course
Computer Science	III	Practical Principles of Operating Systems

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Exploring process communication (shared memory, message passing) and multithreading empowers the design of concurrent applications for efficient data exchange and parallel solutions like generating the Fibonacci sequence.	L3/L4	PO2 PSO1 PSO2
CO2	Exploration of synchronization and scheduling algorithms in Python equips programs to handle concurrent execution, ensuring data integrity through solutions for bounded buffers, reader-writer coordination, and process scheduling (FCFS, non-pre-emptive, RR).	L2/L3/L4	PO2 PSO1 PSO2
CO3	Discussing memory management algorithms (bankers, FIFO, LRU) and file system design empowers the creation of programs with efficient memory allocation and organized data storage solutions.	L2/L3/L4	PO2 PSO1 PSO2



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Department	Semester	Course
Computer Science	III	Practical Java Based Application Development

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Exploring of Constructor Overloading, Method Overloading, Static methods concepts of Abstract classes and methods defined exceptions and raise them as per the requirements	L3/L4	PO2 PSO1 PSO2
CO2	Exploration of program to demonstrate the methods of: a. List interface b. Set interface c. Map interface swing components design JDBC program that displays the data of a given table.	L2/L3/L4	PO2 PSO1 PSO2
CO3	Discussing Construct a GUI using JAVA Swings to accept details of a record of a given table and submit Servlet that displays the names and values of the cookie stored on the client. another JSP that returns the value of this session variable and displays it.	L2/L3/L4	PO2 PSO1 PSO2



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Department	Semester	Course
Computer Science	III	Web Technologies – Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Identify and use basic HTML Tags, Forms and integrate Cascading style sheet	L1/L3/L4	PO1 PO2 PSO1 PSO2
CO2	Discuss and experiment various mathematical operations using Java script. Identify and Create a XML file with Internal / External DTD	L2/L3/L4/L6	PO1 PO2 PSO1 PSO2
CO3	Implement and Design a webpage to handle asynchronous requests using AJAX, PHP Script and JQuery animation.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	III	Advance Database System– Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Identify and Understand the PL/SQL block Syntax loops and conditional statements	L3/L4	PO2 PSO1 PSO2
CO2	Discuss the sequence with the GOTO and NULL statements	L2/L3/L4	PO2 PSO1 PSO2
CO3	Implement and Design Develop Procedure and Function ,Triggers,cursor and exceptions in PL/SQL	L2/L3/L4	PO2 PSO1 PSO2



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Department	Semester	Course
Computer Science	III	Data Structure

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Design and Implement various data structures like linked list, doubly linked list, stack. Understand advanced computer science courses and real-world software development challenges.	L1/L2	PO1 PSO1
CO2	Understand and implement queues, algorithmic concepts and get real-world problem-solving scenarios and advanced topics in computer science by solidifying their foundational knowledge of data structures.	L3 / L4	PO2, PSO2
CO3	Understand and implement complex data structures like graphs and trees, enhancing their algorithmic problem-solving skills.	L3/ L4	PO2, PSO2



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Department	Semester	Course
Computer Science	IV	Advanced Application Development

After completing the course, Students will be able to: -

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define key concepts in AngularJs and NodeJs programming and Flutter app development, including basics, advanced features, and application components, fostering proficiency in flutter app and website development creation with AngularJs,NodeJs,vscod and Android Studio.	L1 L2	PO1 PSO1
CO2	Demonstrate mastery in designing Single Page Website and Flutter UIs, handling images, lists, menus, and data persistence, including Firebase Real-Time Data integration and Mongoddb.	L2 L3	PO1 PO2 PSO2
CO3	Discuss expertise in integrating both front-end and back-end development, including technologies like HTML5, CSS3, JavaScript (Node, Angular), and server-side languages,Flutter.	L3 L4	PO2 PSO2



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Department	Semester	Course
Computer Science	IV	Theory of Computation

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understanding and applying concepts of automata theory, helping solve problems related to algorithms and language processing.	L2/L3	PSO1 PO1 PO2
CO2	Apply knowledge of regular sets, grammar, and language structures to optimize algorithms, design programming languages	L2/L3	PSO1 PO1 PO2
CO3	Understand Linear Bounded Automata and its applications	L2/L3	PSO1 PO1 PO2



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Department	Semester	Course
Computer Science	IV	Software Engineering

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Describe and Discuss software engineering process life cycle, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements.	L1/L2	PO1 PSO1
CO2	Explain and use specification into a design, and then realize that design practically, using an appropriate software engineering methodology.	L2/L3	PO1 PO2 PSO2
CO3	Apply and identify how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	IV	Computer Networks

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define and understand computer networks, communication techniques, networking standards, types, and models like OSI and TCP/IP.	L1/L2	PO1 PSO1
CO2	Understand Data Link Layer, covering addressing, error detection and correction, and media access control, as well as Ethernet and wired and wireless networks.	L2	PO1 PO2 PSO2
CO3	Describe unicast routing algorithms and protocols, next-generation IP with a focus on IPv6, and key transport layer protocols like TCP, UDP, and SCTP.	L2	PO2 PSO2



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Department	Semester	Course
Computer Science	IV	IoT Technologies

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall the fundamental concepts and definitions of the Internet of Things (IoT). Explain the IoT architecture and its various layers.	L1, L2	PO1, PO2, PSO1, PSO2
CO2	Analyze the correlation between various IoT devices and their data patterns to enhance system efficiency and reliability. Evaluate the impact of sensor data integration on IoT network performance using advanced statistical methods .	L4, L5	PO2, PO3, PSO1, PSO2
CO3	Understand the principles of sensor data correlation in IoT systems by analyzing data patterns to establish meaningful connections, ensuring accurate and efficient data processing. Apply techniques for data correlation in IoT applications to enhance predictive maintenance and smart decision-making processes.	L2, L3	PO1, PO5, PSO1, PSO2



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Department	Semester	Course
Computer Science	IV	Android Application Development

After completing the course, Students will be able to: -

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define key concepts in Kotlin programming and Android app development, including basics, advanced features, and application components, fostering proficiency in mobile app creation with Kotlin and Android Studio.	L1 L2	PO1 PSO1
CO2	Demonstrate mastery in designing Android UIs, handling images, lists, menus, and data persistence, including Firebase Real-Time Data integration .	L2 L3	PO1 PO2 PSO2
CO3	Discuss expertise in integrating graphics, animations, media, camera, location data, background tasks, and deploying Android apps on Google Play.	L3 L4	PO2 PSO2



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Department	Semester	Course
Computer Science	IV	Research Methodology

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understanding of research methodology, research process and various approaches, define and state research problems, hypotheses, literature review., research design and its principles.	L1/L2	PO1 PO4 PSO1
CO2	Apply various tools for data collection, reliability, and validity of research instruments. understanding of hypothesis testing and its procedure and sampling design.	L2/L3	PO1 PO2 PSO1
CO3	Preparing a research proposal, scientific paper, structuring, and formatting research papers, writing abstracts, citing references, and preparing tables and figures for scientific publishing.	L3/L4	PO2 PO3 PSO3 PSO4



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Department	Semester	Course
Computer Science	IV	Practical-Advanced Application Development

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Exploring program using Kotlin to implement control structures and loops.different layouts and UI including Button, Edittext, Textview,use Gridview for shopping cart application.to demonstrate implicit and explicit intents.	L1/L2/L3	PO1 PSO1
CO2	Demonstrate practical use of Broadcast listeners. XML based animation Implement play, pause, and loop features.to implement Asynctask and threading concepts.	L3 / L4	PO3, PO4, PSO1, PSO2
CO3	Develop and deploy an Android application to record the current location.Android application to store and retrieve data in the SQLite database.	L3/ L5	PO3, PO4, PSO1, PSO2



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Department	Semester	Course
Computer Science	IV	Theory of Computation

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Demonstrate the ability to process strings through tokenization, regular expressions, derivation sequences, and state machines, thus providing practical understanding and application of formal language and automata theory.	L2/L3	PO1 PSO1
CO2	Design and implement finite state machines and string processing algorithms, thereby enhancing the understanding of automata theory, number theory, and string manipulation techniques.	L3 / L4	PO2, PSO2
CO3	Design and implement abstract computational models such as Pushdown Automata and Turing Machines, providing hands-on experience with theoretical concepts in automata theory and formal languages.	L3/ L4	PO2, PSO2



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Department	Semester	Course
Computer Science	IV	Software Engineering – Practical

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	State the project problem statement and explain requirement analysis and develop Software Requirement Specification Sheet, classify and draw diagram for Data Flow Diagram (DFD), Use case diagram, Class diagram, object diagram, State-chart diagram, Activity diagram, Sequence diagram, Collaboration diagram, Component diagram, Deployment diagram	L1/L2/L3/L4	PO1 PO2 PSO1 PSO2
CO2	Discuss and explain Estimation of effort using FP Estimation, Prepare timeline chart/Gantt Chart/PERT Chart.	L2/L3	PO1 PO2 PSO1 PSO2
CO3	Implement and identify test cases for various software testing.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	IV	Computer Networks

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand and Configure basic network setups using both static and dynamic IP addressing and verify network connectivity using Packet Tracer, network management and troubleshooting.	L2/L3	PO1 PSO1
CO2	Configure and manage networks with various routing protocols (RIPv1, RIPv2, OSPF, and BGP) using Packet Tracer. Enhance skills in network design, implementation, and troubleshooting.	L3 / L4	PO2, PSO2
CO3	Create a wireless network in Packet Tracer and using Wireshark to analyze network traffic, gain practical skills in wireless network configuration and protocol analysis.	L3/ L4	PO2, PSO2



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Department	Semester	Course
Computer Science	IV	Practical IoT Technology

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand and explain the fundamental concepts of IoT, including architecture, protocols, and applications.	L2	PO1 PSO1
CO2	Demonstrate practical skills in setting up IoT devices and integrating sensors and actuators. Evaluate the security aspects of IoT systems and propose improvements based on real-world scenarios.	L3 / L4	PO3, PO4, PSO1, PSO2
CO3	Develop and deploy basic IoT applications using appropriate communication technologies. Analyze data from IoT devices to extract meaningful insights and evaluate system performance.	L3/ L5	PO3, PO4, PSO1, PSO2



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Department	Semester	Course
Computer Science	IV	Practical Android Application Development

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand and explain the fundamental concepts of Kotlin implementation and basics of Android Application button, Edit text, Text view, checkbox, radio buttons, spinner etc	L1/L2/L3	PO1 PSO1
CO2	Demonstrate practical skills Build Android applications and propose improvements based on real-world scenarios.	L3 / L4	PO3, PO4, PSO1, PSO2
CO3	Develop and deploy Advanced Android applications using appropriate communication technologies. Analyze data from Websites to extract meaningful insights and evaluate system Application performance.	L3/ L5	PO3, PO4, PSO1, PSO2



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Department	Semester	Course
Computer Science	V	Information and Network Security

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Identify some of the factors driving the need for network security & Evaluate public -key cryptography principles. Determine cryptographic Encryption and decryption techniques and compare	L1 L2	PO1 PO2 PSO1
CO2	Recognize Digital Signature Standards and Demonstrate Authentication Application, Authentication techniques	L2, L3	PO1 PSO1 PSO2
CO3	Illustrate IP security, Electronic Mail Security identify and Classify Types of malwares	L2,L3,L4	PO1 PSO1



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Department	Semester	Course
Computer Science	V	Web Services

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	To understand the details of web services technologies like SOAP, WSDL, and UDDI.	L1/L2	PO1 PSO1
CO2	Discuss Introducing HTTP, The core architectural elements of a RESTful system, Description and discovery of RESTful web services	L2/L3	PO1 PO2 PSO2
CO3	Develop Windows Communication Foundation Architecture, WCF and .NET Framework Client Profile, Basic WCF Programming, WCF Feature Details. Web Service QoS	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	V	Software Testing and Quality Assurance

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Describe and explain various software testing methods and strategies.	L1/L2	PO1 PSO1
CO2	Discuss and execute a variety of software metrics, and identify defects and manage those defects for improvement in quality for given software.	L2/L3	PO1 PO2 PSO2
CO3	Carry out SQA activities, Identify SQA strategy and discuss formal technical review reports for software quality control assurance.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	V	Linux Server Administration

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand Linux distributions, software management, user/group administration, file systems, core system services, kernel configuration, basic network setup, Linux firewall management, and system/network security.	L1	PO1 PSO1
CO2	Configure and manage DNS, FTP, Apache, SMTP, POP, IMAP, SSH, LDAP, Samba, Kerberos, and DNS security	L2 L3	PO1 PSO1 PSO2
CO3	Configure and manage NFS, Samba, DFS, NIS, LDAP, DHCP, MySQL, LAMP, email, chat, and VPN services	L2 L3	PO1 PSO1 PSO2



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Department	Semester	Course
Computer Science	V	Game Programming

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Understand the fundamentals of vectors, transformations, and 3D graphics.	L1/L2	PO1 PSO1
CO2	Discuss Game engine architecture, Engine support systems, Resources and File systems COM, Textures and Resources Formats, The swap chain and Page flipping, Depth Buffering, Texture Resource Views	L2/L3	PO1 PO2 PSO2
CO3	Develop IDE Basics, Unity Concepts, Sprites, Game Loops and Functions Simple Rotation and Scaling, Rigidbody Components, Unity Colliders, Physics Materials	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	V	Practical Information and Network Security

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Implementing substitution cipher techniques (Caesar, Monoalphabetic, Vernam, Playfair) and transposition cipher techniques (Rail Fence, Simple Columnar) for encryption and decryption.	L3,L4	PO1 PO2 PSO2 POS3
CO2	Implementing encryption and decryption algorithms including DES, AES, RSA, and Diffie-Hellman for secure data transmission and communication.	L3,L4	PO1 PO2 PSO2 POS3
CO3	Implementing cryptographic algorithms (MD5, HMAC-SHA1, SSL) and configuring Windows Firewall for network security.	L3,L4	PO1 PO2 PSO2 POS3



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Department	Semester	Course
Computer Science	V	Practical Web Services

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Develop a program to create a simple web service that converts the temperature from Fahrenheit to Celsius and vice versa. implement the operation can receive a request and will return a response in two ways.program to implement business UDDI Registry entry.	L3/L4	PO1 PO2 PSO1 PSO2
CO2	Develop a client which consumes web services developed in different platform. Write a JAX-WS web service to perform the following operations Define a web service method that returns the contents of a database in a JSON string.	L3/L4	PO1 PO2 PSO1 PSO2
CO3	Define a RESTful web service that accepts the details to be stored in a database and performs CRUD operation Implement a typical service and a typical client using WCF. Use WCF to create a basic ASP.NET Asynchronous JavaScript and XML (AJAX) service.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	V	Practical Software Testing

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Write a test suite containing a minimum 4 test cases for different formats. and test suite for any two web sites.	L3/L4	PO1 PO2 PSO1 PSO2
CO2	Install Selenium server (Selenium RC) and demonstrate it using a script in Java/PHP, test a program to login a specific web page and test a program to update 10 student records into table into Excel file	L3/L4	PO1 PO2 PSO1 PSO2
CO3	Write and test a program to provide a total number of objects present / available on the page and Load Testing using JMeter, Android Application testing using Appium Tools, Bugzilla Bug tracking tools.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	V	Practical Linux Server Administration

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Configure and manage network services on Ubuntu, enhancing the ability to implement and troubleshoot server and client settings, ensuring effective network administration and security practices	L2/L3	PO1 PSO1
CO2	Configure and manage network services such as DNS, DHCP, NFS, LDAP, and NIS, enabling effective administration and user management in local network environments on both Ubuntu and Windows client operating systems	L2/L3	PO2, PSO2
CO3	Configure and implement database servers with MySQL and phpMyAdmin for web-based administration, and in enabling file sharing between Windows and Linux systems using Samba, enhancing proficiency in database and file management	L3/ L4	PO2, PSO2



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Department	Semester	Course
Computer Science	V	Practical Game Programming

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Develop Setup DirectX 11, Window Framework and Initialize Direct3D Device.Buffers, Shaders and HLSL (Draw a triangle using Direct3D 11)Texturing (Texture the Triangle using Direct 3D 11)	L3/L4	PO1 PO2 PSO1 PSO2
CO2	Develop Lightning (Programmable Diffuse Lightning using Direct3D 11)Specular Lightning (Programmable Spot Lightning using Direct3D 11)Loading models into DirectX 11 and rendering.	L3/L4	PO1 PO2 PSO1 PSO2
CO3	Develop 2D-ufo-2D game develop and create space shooter 3D game Develop 2D Roll a ball game in unity	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	VI	Ethical Hacking

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Outline the vulnerabilities in a system or network.	L1/L2	PO1 PSO1
CO2	Analyze and critically evaluate techniques used to break into an insecure web application and identify relevant countermeasures.	L2/L3	PO1 PO2 PSO2
CO3	Critically evaluate the potential counter measures to advanced hacking techniques.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	VI	Information Retrieval

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Define History of IR, Components of IR, and Issues related to IR, Boolean retrieval, Dictionaries and tolerant retrieval..	L1/L2	PO1 PSO1
CO2	Discuss Link Analysis, hubs and authorities, Pagerank and HITS algorithms, Similarity, Hadoop & Map Reduce, Evaluation, Personalized search, Collaborative filtering.	L2/L3	PO1 PO2 PSO2
CO3	Web search overview, web structure, the user, paid placement, search engine optimization/spam, Web size measurement.	L3/L4	PO2 PSO2



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Department	Semester	Course
Computer Science	VI	Data Science

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall, Understanding Data and Data Science, Programming Proficiency, Exploratory Data Analysis, Determining Data Source Evaluation, Execution of Data Management Skills	L1, L2, L3, L4	PO1, PSO1, PO2, PSO2, PSO4
CO2	Analyze and transform data using query languages and operations, utilize software development tools for large-scale data systems, assess security and ethical considerations for data access	L3, L4, L5	PO4, PSO1, PSO4
CO3	Understand the principles of model selection and regularization techniques, Apply data transformation techniques for effective data preprocessing, Analyze and construct supervised learning models, Implement unsupervised learning techniques for data analysis	L2, L3, L4, L6	PO1, PSO1, PSO2



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Department	Semester	Course
Computer Science	VI	Cloud Computing

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Define the concept of Cloud Computing and Compare cloud computing with distributed computing. Identify the architecture and infrastructure of cloud computing ,including SaaS, PaaS LaaS,	L1 L2	PO1, PO2 PSO1
CO2	Describe the characteristics of Virtualized Environments, Virtualization using KVM	L2 L3	PO1 PSO1, PSO2
CO3	Explain the concept of OpenStack in cloud computing	L1 L2	PO1 PSO1



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Department	Semester	Course
Computer Science	VI	Wireless Sensor Networks and Mobile Communication

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Understand the unique constraints, challenges, advantages, and applications of sensor networks and their enabling technologies.	L1/L2	PO1 PSO1
CO2	Understand and analyze the fundamentals of MAC protocols, routing, and transport control protocols, including specific challenges, design issues, and strategies for Wireless Sensor Networks (WSNs).	L2	PO1 PSO2
CO3	Gain insights into the architecture, protocols, services, and security aspects of wireless communication systems, including cellular networks and satellite systems, to analyze their applications and design considerations.	L3/L4	PO1 PSO2



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Department	Semester	Course
Computer Science	VI	Practical Information Retrieval

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Develop a program to demonstrate bitwise operation. Implement Page Rank Algorithm. Implement Dynamic programming algorithm for computing the edit distance between strings s1 and s2.	L2, L3, L4, L5, L6	PO2, PO3, PO4, PO5, PO6, POS1, POS2, POS3
CO2	Write a program to Compute Similarity between two text documents. program to count the number of occurrences of each alphabetic character in the given dataset. The count for each letter should be case-insensitive. Implement a basic IR system using Lucene.	L2, L3, L4, L5, L6	PO2, PO3, PO4, PO5, PO6, POS1, POS2, POS3, PSO4
CO3	Implement a program for Pre-processing of a Text Document: stop word removal. program to implement a simple web crawler. program to parse XML text, generate Web graph and compute topic specific page rank.	L2, L3, L4, L5, L6	PO1, PO2, PO3, PO4, PO5, PO6, POS1, POS2, POS3



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Department	Semester	Course
Computer Science	VI	Practical Cloud Computing

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand and implement cloud-based infrastructure and storage services, and configure virtualization using KVM for efficient resource management and deployment.	L2,L3	PO1 PO2 PSO1 PSO3
CO2	Applying secure identity management, cloud security measures, and web feed application development for robust, efficient, and secure IT solutions	L3,L4	PO1 PO2 PSO1 PSO3
CO3	Implementing Single Sign-On, managing cloud-based user identities, and applying best practices from leading cloud service providers.	L3,L4	PO1 PO2 PSO1 PSO3



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Department	Semester	Course
Computer Science	VI	Practical Wireless Sensor Networks and Mobile Communication

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand and implement sensor network concepts, TinyOS and TOSSIM for simulation, and developing nesC applications for real-world sensor networks, design and analyze distributed systems	L2/L3	PO1 PSO1
CO2	Understand and implement routing tables, MANETs, wireless sensor networks, and MAC protocols, thereby bridging the gap between theoretical concepts and practical applications	L1 / L2/L3	PO2, PSO2
CO3	Create a wireless network in Packet Tracer and using Wireshark to analyze network traffic, gain practical skills in wireless network configuration and protocol analysis	L3/ L4	PO2, PSO2



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Department	Semester	Course
Computer Science	VI	Practical Data Science

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Develop a program to collect, curate, and manage various types of data, including unstructured data with NoSQL databases like organizing a digital library with flexible shelving.	L2, L3, L4, L5, L6	PO2, PO3, PO4, PO5, PO6, POS1, POS2, POS3
CO2	Write a program to handle large-scale data systems like MongoDB, organizing and managing vast amounts of data akin to managing a massive warehouse efficiently.	L2, L3, L4, L5, L6	PO2, PO3, PO4, PO5, PO6, POS1, POS2, POS3, PSO4
CO3	Implement algorithms like Principal Component Analysis to uncover essential patterns and insights hidden within complex datasets, like finding key themes, Mathematical foundations, Ethical and practical considerations	L2, L3, L4, L5, L6	PO1, PO2, PO3, PO4, PO5, PO6, POS1, POS2, POS3



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Department	Semester	Course
Computer Science	VI	Practical Ethical Hacking

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Outline the vulnerabilities in a system or network. Analyze and critically evaluate techniques used to break into an insecure web application and identify relevant countermeasures.	L3	PO1 PSO1
CO2	Demonstrate a critical evaluation of an advanced security topic with an independent project	L3	PO1 PO2 PSO2
CO3	Critically evaluate the potential counter measures to advanced hacking techniques. Explain computer forensic fundamentals	L4	PO2 PSO2



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Department	Semester	Course
Computer Science	V & VI	Project Implementation

After completing the course, Students will be able to:-

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Project Implementation Mastery: focusing on practical application of knowledge gained throughout their BSc in Computer Science, ensuring a hands-on understanding of concepts. Research Analysis.	L3, L4, L6	PO4
CO2	Flexibility in Project Selection, providing opportunities for creativity and exploration within the field of computer science.	L4, L6	PO2 PO6 PSO2 PSO1 PSO4
CO3	Projects will be evaluated based on emerging technologies, and real-world applicability, ensuring students develop skills that are both academically rigorous and practically relevant. Creating proper documentation.	L4, L5	PO2 PO4 PSO2 PSO3