



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. Information Technology

Program Specific Outcome

PSO1	Attain strong foundation in programming languages, databases, networks, systems development, web technologies, graphics and engineering principles
PSO2	Analyzing large datasets using data mining, machine learning, and statistical tools.
PSO3	Attain proficiency in, designing and implementation of information systems architectures, integrating technology solutions, security and integrity of data systems.
PSO4	Attain effective communication skills, teamwork, and entrepreneurial mindset



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Department	Semester	Course
Information Technology	I	Programming Principles with C

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Explain and write well-structured C programs, understanding core concepts like data types, control flow, and functions. Also gain proficiency in using tools like compilers and debuggers.	L2	PO1, PO2, PSO1, PSO2
CO2	Analyze and simplify logic and utilizing control flow structures, operators, and expressions, construct well-structured C programs that solve problems efficiently.	L4, L6	PO2, PO3, PSO1, PSO2
CO3	Understanding functions, program structure, and input/output mechanisms, students are able to decompose problems, create modular and reusable code, and interact with users effectively in your C programs.	L4 , L6	PO2, PO3, PSO1, PSO
CO4	Proficiency in C pointers and arrays unlocks powerful techniques for memory management, data manipulation, and building complex data structures. This empowers the creation of efficient solutions for diverse programming challenges.	L3, L4, L5	PO2, PO3, PSO1
CO5	C's structures, unions, and file I/O empower the creation of programs for complex data management and persistent storage.	L5, L6	PO3,PO4, PSO1, PSO2



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Department	Semester	Course
Information Technology	I	Digital Logic And Applications

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 fundamental concepts of digital logic, including binary systems,	L2	PO1, PO2, PSO1, PSO2
CO2	Analyze and simplify Boolean functions using Karnaugh maps and Boolean algebra to design efficient digital circuits. Design and implement combinational logic circuits such as adders, multiplexers, and decoders using basic logic gates.	L4, L6	PO2, PO3, PSO1, PSO2
CO3	Analyze digital logic circuits using Boolean algebra and Karnaugh maps to simplify logic expressions and designs. Design combinational and sequential logic circuits to implement specified functional requirements in various applications.	L4 , L6	PO2, PO3, PSO1, PSO
CO4	Analyze the fundamental concepts of combinational and sequential logic circuits to design and evaluate various digital systems (Analysis, Synthesis, Evaluation - Bloom's Taxonomy). Apply Boolean algebra and logic simplification techniques to implement efficient and optimized digital logic circuits	L3, L4, L5	PO2, PO3, PSO1
CO5	Evaluate combinational and sequential logic circuits to determine their functionality and performance. Design and implement digital circuits using basic logic gates and flip-flops to solve real-world problems.	L5, L6	PO3,PO4, PSO1, PSO2



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Department	Semester	Course
Information Technology	I	Fundamental of Database Management System

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Define and describe the fundamental elements of relational database management systems. Understand the basic concepts and architecture of database systems, the relational model, relational database constraints, and relational algebra operations for querying databases.	L1/L2	PO1, PSO1
CO2	Understand how to model data using ER and EER diagrams, and design relational databases based on these models, database design methods and use UML diagrams for database design.	L2/L3	PO1 PO2 PSO1, PSO3
CO3	Define the database design by normalizing the Fundamentals of organizing data efficiently in relational databases through normalization, ensuring data integrity and minimizing redundancy, leading well-structured and optimized databases.	L1	PO1, PSO1, PSO3
CO4	Transform the ER-model to relational tables, populate relational database and formulate SQL queries on data. Create SQL for query and modifying databases, including complex queries, triggers, and views. Analyze efficient query processing and optimization techniques like indexing for faster data retrieval.	L6	PO1, PO2, PSO1, PSO3
CO5	Define and apply multiple transactions simultaneously, ensuring data consistency through concurrency control methods, and learn about recovery techniques to restore data integrity after system failures.	L1/L3	PO2, PSO1, PSO3



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Department	Semester	Course
Information Technology	I	Computational Logic and Discrete Structure

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall logical proofs of set theory and and solve recurrence relations	L1/L3	PO1 PO2 PSO2
CO2	Identify functions and algorithms, including their classifications and mathematical representations. Also, I will gain knowledge in probability theory.	L1/L2	PO1 PO2 PSO2
CO3	Define and apply various techniques for counting, including permutations and combinations as well as advanced methods - recursion and recurrence relations	L1/L3	PO1 PO2 PSO2
CO4	Understand the fundamentals of graph theory, including different types of graphs and their properties. They will be able to analyze and solve problems related to connectivity, paths, and graph algorithms	L2/L3	PO1 PO2 PSO2
CO5	Define and analyze data through binary trees, ordered sets, and lattices.	L1/L3	PO1 PO2 PSO2



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Department	Semester	Course
Information Technology	I	Technical communication skills

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 of technical communication, Explain the significance of language, identify barriers of communication, Utilize knowledge of communication networks, Evaluate the impact of noise and barriers on communication, Develop solutions to enhance non-verbal communication	L1, L2, L3, L5, L6	PO1, PSO1, PO3, PSO4, PSO3
CO2	Recall and list the Seven Cs of Effective Communication, Explain the significance of conversations, Apply the principles of the Seven Cs, Evaluate meeting processes and techniques, Develop strategies for planning and leading effective communications	L1, L2, L3, L5, L6	PO1, PSO1, PO3, PSO4, PSO3, PO5, PO6
CO3	Recall the types of listening and traits of good listeners, Comprehend effective presentation strategies, Apply knowledge of interview objectives and types, Evaluate the effectiveness of presentation strategies in listening, Develop presentation outlines and delivery techniques tailored.	L1, L2, L3, L5, L6	PO1, PSO1, PO3, PSO3, PO2, PO5, PO6, PSO4
CO4	Recall the importance of written business communication, Understand the structure and components of business correspondence, Apply and Understand the steps involved in writing business reports, Analyze different resume formats, Creating effective business messages, reports, and resumes.	L1, L2, L4, L6	PO3, PO4, PSO4
CO5	Recall the principles of ethical communication, Understand the significance of financial communication and MIS, Apply knowledge of ethical communication principles, Analyze the effectiveness of visual aids, Create and utilize various types of visual aidS	L1, L2, L3, L4, L6	PO1, PO2, PO3, PO4, PO6



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Department	Semester	Course
Information Technology	I	Programming With C- Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Write and Implement the code in C Programs for calculating areas, finding factorials, and manipulating numbers.	L1/L3	PO2 PSO2
CO2	Write and Implement the code in C Program for checking character types (vowel/consonant), determine weekdays, find maximum values, and generate various patterns using loops and switch statements.	L1/L3	PO2 PSO2
CO3	Write and Implement the code in C functions, arrays, and strings in this course empowers building versatile programs for calculations, data organization, string manipulation, and control flow.	L1/L3	PO2 PSO2
CO4	Write and Implement the code in C's pointers, file I/O, structures, and project-based learning empowers building applications for data manipulation, memory management, data persistence, and real-world problem solving.	L1/L3	PO2 PSO2



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Department	Semester	Course
Information Technology	I	Digital Logic And Applications- Practicals

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 fundamental concepts of digital logic, including binary systems, Boolean algebra, and logic gates.	L2	PO1, PSO1
CO2	Apply Boolean algebra and Karnaugh maps to simplify digital logic circuits.	L3	PO2, PSO1
CO3	Design and implement combinational circuits such as adders, multiplexers, and decoders using basic logic gates.	L6	PO3, PSO2
CO4	Analyze and test the functionality of digital circuits through simulation and practical experiments.	L4	PO4, PSO1
CO5	Evaluate and troubleshoot combinational and sequential circuits to improve performance and reliability.	L5	PO4, PSO1



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Department	Semester	Course
Information Technology	I	Fundamental of Database Management 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. Defining and manipulating data	L1,L4, L6	PO1, PO2, PSO1, PSO2
CO2	Creating and manipulating tables and restricting and sorting data using SQL	L6,L2, L3	PO1, PO2, PO3, PSO1, PSO2
CO3	Aggregate and mathematical functions 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
Information Technology	I	Computational Logic and Discrete Structure- Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Write and Implement the code in Scilab Programs for Set theory and Functions	L1/L3	PO2 PSO2
CO2	Write and Implement the code in Scilab Program for probabilities for Sample space events, Finite probability space	L1/L3	PO2 PSO2
CO3	Write and Implement the code in Scilab Program for Counting Principles	L1/L3	PO2 PSO2
CO4	Write and Implement the code in Scilab Program for drawing the Graphs by using Graph theory. Also, for solving recurrence relations.	L1/L3	PO2 PSO2



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Department	Semester	Course
Information Technology	I	Technical communication skills (Practical)

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall and apply various word processing tools like spell checker, headers, and footers, while also utilizing templates to design brochures and flyers in Microsoft Word.	L1, L2, L3	PSO1, PSO3, PO1, PO2, PO3
CO2	Understand the formats and requirements for writing different types of documents such as reports, meeting minutes, and action plans.	L1, L2, L3	PO3
CO3	Apply spreadsheet software for interpreting and analyzing data, including basic what-if analysis in Excel.	L3 L4, L5, L6	PSO2, PSO3, PSO4, PO2, PO4
CO4	Analyze data and create visual representations using charts like pie charts, line charts, and bar charts in Excel, enhancing their ability to present data effectively.	L4, L6	PO2, PO4
CO5	Use pivot tables and charts in Excel to summarize and present data concisely, improving their data analysis and presentation skills.	L3, L4, L6	PSO3



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Department	Semester	Course
Information Technology	II	Object Oriented programming with C++

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand the basics of object-oriented design, including concepts like classes, objects, polymorphism, and inheritance, and how these fit into software development. Define C++ syntax, data types, operators, and control structures, enabling them to write and understand basic C++ programs.	L1/L2	PO1 PSO1
CO2	Defining and using functions in C++, including recursion and function overloading, and understanding how to work with classes, objects, constructors, destructors, and operator overloading, manipulate objects and use various methods to enhance program functionality.	L1/L3	PO1, PO2, PSO2
CO3	Design & implement various forms of inheritance in C++ including public, private, and protected inheritance, String class, calling base class constructors. Define pointers with objects and virtual functions for dynamic behavior. input-output stream classes and formatting techniques for data display.	L6	PO1, PSO2
CO4	Compile and Manipulate file operations in C++, including opening, closing, and accessing files, and error handling, template programming for generic functions and classes, as well as implement exception handling mechanisms to manage runtime errors.	L3/L6	PO1, PSO1, PSO2
CO5	Analyze and explore various Stream classes, I/O operations and usage of the Standard Template Library (STL) in C++, including containers, algorithms, and iterators, manipulate string objects. Define ANSI C++ standard, such as new data types, operators, and keywords.	L4	PO1, PO2, PSO1



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Department	Semester	Course
Information Technology	II	Fundamentals Of Microprocessor And Microcontroller

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall the basic architecture and operation of microprocessors. Understand the function and purpose of microprocessor components and their interconnections.	L1, L2	PO1, PO2, PSO1, PSO3
CO2	Develop assembly language programs for the 8085 microprocessor. Analyze differences between various addressing modes and instruction sets of the 8085 microprocessor.	L6, L4	PO1, PO2, PSO1, PSO2
CO3	Implement basic interfacing techniques with peripherals using the 8085 microprocessor. Design simple I/O programs to control external devices using the 8085.	L3, L6	PO1, PO2, PO3, PSO1, PSO2
CO4	Identify the key features and architecture of microcontrollers. Compare microcontrollers with microprocessors in terms of functionality and applications.	L4, L5	PO1, PO3, PO4, PSO1, PSO2
CO5	Write assembly and C programs for the 8051 microcontroller. Assess the performance of 8051-based systems through program testing and debugging.	L6, L5	PO3, PO4, PSO1, PSO2



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Department	Semester	Course
Information Technology	II	Web Application Development

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	State and various concepts of Internet and Ecommerce, Internet Protocols-like FTP, HTTP, DNS etc. Introduction of HTML5-Basic Tags of HTML Introduction of CSS	L1,L2	PO1 PSO1 PSO2
CO2	Understanding of HTML page layout, Media, Tables and Different HTML Forms.	L2	PO1 PO2 PSO2
CO3	Classify various Concept of different syntax of javascript .Understanding the concept of Operators, different types of Statements, Objects and Events Handler with the programs as example	L2,L3	PO1 PO2 PSO2
CO4	Understanding the PHP data types, forms, its validation, Errors	L3,L4	PO1 PO2 PSO2
CO5	Understanding the concept of cookies and session. PHP and MYSQL.connection between them.	L3,L5	PO1 PO2 PSO2



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Department	Semester	Course
Information Technology	II	Numerical Methods

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Identify and analyze models, manage approximations and round-off errors, and understand the impact of truncation errors	L1/L3	PO1 PO2 PSO2
CO2	Identify and solve equations using Bisection, Newton-Raphson, Regula-Falsi, and Secant methods, and interpolation using Interpolation method	L1/L3	PO1 PO2 PSO2
CO3	Identify and solve linear equations with Gauss-Jordan and Gauss-Seidel methods, and numerical differentiation and integration using Trapezoidal, Simpson's rules	L1/L3	PO1 PO2 PSO2
CO4	Solve differential equations using Taylor series, Euler's Method, Modified Euler's Method, and Runge-Kutta Method, as well as least-squares regression including linear, polynomial, multiple linear, general linear, and nonlinear regression	L1/L3	PO1 PO2 PSO2
CO5	Formulating and solving LPP and solving for maximization and minimization.alongside numerical methods for solving partial differential equations	L1/L3	PO1 PO2 PSO2



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Department	Semester	Course
Information Technology	II	Green IT

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall the key environmental issues related to IT, Understand the regulations governing Green IT, Apply knowledge of Green IT concepts to analyze and propose solutions, Analyze the implications of regulations and standards on IT.	L1, L2, L3, L4, L6	PO1, PO2, PO3, PSO1, PSO2, PSO4, PSO3
CO2	Recall the challenges associated with power usage in IT, Understand the importance of minimizing power usage in IT, calculate and reduce cooling costs, Apply knowledge of power-saving techniques,	L1, L2, L3, L4, L6	PO2, PO1, PO6, PSO2, PSO3, PSO1
CO3	Recall the concept of greening IT and understand its application, Understand the need for changing work behaviors to promote sustainability, Apply strategies for transitioning to a paperless environment.	L1, L2, L3, L4, L6	PO1, PO2, PO5, PO6, PSO1, PSO3, PSO4
CO4	Recall methods of disposal and recycling for IT, Understand the importance of certifications like EPEAT and RoHS, Apply knowledge of recycling methods and procurement, Analyze the pros and cons of various recycling methods, Create guidelines for selecting recycling companies, and promote sustainable practices in IT operations.	L1, L2, L3, L4, L5, L6	PO1, PO2, PO5, PO6, PSO1, PSO3, PSO4
CO5	Recall methods for greening information systems, Understand the importance of organizational check-ups, Apply techniques for improving technology infrastructure	L1, L2, L3, L5, L6	PO1, PSO1, PO2, PO5, PO6, PSO2, PSO3



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Department	Semester	Course
Information Technology	II	Object Oriented Programming with 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 PSO1
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 PSO1,
CO3	Create and understand application of advanced C++ features including friend functions, inline functions, this pointer, function overloading, function overriding, pointers, and file handling.	L2,L6	PO1, PO2 PSO1



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Department	Semester	Course
Information Technology	II	Fundamentals Of Microprocessor And Microcontroller - Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Write and execute the program to store the data in memory location. Exchange the contents of memory location	L1, L2, L3	PO2, PSO2
CO2	Write and execute programs for addition, subtraction of data in different memory location	L1, L2	PO2 PO4 PSO2
CO3	Write and execute programs for BCD numbers	L1, L2	PO4 PSO2



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Department	Semester	Course
Information Technology	II	Web Application Development- Practicals

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Write and execute the HTML program to print different output on browsers with different HTML tags. With CSS formatting.	L1 L3	PO2 PSO2
CO2	Write and execute the Javascript program with the use of different conditional statement, loops, events and object	L1 L2 L3	PO2 PO4 PSO2
CO3	Write and execute the PHP programs with the use of different conditional statement, loops, forms with the Method POST and GET. Connection between PHP and MYSQL	L4	PO4 PSO2



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Department	Semester	Course
Information Technology	II	Numerical Methods - Practicals

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Write and execute code in Scilab for finding roots of a quadratic equation using the formula and solution of algebraic and transcendental equations	L1/L3	PO2 PSO2
CO2	Write and execute code in Scilab for Interpolation and solving linear system of equations by iterative methods	L1/L3	PO2 PSO2
CO3	Write and execute code in Scilab for Numerical Differentiation, Integration and Differential equation	L1/L3	PO2 PSO2
CO4	Write and execute code in Scilab for Regression and Numerical solution of partial differential equations	L1/L3	PO2 PSO2



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Department	Semester	Course
Information Technology	II	Practical - Green IT (PL/SQL)

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 basics of PL/SQL, including the use of variables, writing executable statements, and interacting with Oracle Server	L1, L2	PSO1, PSO2
CO2	Apply control structures in PL/SQL, such as while loops, do loops, for loops, and conditional statements, to analyze and solve problems efficiently.	L3, L4, L6	PSO1, PSO3, PO2
CO3	Create sequences, cursors (implicit, explicit, and parameterized), procedures, functions, triggers, and packages in PL/SQL, demonstrating their ability to develop solutions using database programming techniques.	L4, L5, L6	PO1, PO2, PSO1, PSO4
CO4	Analyze and evaluate different types of exceptions handling mechanisms, including creation of both user-defined and system-defined exceptions, ensuring robustness and reliability in database operations.	L4, L5	PO1 , PO2



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Department	Semester	Course
Information Technology	III	Python Programming

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Introduction: The Python Programming Language, History, features, Installing Python, Running Python program, Debugging Looping: for, while, nested loops Control statements: Terminating loops, skipping specific conditions.	L1,L2	PO1, PSO1
CO2	Understanding of Functions: Function Calls, Type Conversion Functions, Math Functions, Composition, Adding New Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments	L2,L3,L4	PO1, PO2 PSO1, PSO2
CO3	Classify Lists: Values and Accessing Elements, Lists are mutable, traversing a List, Deleting elements from List, Tuple and dictionary	L3,L4	PO1 PSO1
CO4	Understanding the Regular Expressions – Concept of regular expression, various types of regular expressions, using match function. Classes and Objects: Overview of OOP (Object Oriented Programming), Class Definition, Creating Objects	L2	PO1 PSO1, POS2
CO5	Understanding the Creating the GUI Form and Adding Widgets: Widgets: Button, Canvas, Checkbutton, Entry, Frame, Label, Listbox, Menubutton, Menu Storing Data in Our MySQL Database via Our GUI : Connecting to a MySQL database from Python, Configuring the MySQL connection	L2,L3	PO1 PSO1



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Information Technology	III	Computer Networking

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Study the different aspects of networks. Explain types of addresses ,OSI model. Classify various wired transmission media for data communication networks	L1,L2	PO1, PSO1
CO2	Compare the characteristics of analog and digital signals on the given parameter. Analyze the concepts of networking models , functionality of each layer	L2,L3,L4	PO1, PO2 PSO1, PSO2
CO3	Classify various wired transmission media for data communication networks	L3,L4	PO1 PSO1
CO4	Understanding the transition from Ipv4 to Ipv6. Interpret routing Algorithms.	L2	PO1, PO2 PSO1, POS2
CO5	Understanding the concept of wireless networking. Functionality of its application	L2,L3	PO1 PSO1



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Information Technology	III	Database Management Systems

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understanding database system, purpose of database system, view of data, relational databases, database architecture, transaction management	L1,L2	PO1 PSO1
CO2	Define Logical view of data, keys, integrity rules, Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF)	L2	PO1 PO2 PSO2
CO3	Classify Constraints, types of constraints, Integrity constraints, Views: Introduction to views, data independence, security, updates on views, comparison between tables and views SQL	L2,L4	PO2 PSO2
CO4	Concept of Control Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control	L3	PO1 PSO2
CO5	Apply beginning with PL / SQL, Identifiers and Keywords, Operators, Expressions, Sequences, Control Structures, Cursors and Transaction, Collections and composite data types, Procedures and Functions,	L2, L3	PO2 PSO2



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

Department	Semester	Course
Information Technology	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	Study the different data structures .Classify various data structures.Introduction of an array.Types of an array.	L1,L2	PO1, PSO1
CO2	Understanding of Linked list Data Structures with its type and different operation on Linked List.	L2,L3,L4	PO1, PO2 PSO1, PSO2
CO3	Classify various linear data structure like Stack and Queue.Different operation on stack and queue.Difference between them.Use of stack	L3,L4	PO1 PSO1
CO4	Understanding the different Sorting Algorithms with its example.Understanding the heap data structure.	L2	PO1 PSO1, POS2
CO5	Understanding the non-linear data structure like tree and graph with its terminology and its operation.	L2,L3	PO1 PSO1



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

Department	Semester	Course
Information Technology	III	Applied Mathematics

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understand matrix operations, complex numbers and hyperbolic functions applied to solve linear equations and analyze vector relationships. electrical circuits, complex analysis etc	L1/L2/L3	PO1 PO2 PSO1
CO2	Solve first-order, higher degrees and linear differential equations with constant coefficients, and differential operators, apply to electrical circuits and complex engineering problems.	L3	PO1 PO2 PSO1
CO3	understand the Laplace Transform technique, to solve complex ordinary differential equations, apply theorems and properties of Laplace Transformation, to analyze dynamic systems and signal processing problems.	L2/L3/L4	PO1 PO2 PSO1
CO4	understand and apply multiple integrals, changing the order of integration and polar coordinates to calculate areas, volumes, and solve diverse engineering problems	L2/L3	PO1 PO2 PSO1
CO5	Understand Beta and Gamma functions, differentiation under the integral sign error functions and solve complex problems and analyze various mathematical phenomena.	L2/L3	PO1 PO2 PSO1



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

Department	Semester	Course
Information Technology	III	Python Programming - Practicals

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Write and execute the Create a program that asks the user to enter their name and their age Write a program to generate the Fibonacci series.	L1 L3	PO2 PSO2
CO2	Write and execute Write a function that takes a character (i.e. a string of length 1) and returns True if it is a vowel, False otherwise. Define a function that computes the length of a given list or string.	L1 L2 L3	PO2 PO4 PSO2
CO3	Write and execute Write a Python script to sort (ascending and descending) a dictionary by value a Python program to read an entire text file. Design a class that store the information of students and display the same program to implement exception handling.	L4	PO4 PSO2



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

Department	Semester	Course
Information Technology	III	Computer Networking Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Proficiency in crimping LAN cables with adherence to color codes, along with configuring and troubleshooting LAN setups including IP network planning, subnetting, basic network command usage, TCP/IP protocol configuration, and file/printer sharing implementation.	L2,L3,L4	PO1, PO2 PSO1, PSO2
CO2	Mastery in IPv4 addressing, subnetting, and configuring network topologies including IP static routing, RIP, and OSPF configurations.	L2,L3,L4	PO1, PO2 PSO1, PSO2
CO3	Proficiency in configuring server-client interactions by setting up DHCP, DNS, HTTP, Telnet, and FTP services, along with implementing basic security features for networks.	L2,L3,L4	PO1, PO2 PSO1, PSO2
CO4	Ability to capture and analyze packets using Wireshark, including TCP, UDP, and IP headers, and proficiency in planning and designing corporate networks tailored to specific scenarios.	L2,L3,L4	PO1, PO2 PSO1, PSO2



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

Department	Semester	Course
Information Technology	III	Database Management System - Practicals

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	SQL Statements – 1 a. Writing Basic SQL SELECT Statements b. Restricting and Sorting Data SQL Statements – 2 a. Displaying Data from Multiple Tables	L1 L3	PO2 PSO2
CO2	Manipulating Data a. Using INSERT statement b. Using DELETE statement c. Using UPDATE statement Creating and Managing Tables a. Creating and Managing Tables	L1 L2 L3	PO2 PO4 PSO2
CO3	Creating and Managing other database objects a. Creating Views Using SET operators, Date/Time Functions, GROUP BY clause (advanced features) and advanced subqueries	L4	PO4 PSO2



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

Department	Semester	Course
Information Technology	III	Data Structure - Practicals

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Write and execute the various operations on Array data structure like addition of two matrices , multiplication of two matrix-Menu Driven,Linkedlist Data Structure its type and its operation insertion,deletion,searching ,display and merge etc.	L1 L3	PO2 PSO2
CO2	Write and execute stack and Queue program example of recursion-factorial,.discuss the operation on searching and sorting algorithms bubble, selection sort, and insertion sort and merge sort and Quicksort	L1 L2 L3	PO2 PO4 PSO2
CO3	Write and execute searching program –linear and Binary ,heap sort ,collision technique and adjacency of graph	L4	PO4 PSO2



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

Department	Semester	Course
Information Technology	III	Mobile 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	Understand the syntax of Dart language for building mobile apps. Create interactive elements like buttons, text fields, or images that users can interact with. Arrange widgets in various layouts like rows, columns, grids, or stacks to structure	L2/L3/L4	PO1 PO2 PSO1 PSO2
CO2	Integrate interaction tapping, swiping, or dragging to enable users to interact with the app through intuitive gestures. Apply themes and styles to customize the appearance of the mobile app	L3	PO1 PO2 PSO1 PSO2
CO3	Integrate animations to add visual effects and enhance user experience Utilize SQLite, store and retrieve data locally within the mobile app.	L3/L4	PO1 PO2 PSO1 PSO2
CO4	Integrate Firebase, a backend platform, to enable features like real-time data synchronization, authentication, and cloud storage within the mobile app	L4	PO1 PO2 PSO1 PSO2



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

Department	Semester	Course
Information Technology	IV	Software Engineering

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall software, Understand the fundamentals of software engineering, Learn about different types of software requirements, Explore various software development process models	L1, L2, L4	PSO1
CO2	Understand socio-technical systems, Learn about critical systems, their types, and aspects, Explore the Requirements Engineering process	L2, L3	PSO1, PO1
CO3	Understand Architectural software Design and its process, Learn about User Interface Design, Explore Project Management concepts in Software Engineering, Delve into Quality Management aspects	L2, L3	PSO1, PO1, PSO2
CO4	Understand Verification and Validation processes, Learn about Software Testing techniques, Explore Software Measurement methods, Delve into Software Cost Estimation, estimation techniques, algorithmic cost model	L2	PSO1, PO1
CO5	Understand Process Improvement in software engineering, Learn about Service Oriented Software Engineering, Explore Software Reuse, Delve into Distributed Software Engineering	L2, L3	PSO1, PO1



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

Department	Semester	Course
Information Technology	IV	Introduction to embedded system

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 embedded systems, and demonstrate comprehension of fundamental concepts through practical application and problem-solving.	L4	PO2, PO3, PSO1
CO2	Students will apply knowledge of embedded systems, demonstrating analysis and synthesis skills through practical projects.	L3,L4	PO1, PO2, PSO1, PSO2
CO3	Analyze and evaluate the functionality of embedded systems through practical design projects, demonstrating proficiency in applying critical thinking skills	L4, L5	PO2, PO3, PSO2
CO4	Design and implement embedded systems using advanced programming techniques, demonstrating synthesis and evaluation skills in solving real-world problems.	L3, L5, L6	PO3, PO4, PSO1, PSO2
CO5	Analyze the hardware and software components of embedded systems to understand their integration and functionality. Develop efficient embedded system programs by applying suitable design techniques and programming skills	L3, L4	PO1, PO3, PSO1



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

Department	Semester	Course
Information Technology	IV	Computer Oriented Statistical Methods

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Analyze data using measures of central tendency and dispersion, understand data distribution and variability.	L2/L4	PO1 PO2 PSO2
CO2	Implementation of statistical techniques, probability theory, probability distributions, sampling theory, to interpret data distribution, analyze uncertainty and standard errors	L3/L4	PO1 PO2 PSO2
CO3	Understand statistical estimation theory, hypothesis testing and significance testing, apply to estimate population parameters to analyze data and draw conclusions.	L2/L3/L4	PO1 PO2 PSO2
CO4	Understand small sampling theory, Student's t distribution and Chi-square distribution, apply Chi-square tests for goodness of fit and contingency tables analysis small sample data and categorical data.	L2/L3/L4	PO1 PO2 PSO2
CO5	Analyze relationships between variables through curve fitting and correlation theory, apply to model and predict data trends effectively.	L3/L4	PO1 PO2 PSO2



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

Department	Semester	Course
Information Technology	IV	Core Java

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Introduction: History, architecture and its components, Java Class File, Java Runtime Environment Data types: primitive data types, Object Reference Types, Strings, Auto boxing, operators and properties of operators	L1/L2/L3	PO1 PO2 PSO1
CO2	Control Flow Statements: The If...Else If...Else Statement, The Switch...Case Statement Iterations: The While Loop, The Do ... While Loop, The For Loop	L3	PO1 PO2 PSO1
CO3	Classify Inheritance: Derived Class Objects, Inheritance and Access Control, Default Base Class Constructors, this and super keywords Packages: Creating Packages, Default Package, Importing Packages, Using A Package.	L2/L3/L4	PO1 PO2 PSO1
CO4	Understanding Enumerations, Arrays: Two Dimensional Arrays, Multi-Dimensional Arrays, Multithreading: the thread control methods, thread life cycle, the main thread, creating a thread, extending the thread class. Exceptions: Catching Java Exceptions	L2/L3	PO1 PO2 PSO1
CO5	Understanding Event Handling: Delegation Event Model, Events, Event classes, Event listener interfaces, Using delegation event model, adapter classes and inner classes. Abstract Window Toolkit: Window Fundamentals, Component, Container, Panel, Window, Frame, Canvas. Layouts: Flow Layout, Grid Layout, Border Layout, Card Layout.	L2/L3	PO1 PO2 PSO1



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Affiliated to University of Mumbai

Department	Semester	Course
Information Technology	IV	Computer Graphics

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Study the different types of graphics active and passive devices.CRT,LCD,LED Raster Scan Basics, Video Basics, The Video Controller, Random-Scan Display Processor,Digital Differential Analyzer (DDA) algorithm, Bresenham's Line ,circle, Midpoint circle, Ellipse Algorithm	L1/L2/L3	PO1 PO2 PSO1
CO2	2D Transformations, Homogeneous Coordinates and Matrix Representation ,2D Transformations, Three-Dimensional Scaling, al Shearing, Rotation, Reflection	L3	PO1 PO2 PSO1
CO3	Classify various Stages in 3D viewing, Canonical View Volume (CVV), Specifying an Arbitrary 3D View, Examples of 3D Viewing Radiometry, Transport, Equation, Photometry, Colorimetry, Color Spaces, Chromatic	L2/L3/L4	PO1 PO2 PSO1
CO4	Understanding Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting), Area subdivision method, BSP trees, Curve Representation, Nonparametric Curves, Parametric Curves, Bezier Curves	L2/L3	PO1 PO2 PSO1
CO5	Understanding Principles of Animation, Deformations, What is an Image? Digital image file formats, Image compression standard – JPEG, Image Processing	L2/L3	PO1 PO2 PSO1



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

Department	Semester	Course
Information Technology	IV	Software Engineering- Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Recall and identify the components and relationships within class diagrams.	L1	PO1, PSO1, PSO3
CO2	Comprehend the functionalities and interactions depicted in Use Case Diagrams, understanding how different parts of a system work together to achieve certain goals.	L2	PSO1, PO1
CO3	Implementing Entity Relationship Diagrams, used to apply knowledge to represent real-world data relationships effectively.	L2, L3, L4, L6	PO1, PO2, PO3, PSO1, PSO3
CO4	Analyze the flow of interactions between different components or objects in a system, identifying patterns and dependencies.	L4	PSO3, PO2
CO5	Create representations of how software components are deployed across various hardware nodes or environments through Deployment Diagrams.	L3, L4	PO1, PO2, PO3, PO4, PSO1, PSO3



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

Department	Semester	Course
Information Technology	IV	Introduction to embedded system - Practicals

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Explain the basic components and architecture of embedded systems..	L2	PO1, PSO1
CO2	Demonstrate practical skills in programming and interfacing embedded systems..	L3	PO3, PSO2
CO3	Analyze the performance and functionality of embedded systems through practical projects.	L4	PO4, PSO1
CO4	Design and implement embedded system applications for specific tasks.	L6	PO3, PSO2
CO5	Evaluate the integration and efficiency of hardware and software components in embedded systems.	L5	PO4, PSO1



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Affiliated to University of Mumbai

Department	Semester	Course
Information Technology	IV	Computer Oriented Statistical Techniques - Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Describe commands in R language and apply mathematical and statistical operations using R	L1/L3	PO2 PSO2
CO2	Import data from excel to work as per requirement and will be able to understand the use of a R-tool in doing statistical analysis.	L1/L2/L3	PO2 PO4 PSO2
CO3	Analyze data and draw judgements and decisions.	L4	PO4 PSO2



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Affiliated to University of Mumbai

Department	Semester	Course
Information Technology	IV	Core Java Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Implement various object-oriented programming (OOP) concepts in Java including constructors, method overloading, static methods, inheritance, method overriding, abstract classes, methods, and interfaces.	L2, L3	PO2 PSO2
CO2	Develop Java programs showcasing exception handling techniques, including raising built-in and user-defined exceptions, and demonstrate multithreading concepts through a Java application	L2,L3	PO2 PSO1
CO3	Create JDBC programs in Java to interact with databases, including displaying table data in a GUI application.	L2,L3,L4	PO2 PSO2
CO4	Develop Swing applications in Java showcasing dynamic color changes on button click and writing programs demonstrating various layouts including as well as events	L2,L3	PO2 PSO1
CO5	Illustrate event handling in Java by demonstrating the use of Adapter Class and Anonymous Inner Class techniques.	L3	PO2 PSO1



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

Department	Semester	Course
Information Technology	IV	Computer Graphics Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Write and execute the program to basic functions used for graphics like shapes circle, square, triangle, Eclipse, Line Rectangle etc. Draw a coordinate axis at the center of the screen.	L1, L2	PO1, PO2 PSO2, PSO3
CO2	Write and execute the program Divide your screen into four regions, draw circle, rectangle, ellipse, and half ellipse. in each region with appropriate messages. Draw a simple hut on the screen.	L1, L2	PO1, PO2 PSO2, PSO3
CO3	Write and execute the program Develop the program for DDA Line drawing algorithm. Develop the program for Bresenham's Line and Midpoint drawing algorithm.	L3, L4	PO2 PSO2, PSO3
CO4	Write and execute a program to implement 2D scaling, translation and Rotation on a given object. Cohen-Sutherland clipping. Liang - Barsky Line Clipping Algorithm	L3, L4	PO1, PO2 PSO2 , PSO3
CO5	Write and execute the program to fill a circle using Flood Fill Algorithm and boundary Fill Algorithm.	L3,L4,/15	PO1, PO2 PSO2, PSO3



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

Department	Semester	Course
Information Technology	V	Software Project Management

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Explains and applies software project management principles for effective project planning, execution, and evaluation. Master key steps like scope definition, resource control, and risk assessment to drive successful software development.	L1,L2	PO1, PO2 PSO1, PSO2
CO2	Explain the Software project approaches (Waterfall, Agile) and estimation techniques (function points, COCOMO) for effective project planning, scope management, and cost control.	L1,L2,L3	PO1, PO2 PSO1
CO3	Apply principles of software project management for efficient planning. Master scheduling, risk mitigation and resource allocation for successful project delivery.	L3,L4,L5	PO2 PSO2, PSO3
CO4	Analyzing software project management principles, this course equips you to monitor and control projects (earned value analysis), manage contracts effectively, and lead teams using best practices in software development.	L3,L4	PO1 PSO2 , PSO3
CO5	Analyzing project dynamics, this course equips teams with effective communication, software quality control (models, metrics, testing), and project closure best practices for successful software development delivery. Master teamwork skills and ensure a smooth project finish.	L3,L4	PO1, PO2, PSO2, PSO3



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

Department	Semester	Course
Information Technology	VI	Internet Of Things

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Explain the fundamental concepts of IoT, including its architecture, protocols, and applications, demonstrating a comprehensive understanding of how IoT systems integrate with real-world scenarios. Apply knowledge of IoT principles to design and simulate basic IoT systems, showcasing the ability to implement and analyze IoT solutions for various practical applications.	L2, L3	PO1, PO3, PSO1
CO2	Explain the architecture and core components of IoT systems, including sensors, actuators, and communication protocols, demonstrating a clear understanding of their functions and interactions	L2	PO1, PO3, PSO2
CO3	Apply principles of IoT architecture and protocols to design and develop IoT systems for real-world applications. Evaluate the performance, scalability, and security aspects of IoT solutions using advanced analytical techniques and tools.	L3/ L5	PO3, PO4, PSO1
CO4	Analyze various security threats and privacy concerns associated with IoT systems, and evaluate strategies to mitigate these risks. Design and implement secure IoT applications by integrating appropriate security protocols and privacy measures.	L4, L5	PO3, PO4, PSO1, PSO2
CO5	Apply principles of IoT to develop and deploy basic IoT systems, integrating sensors, actuators, and communication technologies. Evaluate the performance and security aspects of IoT solutions, proposing improvements based on analysis of real-world use cases.	L3	PO3, PO4, PSO1, PSO2



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

Department	Semester	Course
Information Technology	V	Advanced Web Programming

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understanding Introducing .NET: The .NET Framework, C#, VB, and the .NET Languages	L1,L2	PO1, PO2 PSO1, PSO2
CO2	Understand Web Form Fundamentals: Writing Code, Using the Code-Behind Class, Adding Event Handlers, Understanding the Anatomy of an ASP.NET Application, Introducing Server Controls, Using the Page Class, Using Application Events, Configuring an ASP.NET Application	L1,L2,L3	PO1, PO2 PSO1
CO3	Define Error Handling, Logging, and Tracing: Avoiding Common Errors, Understanding Exception Handling, Handling Exceptions, Throwing Your Own Exceptions, Using Page Tracing State Management: Understanding the Problem of State, Using View State, Transferring Information Between Pages	L3,L4,L5	PO2 PSO2, PSO3
CO4	Understanding ADO.NET Fundamentals: Understanding Databases, Configuring Your Database, Understanding SQL Basics, Understanding the Data Provider Model, Using Direct Data Access, Using Disconnected Data Access. Data Binding: Introducing Data Binding, Using Single-Value Data Binding	L3,L4	PO1 PSO2 , PSO3
CO5	Understanding XML: XML Explained, The XML Classes, XML Validation, XML Display and Transforms. Security Fundamentals: Understanding Security Requirements, Authentication and Authorization, Forms Authentication, Windows Authentication. ASP.NET AJAX: Understanding Ajax,	L3,L4	PO1, PO2 PSO2, PSO3



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

Department	Semester	Course
Information Technology	V	Linux System Administrator

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understanding RED HAT Enterprise Linux Command Line, System Administration Task, Managing Software	L1,L2	PO1, PO2 PSO1, PSO2
CO2	Understand Configuring and Managing Storage Connecting to the Network Working with Users, Groups, and Permissions	L1,L2	PO1, PO2
CO3	Contrast and compare Securing Server with ip tables Setting Up Cryptographic Services Configuring Server for File Sharing	L3,L4	PO2 PSO2, PSO3
CO4	Understanding Configuring DNS and DHCP Setting Up a Mail Server Configuring Apache on Red Hat Enterprise Linux	L3,L4	PO1 PSO2 , PSO3
CO5	Understanding Introducing Bash Shell Scripting High-Availability Clustering Setting Up an Installation Server	L3,L4	PO1, PO2 PSO2, PSO3



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Department	Semester	Course
Information Technology	V	Enterprise Java

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Understanding Java EE Understanding concept of Server Compare and contrast between Server and Container. working with JDBC	L1,L2	PO1, PO2 PSO1, PSO2
CO2	Understand the Sessions, LifeCycle of Http Session Request Dispatcher and Cookies	L1,L2,L3	PO1, PO2 PSO1
CO3	Contrast and Compare between Advantages of using JSP and Disadvantages of using JSP, Implement the simple JSP application understanding Java Server Pages Standard Tag Libraries	L3,L4,L5	PO2 PSO2, PSO3
CO4	Understanding EJB, Implement with session Beans	L3,L4	PO1 PSO2 , PSO3
CO5	Understanding JavaPersistence API ,Writing JPA Application Working of Hibernate and construct an HibernateApplication:	L3,L4	PO1, PO2 PSO2, PSO3



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Affiliated to University of Mumbai

Department	Semester	Course
Information Technology	V	Internet Of Things Practical

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 and architecture of IoT.	L2	PO1, PSO1
CO2	Demonstrate practical skills in configuring and integrating sensors and actuators in IoT systems.	L2	PO1, PO3, PSO2
CO3	Develop and deploy basic IoT applications using appropriate communication protocols.	L3	PO3, PSO2
CO4	Analyze data collected from IoT devices to derive meaningful insights and improve system efficiency.	L4	PO4, PSO1
CO5	Evaluate the performance and security aspects of IoT solutions, suggesting enhancements based on real-world use cases.	L5	PO4, PSO1



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Department	Semester	Course
Information Technology	V	Advanced Web Programming Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Develop and Create an application that obtains four int values from the user and displays the product. b. Create an application to demonstrate string operations. Create a simple application to perform following operations i. Finding factorial Value ii. Money Conversion	L1,L2	PO1, PO2 PSO2, PSO3
CO2	Develop and Create a simple web page with various server controls to demonstrate setting and use of their properties. (Example : AutoPostBack) Demonstrate the use of Calendar control to perform following operations. a) Display messages in a calendar control	L1,L2,L3	PO1, PO2 PSO2, PSO3
CO3	Create a Registration form to demonstrate use of various Validation controls. Create Web Form to demonstrate use of Website Navigation controls and Site Map.	L3,L4,L5	PO2 PSO2, PSO3
CO4	Create a web application bind data in a multiline textbox by querying in another textbox. Create a web application to display Data Binding using dropdownlist control.	L3,L4	PO1, PO2 PSO2 , PSO3
CO5	Create a web application to demonstrate various uses and properties of SqlDataSource Create a web application to demonstrate use of GridView control template and GridView hyperlink.	L3,L4	PO1,PO2 PSO2,PSO3



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Department	Semester	Course
Information Technology	V	Linux System Administration Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Installation of RHEL 6.X Graphical User Interface and Command Line Interface and Processes Exploring the Graphical DesktopThe Command Line Interface Managing Processes Storage Devices and Links, Backup and Repository Working with RPM Storage and Networking	L1, L2	PO1, PO2 PSO2, PSO3
CO2	Execute the commands Working with Users, Groups, and Permissions Firewall and Cryptographic services	L1,L2,L3	PO1, PO2 PSO2 PSO3
CO3	Configuring Server for File Sharing DNS, DHCP and Mail Server	L3,L4,L5	PO2 PSO2, PSO3
CO4	Configuring Web Server Configuring Apache on Red Hat Enterprise Linux	L3,L4	PO1,PO2 PSO2 , PSO3
CO5	Shell Scripts and High-Availability Clustering Write and execute Shell Scripts	L3,L4	PO1,PO2 PSO2,PSO3



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Department	Semester	Course
Information Technology	V	Enterprise Java Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Develop Servlet applications in Java including simple calculator, login page, and registration functionality using JDBC, as well as applications utilizing Cookies, Sessions, Request Dispatcher Interface, and Servlet IO for file upload and download functionalities.	L1,L2	PO1, PO2 PSO2, PSO3
CO2	Develop JSP applications in Java for displaying intrinsic object values functionalities using JDBC. Demonstrate updating database records , utilize Expression Language, and showcase the use of JSTL in JSP applications.	L1,L2,L3	PO1, PO2 PSO2, PSO3
CO3	Implement EJB applications and Beans	L3,L4,L5	PO2 PSO2, PSO3
CO4	Implement the JPA applications with ORM	L3,L4	PO1, PO2 PSO2 , PSO3
CO5	Working of Hibernate and construct an HibernateApplication:	L3,L4	PO1, PO2 PSO2, PSO3



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Department	Semester	Course
InformationTechnology	VI	Software 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	Understand the fundamental concepts and definitions of TQM, statistical methods, and continuous improvement. You'll then apply them to software development, identifying challenges and implementing quality management systems for reliable, defect-free software.	L1/L2	PO1 PSO1
CO2	Understand hardware and software testers with the knowledge and skills to design and execute effective tests throughout the development lifecycle, ensuring high-quality software.	L2	PO1 PO2 PSO2
CO3	Understand testers with techniques like boundary value, equivalence class, decision table, path, and data flow testing to design effective test cases for individual software modules, ensuring proper functionality and high-quality code.	L2/L4	PO2 PSO2
CO4	Applying software verification and validation techniques, this course equips testers to ensure software meets requirements and fulfills its intended purpose. You'll explore methods, levels, and coverage aspects for both verification and validation, empowering you to deliver high-quality software.	L3	PO1 PSO2
CO5	Comprehensive software testing course explores various testing levels and specializations (GUI, security, performance). Master test design and execution throughout the development lifecycle for high-quality, reliable software.	L2/L3	PO2 PSO2



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(Arts, Science and Commerce)
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Department	Semester	Course
InformationTechnology	VI	Security In Computing

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

CO No.	Course Outcome	Bloom's level	Mapping of PO and PSO's
CO1	Understanding and Information Security Overview: The Importance of Information Protection, The Evolution of Information Security.	L1/L2	PO1 PSO1
CO2	Explain Authentication and Authorization: Authentication, Authorization Encryption: A Brief History of Encryption, Symmetric-Key Cryptography, Public Key Cryptography, Public Key Infrastructure. Storage Security: Storage Security Evolution, Modern Storage Security, Risk Remediation, Best Practices	L2	PO1 PO2 PSO2
CO3	Explore classification Secure Network Design: Introduction to Secure Network Design, Performance, Availability, Security. Network Device Security: Switch and Router Basics, Network Hardening. Firewalls: Overview, The Evolution of Firewalls,	L2/L4	PO2 PSO2
CO4	Understands Intrusion Detection and Prevention Systems: IDS Concepts, IDS Types and Detection Models, IDS Features, IDS Deployment Considerations, Security Information and Event Management (SIEM). Voice over IP (VoIP) and PBX Security: Background, VoIP Components, VoIP Vulnerabilities.	L3	PO1 PSO2
CO5	Define Virtual Machines and Cloud Computing: Virtual Machines, Cloud Computing. Secure Application Design: Secure Development Lifecycle, Application Security Practices, Web Application Security.	L2/L3	PO2 PSO2



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Department	Semester	Course
InformationTechnology	VI	Business Intelligence

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 leverage business intelligence (BI) and decision support systems (DSS). Master BI architectures, ethical considerations, and DSS development for informed decisions and effective problem-solving.	L1,L2	PO1, PO2 PSO1, PSO2
CO2	Explain mathematical modeling, data mining, and data preparation techniques used in business intelligence (BI) to extract insights from data and support informed decision-making.	L1,L2,L3	PO1, PO2 PSO1
CO3	Explore classification (Bayesian methods, logistic regression, etc.) and clustering (partitioning, hierarchical methods) to uncover patterns and make data-driven decisions.	L3,L4,L5	PO2 PSO2, PSO3
CO4	Understands applications in marketing (customer relations, sales), logistics (supply chain, revenue management), and data analysis (efficiency measures) to optimize business operations and decision-making.	L3,L4	PO1 PSO2 , PSO3
CO5	Analyzing knowledge management (KM) for capturing and leveraging organizational knowledge, and explores artificial intelligence (AI) applications. Master KM strategies, IT integration, and expert systems to drive business transformation and utilize AI for intelligent solutions.	L3,L4	PO1, PO2, PSO2, PSO3



Satish Pradhan Dnyanasadhana College, Thane

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Department	Semester	Course
Information Technology	VI	Geographical Information System

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Install QGIS , analyze vector and raster data. Create maps, manage attributes, importing data, utilizing plugins, and accessing OpenStreetMap data.	L3/L4	PO1 PSO1
CO2	Configure and manage advanced GIS operations including georeferencing, digitizing, and managing spatial datasets, spatial analysis, working with projections, WMS data, and advanced geospatial techniques like nearest neighbor analysis and data interpolation.	L3 / L4	PO2, PSO2
CO3	Configure and manage complex GIS workflows using the Processing Modeler and Batch Processing Framework, and automate map creation with Print Composer Atlas. Validate map data for accuracy and consistency.	L3/ L4	PO2, PSO2



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Department	Semester	Course
Information Technology	VI	IT Service Management

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Define fundamentals of IT service management, including understanding services, business processes, and the service lifecycle, service strategy principles, value creation, and addressing challenges and risks in service management.	L1/L2	PO1 PSO1
CO2	Understand the principles and processes of IT service design, including identifying service requirements, designing service catalogs, managing service levels, and ensuring continuity and security analyze challenges and risks.	L2/L6	PO1 PO2 PSO2
CO3	comprehend the principles and processes involved in transitioning IT services, including planning, change management, configuration, deployment, testing, and knowledge management analyze challenges, ensure critical success factors, and risk.	L5/L6	PO2 PSO2
CO4	Define the fundamentals and principles of IT service operation, including managing functions, teams, and communication, and processes such as event, incident, request, problem, and access management, equipped to address challenges, ensure critical success factors, and risk.	L1/L3	PO1 PSO2
CO5	Analyze and explore the principles and processes of continual service improvement (CSI) in IT service management, including the seven-step improvement process, methods, and techniques for assessing and benchmarking services Understand the organizational development, roles, responsibilities.	L4/L2	PO1 PSO2



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)
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Department	Semester	Course
Information Technology	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	Ability to prepare a project by gathering requirements	L2	PO5, PSO5, PSO1
CO2	Ability to design models for the software project	L5	PO5, PSO5, PSO1, PSO2
CO3	Ability to construct a software project and test it	L6	PO3, PSO5, PSO3, PSO2



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(Arts, Science and Commerce)
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Department	Semester	Course
Information Technology	VI	Security In Computing- Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Program to Configure Routers a OSPF MD5 authentication. b NTP. c to log messages to the syslog server. d to support SSH connections.	L1/L3	PO2 PSO2
CO2	Configure AAA Authentication Configuring Extended ACLs a Configure, Apply and Verify an Extended Numbered ACL	L1/L3	PO2 PSO2
CO3	Perform the Configure IP ACLs to Mitigate Attacks and IPV6 ACLs Configuring a Zone-Based Policy Firewall Layer 2 Security Layer 2 VLAN Security	L1/L3	PO2 PSO2
CO4	Perform the Configure and Verify a Site-to-Site IPsec VPN Using CLI Configuring ASA Basic Settings and Firewall Using CLI	L1/L3	PO2 PSO2



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Department	Semester	Course
Information Technology	VI	Business Intelligence- Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Program to Write data warehousing course equips programs to import legacy data (Excel, SQL Server, Oracle) and perform ETL (Extract, Transform, Load) processes for building data warehouses in SQL Server. Master data staging, cube creation with dimensions and facts (ROLAP, MOLAP, HOLAP), for efficient data analysis.	L1, L2	PO1, PO2 PSO2, PSO3
CO2	Programs with ETL job scheduling, MDX queries for data extraction, and Microsoft Excel integration for data analysis and visualization. Master ETL automation, data exploration with MDX, and pivot tables/charts for data-driven decision making.	L1,L2,L3	PO1, PO2 PSO2,PSO3
CO3	Perform the data classification using a classification algorithm. Write a program data clustering using a clustering algorithm.	L3,L4,L5	PO2 PSO2,PSO3
CO4	Perform the Linear regression on the given data warehouse data.	L3,L4	PO1,PO2 PSO2 , PSO3
CO5	Perform the logistic regression on the given data warehouse data.	L3,L4	PO1,PO2 PSO2,PSO3



Satish Pradhan Dnyanasadhana College, Thane

(Arts, Science and Commerce)

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Department	Semester	Course
Information Technology	VI	Geographical Information System- Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Install QGIS , analyze vector and raster data. Create maps, manage attributes, importing data, utilizing plugins, and accessing OpenStreetMap data.	L3/L4	PO1 PSO1
CO2	Configure and manage advanced GIS operations including georeferencing, digitizing, and managing spatial datasets, spatial analysis, working with projections, WMS data, and advanced geospatial techniques like nearest neighbor analysis and data interpolation.	L3 / L4	PO2, PSO2
CO3	Configure and manage complex GIS workflows using the Processing Modeler and Batch Processing Framework, and automate map creation with Print Composer Atlas. Validate map data for accuracy and consistency.	L3/ L4	PO2, PSO2



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(Arts, Science and Commerce)
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Department	Semester	Course
Information Technology	VI	Advanced Mobile Programming- Practical

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

CO No.	Course Outcome	Bloom's Level	Mapping of PO & PSO's
CO1	Program to Android, Introduction to Android Studio IDE, Application Fundamentals Android Resources: (Color, Theme, String, Drawable, Dimension, Image), Activity Life Cycle, Activity methods, Multiple Activities, Life Cycle of fragments and multiple fragments.	L1/L3	PO2 PSO2
CO2	Programs Programs related to different Layouts Coordinate, Linear, Relative, Table, Absolute, Frame, List View, Grid View	L1/L3	PO2 PSO2
CO3	Perform Programming UI elements AppBar, Fragments, UI Components Programming menus, dialog, dialog fragments Programs on Intents, Events, Listeners and Adapters The Android Intent Class, Using Events and Event Listeners	L1/L3	PO2 PSO2
CO4	Perform the Programs on Services, notification and broadcast receivers Database Programming with SQLite Programming Media API and Telephone API	L1/L3	PO2 PSO2