DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

	CO No	Course Outcome
CE	CO-1	Understand the basic quantum-mechanical approach to deriving molecular orbitals from atomic orbitals.
	CO-2	Apply grammatical structures to formulate sentences and correct word forms.
	CO-3	Compare the materials of construction for battery and Electrochemical sensors.
	CO-4	**U**nderstand basic chemistry and technology involved in the manufacture of various types of polymers, plastics, Elastomers, their properties, applications, characterization, impact on environment.
	CO-5	Analyze the principles of different analytical instruments and their applications and can summarize the concepts of Instrumental methods

	CO No	Course Outcome
LA&C	CO-1	Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
	CO-2	Utilize mean value theorems to real life problems
	CO-3	Familiarize with functions of several variables which is useful in optimization.
	CO-4	Learn important tools of calculus in higher dimensions.
	CO-5	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three

	CO No	Course Outcome
BCME	CO- 1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.
	CO- 2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
	CO- 3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation. Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated
	CO- 4	Understand the different manufacturing processes.Explain the basics of thermal engineering and its applications.
	CO- 5	Describe the working of different mechanical power transmission systems and power plants.Describe the basics of robotics and its applications

	CO No	Course Outcome
ICP	CO- 1	**Write** algorithms and to draw flowcharts for solving problems
	CO- 2	**Evaluate** different types of operators in C, including understanding operator precedence, associativity, expressions, and type conversions
	CO- 3	**Apply** selection statements (if, if-else, nested if, else-if ladder) and iterative statements (while, do-while, for, nested loops) to control the flow of program execution based on different conditions
	CO- 4	**Solve** programming problems using appropriate concepts like arrays, strings, structures & unions, functions, and point
	CO- 5	**Develop** sample programs that incorporates pointer applications and file handling techniques.

	CO No	Course Outcome
CHE LAB	CO- 1	Determine the cell constant and conductance of solutions
	CO- 2	Prepare advanced polymer Bakelite materials
	CO- 3	Measure the strength of an acid by conductometric method
	CO- 4	Analyse the IR spectra of some organic compounds
	CO- 5	Calculate strength of acid in Pb-Acid battery

	CO No	Course Outcome
CP LAB	CO- 1	**Evaluate** different types of operators in C, including understanding operator precedence, associativity, expressions, and type conversions.
	CO- 2	**Apply** selection statements (if, if-else, nested if, else-if ladder) and iterative statements (while, do-while, for, nested loops) to control the flow of program execution based on different conditions
	CO- 3	**Solve** programming problems using appropriate concepts like arrays, strings, structures & unions functions, and pointers
	CO- 4	**Develop** sample programs that incorporates pointer applications and file handling techniques

	CO No	Course Outcome
ITWS	CO- 1	Demonstrate Assemble and dissemble components of a PC
	CO- 2	Identify Hardware components and inter dependencies.
	CO- 3	Illustrate how to safeguard computer systems from viruses/worms.
	CO- 4	Create Document/ Presentation preparation

	CO- 5	Practice and perform calculations using spreadsheets

ENG WORKSHOP	**CO No**	**Course Outcome**
	CO- 1	Identify workshop tools and their operational capabilities
	CO- 2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
	CO- 3	Apply fitting operations in various applications
	CO- 4	Apply basic electrical engineering knowledge for House
	CO- 5	Apply basic plumbing tools to prepare pipe joints using couplings and for different diameters of pipe

DE&VC	**CO No**	**Course Outcome**
	CO- 1	Solve the differential equations related to various engineering fields...
	CO- 2	Solve the higher order linear differential equations
	CO- 3	Identify solution methods for partial differential equations that model physical processes
	CO- 4	Interpret the physical meaning of different operators such as gradient, curl and divergence.
	CO- 5	Estimate the work done against a field, circulation and flux using vector calculus

EP	**CO No**	**Course Outcome**
	CO- 1	Analyze the intensity variation of light due to polarization, interference and diffraction.
	CO- 2	Familiarize with the basics of crystals and their structures
	CO- 3	Summarize various types of polarization of dielectrics and classify the Magnetic materials
	CO- 4	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles
	CO- 5	Identify the type of semiconductor using Hall effect
	CO No	**Course Outcome**
	CO- 1	Understand the problem solving concepts associated to AC and DC circuits and machines, measuring instruments **a**pply theorems to circuits
	CO- 2	Understand the construction and operation of AC and DC

BEEE	CO- 3	Analyse the Electricity bill calculations and layout representation of electrical Power systems
	CO- 4	Understanding operations of CE amplifier and basic concept of feedback amplifier
	CO- 5	Analyse the operation of half wave, full wave bridge rectifiers and understand the instrumentation system

	CO No	**Course Outcome**
EG	CO- 1	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
	CO- 2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views
	CO- 3	Understand and draw projection of solids in various positions in first quadrant
	CO- 4	Understand principles behind development of surfaces and draw surfaces for a cone, prism, pyramid, cylinder and cube.
	CO- 5	Prepare isometric and perspective sections of simple solids

	CO No	**Course Outcome**
DS THROUGH C	CO- 1	**Identify** importance the properties, interfaces, and behaviors of basic abstract data types computational efficiency of the principal algorithms for sorting & searching.
	CO- 2	**Understand & implement** the concept of stacks, queues and their applications
	CO- 3	**Apply** the concept of linked list in solving problems
	CO- 4	**Understand & apply** the concept of binary tree, binary search trees. Design hash based solutions for specific problems
	CO- 5	**Understand & implement** the concept of Graphs & Traversal techniques

	CO No	**Course Outcome**
CE LAB	CO- 1	Understand the rules of accent and apply them in the communication
	CO- 2	Understand role play techniques and present oration skills
	CO- 3	Analyse and speak general questions on familiar topics such as home,family, work, studies and interests;
	CO- 4	Evaluate on the topics of group discussions and debates
	CO- 5	Apply various skills and techniques to face interviews

	CO No	**Course Outcome**

EP LAB	CO- 1	Operate optical instruments like travelling microscope and spectrometer.
	CO- 2	Estimate the wavelengths of different colours using diffraction grating
	CO- 3	Plot the intensity of the magnetic field of circular coil carrying current with distance
	CO- 4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively
	CO- 5	Calculate the band gap of a given semiconductor

	CO No	**Course Outcome**
EEE LAB	CO- 1	Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer . .
	CO- 2	Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.
	CO- 3	Analyse various characteristics of electrical circuits, electrical machines and measuring instruments. Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring
	CO- 4	Understand the usage of electronic measuring instruments and testing of various electronic components.
	CO- 5	Understand the operation and performance of digital logic circuits

	CO No	**Course Outcome**
DS LAB	CO- 1	Support the importance of discipline, character and service motto. (Evaluating, K5)
	CO- 2	Solve some societal issues byapplying acquired knowledge, facts, and techniques. (Applying, K3)
	CO- 3	Motivate the importance of human relationships by analyzing social problems. (Analyzing, K4)
	CO- 4	Determine to extend their help for the fellow beings and downtrodden people. . (Evaluating, K5)
	CO- 5	Survey different business strategies. (Analyzing, K4)

	CO No	**Course Outcome**
DM&GT	CO- 1	Build skills in solving mathematical problems (L3)
	CO- 2	Comprehend mathematical principles and logic (L4)
	CO- 3	Demonstrate knowledge of mathematical modelling and proficiency in using mathematical software (L6)
	CO- 4	Manipulate and analyze data numerically and/or graphically using appropriate Software (L3)
	CO- 5	How to communicate effectively mathematical ideas/results verbally or in writing (L1)

	CO No	**Course Outcome**

UHV	CO- 1	Define the terms like Natural Acceptance, Happiness and Prosperity (L2)
	CO- 2	Identify one's self, and one's surroundings (family, society nature) (L3)
	CO- 3	Apply what they have learnt to their own self in different day-to-day settings in real life (L3)
	CO- 4	Relate human values with human relationship and human society. (L4)
	CO- 5	Justify the need for universal human values and harmonious existence for socially and ecologically responsible engineers (L5)

	CO No	**Course Outcome**
DL CO	CO- 1	Convert numbers between different number systems and analyze their representation in digital circuits using basic logic gates (L3)
	CO- 2	Understand basic sequential circuits using flip-flops and identify key computer components with their roles (L2)
	CO- 3	Implement basic arithmetic operations on signed and unsigned numbers and explain the instruction set architecture (L3)
	CO- 4	Differentiate between various memory types and analyze their impact on computer performance (L3)
	CO- 5	Analyze the functionalities of I/O techniques and principles behind peripheral devices (L4)

	CO No	**Course Outcome**
ADSA	CO- 1	Understand algorithm analysis using asymptotic notations and apply AVL trees and B trees (L2)
	CO- 2	Use various algorithmic approaches and Solve problems using divide and conquer and analyze graph algorithms and heaps (L3)
	CO- 3	Use various algorithmic approaches and Solve problems using Greedy and Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations (L3)
	CO- 4	Organize important algorithmic design paradigms and methods of analysis using backtracking and branch & bound approaches (L4)
	CO- 5	Demonstrate NP-Completeness theory, lower bound theory in graph and scheduling problems (L3)

	CO No	Course Outcome
OOPS THROUGH JAVA	CO- 1	Demonstrate proficiency in fundamental Java programming concepts and constructs (L3)
	CO- 2	Apply the concepts of class, Objects and inheritance (L3)
	CO- 3	Use the concepts of arrays and handling strings in Java to manipulate data effectively (L3)
	CO- 4	Apply the concepts of interfaces, packages, Java library, and exception handling (L3)
	CO- 5	Demonstrate the concepts of GUI programming using Abstract Window Toolkit, Applets and multi-threading (L3)

	CO No	Course Outcome
ADSA LAB	CO- 1	Solve programs using non-linear data structures such as Trees for AVL trees and B-Trees (L3)
	CO- 2	Solve program and examine its time complexity using linear data structures using arrays on sorting and heaps (L3)
	CO- 3	Use appropriate technique to deploy the shortest path and optimal solution algorithms (L3)

	CO No	Course Outcome
OOPS THROUGH JAVA LAB	CO- 1	Apply default value of all primitive data type, Operations, Expressions, Control- flow, Strings (L3)
	CO- 2	Demonstrate Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism (L3)
	CO- 3	Execute Threads, Event Handling, implement packages, developing applets (L3)

	CO No	Course Outcome
PP	CO- 1	Demonstrate Python programming through the implementation of fundamental concepts like control statement, operator, functions and strings (L3)
	CO- 2	Execute built-in data structures like lists, tuples, sets, dictionaries, and strings for efficient data manipulation and analysis (L3)
	CO- 3	Apply the concepts of object oriented programming and python libraries (L3)

	CO No	Course Outcome
ES	CO- 1	Compare various renewable and non-renewable resources. (Analyze, K4)
	CO- 2	Compare bio-geo-chemical cycles and ecological pyramids. (Analyze, K4)
	CO- 3	Identify causes of pollution and solid waste management and related preventive measures. (Apply, K3)
	CO- 4	Identify different types of rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation. (Apply, K3)
	CO- 5	Identify the causes of population explosion, value education and welfare programmes. (Apply, K3)

	CO No	Course Outcome
MEFA	CO- 1	Understand concepts related to Managerial Economics, financial accounting and management. (L2)
	CO- 2	Apply the Concept of Production cost and revenues for effective Business decision (L3)
	CO- 3	Analyze how to invest capital and maximize returns (L4)
	CO- 4	Apply the capital budgeting techniques (L3)
	CO- 5	Develop the accounting statements and evaluate the financial performance of Business entity. (L3)

	CO No	Course Outcome
P&S	CO- 1	Apply discrete and continuous probability distributions (L3)
	CO- 2	Classify the concepts of data science and its importance (L2)
	CO- 3	Interpret the association of characteristics and through correlation and regression tools (L4)
	CO- 4	Design the components of a classical hypothesis test (L6)
	CO- 5	Infer the statistical inferential methods based on small and large sampling tests (L4)

	CO No	Course Outcome
OS	CO- 1	Understanding the fundamentals of Operating system & System structures (L2)
	CO- 2	Apply process scheduling Inter Process Communication and thread scheduling in Operating Systems (L3)
	CO- 3	Identify and solve resource allocations among processes, deadlock conditions (L3)
	CO- 4	Identify and solve Memory & Virtual Memory problems (L3)
	CO- 5	Identify and use OS Protection in few case studies (L3)

	CO No	Course Outcome
DBMS	CO- 1	Understand the concepts of relational database and object-oriented database (L2)
	CO- 2	Apply Relational model and ER model for database design (L3)
	CO- 3	Execute SQL commands to create, maintain and manipulate a relational database (L3)
	CO- 4	Interpret and apply schema refinement and normalization concepts for database design (L3)
	CO- 5	Implement indexing and transaction concepts for data base design (L3)

	CO No	Course Outcome

SE	CO- 1	Understand the basic concepts of software engineering and software life cycle models (L2)
	CO- 2	Apply software project management estimation techniques and requirement analysis specification in software project development (L3)
	CO- 3	Apply function oriented software design and user interface design in software process (L3)
	CO- 4	Use software coding & testing strategies tools and procedures to test and debug the software developed and also implement software reliability and quality management procedures (L3)
	CO- 5	Use of CASE tools in software life cycle and software maintenance (L3)

OS LAB	**CO No**	**Course Outcome**
	CO- 1	Execute Unix utilities and perform basic shell control of the utilities (L3)
	CO- 2	Implement Unix file system and file access control (L3)
	CO- 3	Solve scheduling problems & simulate replacement algorithms and Bankers Algorithm etc. (L3)

DBMS LAB	**CO**	**Course Outcome**
	CO- 1	Execute queries for creating database and performing data manipulation operations (L3)
	CO- 2	Apply integrity constraints to build efficient databases (L2)
	CO- 3	Apply Queries using Advanced Concepts of SQL (L2)

FULL STACK DEVELOPMENT	**CO No**	**Course Outcome**
	CO- 1	Demonstrate the ability to effectively use HTML elements and their attributes to design and structure static web pages. (L3)
	CO- 2	Apply appropriate CSS styles to HTML elements to build visually appealing and responsive web pages. (L3)
	CO- 3	Use dynamic web pages and perform form validation using JavaScript. (L3)

DT&I	**CO**	**Course Outcome**
	CO- 1	Define the concepts related to design thinking. (L2)
	CO- 2	Applying the concepts of Design Thinking and innovation.(L3)
	CO- 3	Apply the design thinking techniques for solving problems in various sectors. (L3)
	CO- 4	Analyse to work in a multi disciplinary environment. (L4)
	CO- 5	Evaluate the value of creativity. (L5)

	CO No	Course Outcome
CN	CO- 1	**Analyze** basic network structures and physical transmission media for different networking scenarios.
	CO- 2	**Analyze** and troubleshoot data link layer protocols and understand how they ensure reliable communication over physical media.
	CO- 3	**Compare** and select appropriate MAC protocols for different network environments and understand the role of Ethernet in wired LANs.
	CO- 4	**Analyze** and troubleshoot network layer operations, and understand how data is routed and managed across interconnected networks.
	CO- 5	**Interpret** transport layer protocols and application layer services form the backbone of internet communication.

	CO No	Course Outcome
FLAT	CO- 1	**Design** deterministic and non-deterministic finite automata including their minimization and applications
	CO- 2	**Construct** regular expressions and demonstrate their equivalence with finite automata
	CO- 3	**Develop** context-free grammars and convert them into normal forms for analyzing language structures
	CO- 4	**Demonstrate** pushdown automata for context-free languages and their equivalence with grammars
	CO- 5	**Analyze** Turing Machines, decidable and undecidable problems for computational complexity classes

	CO No	Course Outcome
OOAD	CO- 1	**Apply** the principles of complexity in software systems to interpret organized and disorganized structures in real-world applications.
	CO- 2	**Analyze** object-oriented modeling concepts and the role of UML in the software development life cycle.
	CO- 3	**Apply** modeling techniques to develop class and object diagrams for given system specifications.
	CO- 4	**Design** basic behavioural models including use case, interaction, and activity diagrams for dynamic system behavior.
	CO- 5	**Analyze** advanced behavioural and architectural models to represent system states, components, and deployments effectively.

	CO No	Course Outcome
AI	CO- 1	**Understand** the fundamental concepts, historical developments, and agent types in Artificial Intelligence to model rational agents and define well-structured problem scenarios.
	CO- 2	**Apply** uninformed and informed search strategies, including A*, AO*, and Mini-Max algorithms,to solve problems and make decisions in game-playing environments.
	CO- 3	**Analyse** the structure and use of knowledge representation methods and assess the effectivenessof reasoning techniques under uncertainty, including Bayesian inference and Dempster-Shafer theory.
	CO- 4	**Apply** logical inference and machine learning techniques such as decision trees, explanation-based learning, and reinforcement learning to build intelligent systems.

	CO- 5	**Analyze** the architecture and components of expert systems to determine their applicability in real-world domains.

	CO No	Course Outcome
MP&MC	CO- 1	Understand the architecture, pin configuration, and operational modes of the 8086 microprocessor.
	CO- 2	**Apply** addressing modes and instruction formats to develop assembly programs using 8086 microprocessor.
	CO- 3	**Analyze** interfacing techniques of memory and I/O devices using 8086 and peripheral ICs such as 8255, 8251, and 8237.
	CO- 4	**Apply** 8051 microcontroller architecture and instruction set to write programs using different addressing modes.
	CO- 5	**Analyze** interfacing of peripherals with 8051 for real-time applications and compare different processor architectures including PIC and ARM.

	CO No	Course Outcome
QC	CO- 1	**Distinguish** between classical and quantum computing paradigms with reference to bits vs qubits and classical vs quantum logical operations.
	CO- 2	**Apply** foundational mathematical concepts, physical principles, and biological knowledge to interpret and support core ideas in quantum computing.
	CO- 3	**Understand** the construction of basic quantum circuits using single and multi-qubit gates and illustrate quantum states using Bloch sphere representations.
	CO- 4	**Apply** quantum algorithms such as Deutsch's, Deutsch-Jozsa, Shor's, and Grover's to relevant
		computational problems.
	CO- 5	**Apply** concepts of quantum error correction, fault-tolerant computation, and quantum cryptographic techniques to solve problems in secure quantum information processing.

	CO No	Course Outcome
DM LAB	CO- 1	**Build** data warehouse schemas and perform ETL using data warehousing tools
	CO- 2	**Apply** data preprocessing and association rule mining using WEKA, R or Python
	CO- 3	**Analyze** classification algorithms and interpret performance metrics using real-world datasets
	CO- 4	**Execute** clustering techniques and visualize patterns in large datasets
	CO- 5	**Develop** programs for data mining tasks and demonstrate knowledge flow in WEKA

	CO No	Course Outcome
CN LAB	CO- 1	**Implement**basic networking concepts by setting up a Local Area Network (LAN) and configuring network devices
	CO- 2	**Develop** programs to implement fundamental concepts of data communication and error detection techniques in computer networks
	CO- 3	**Apply**flow and error control techniques to ensure reliable data transmission in computer networks
	CO- 4	**Design** network routing algorithms and congestion control mechanisms using classical algorithms to analyze performance under varying network conditions
	CO- 5	**Analyze** packet behaviour and network performance using appropriate network analysis and simulation tools

	CO No	Course Outcome
FULL STACK DEVELOPMENT II	CO- 1	**Implement** routing, middleware, templating, and session-based authentication using ExpressJS for web applications.
	CO- 2	**Develop** server-side applications integrating RESTful APIs with MongoDB for performing CRUD operations.
	CO- 3	**Design** and build dynamic front-end interfaces using ReactJS with JSX, components, props, state, and event handling.
	CO- 4	**Utilize** React Router and Hooks to manage page navigation and share data between components in a single-page application.
	CO- 5	**Apply** MongoDB database operations for document-based data storage and retrieval using real- world queries and aggregation.

	CO No	Course Outcome
UID USING FLUTTER	CO- 1	**Apply** fundamental concepts of Dart and Flutter to develop basic applications using widgets and layouts.
	CO- 2	**Design** responsive user interfaces using layout widgets, media queries, and navigation techniques.
	CO- 3	**Develop** customized UI components using custom widgets and themes for enhanced user experience.
	CO- 4	**Integrate** animation effects and manage application state effectively using stateful widgets and Provider.
	CO- 5	**Implement** data-driven Flutter applications by fetching and displaying data from REST APIs, with appropriate validation and debugging.

	CO No	Course Outcome
CD	CO- 1	**Understand** the phases of a compiler with emphasis on lexical and syntax analysis using finite automata and parsing techniques.
	CO- 2	**Construct** predictive and LR parsers and demonstrate error recovery and ambiguity handling techniques.
	CO- 3	**Implement** syntax-directed definitions and generate intermediate code using three-address representation.
	CO- 4	**Analyze** various code optimization techniques including flow graphs and loop transformations.
	CO- 5	**Design** runtime environments and generate optimized object code using register allocation techniques.

	CO No	Course Outcome
CC	CO- 1	**Understand** the fundamental concepts of cloud computing, service models, and deployment models.
	CO- 2	**Analyze** the enabling technologies of cloud computing including virtualization and distributed systems in real world applications.
	CO- 3	**Apply** virtualization and containerization technologies with examples and applications.
	CO- 4	**Analyze** the key challenges in cloud computing including scalability, security, and energy efficiency.
	CO- 5	**Evaluate** advanced cloud paradigms such as serverless computing, IoT integration, and edge/fog computing in real world applications.

	CO No	Course Outcome
CNS	CO- 1	**Analyze** cryptographic goals and threats, and apply mathematical tools to design and evaluate secure systems.
	CO- 2	**Analyze** symmetric encryption algorithms and understand the mathematical principles that ensure their strength and efficiency.
	CO- 3	**Compare** asymmetric encryption algorithms, and understand the mathematical principles that ensure their security and efficiency.
	CO- 4	**Understand** mechanisms for ensuring data integrity, digital signature techniques, and manage cryptographic keys securely in real-world systems.
	CO- 5	**Understand** security mechanisms across the application, transport, and network layers, and understand how systems are protected against both internal and external threats.

	CO No	Course Outcome
STM	CO- 1	**Understand** the fundamental concepts, purpose, and models of software testing along with bug taxonomy and flow graphs.
	CO- 2	**Apply** transaction flow, data flow, and domain testing techniques to analyze and test software paths and interfaces.
	CO- 3	**Analyze** path expressions, reduction techniques, and logic-based testing using formal methods like decision tables and regular expressions.
	CO- 4	**Apply** state transition testing using state graphs to evaluate system behavior and testability.
	CO- 5	**Analyze** graph matrices, node reduction algorithms, and apply automated testing tools (e.g., JMeter, Selenium) for software validation.

	CO No	Course Outcome
CYBER SECURITY	CO- 1	**Understand** the concept, types, and evolution of cybercrime and identify the security threats arising from mobile, wireless, and network systems.
	CO- 2	**Apply** various tools, attack methods, and techniques used in cyberattacks such as phishing, spoofing, and malware to assess vulnerabilities.
	CO- 3	**Analyze** cybercrime investigations using tracking techniques, forensic tools, and digital evidence handling procedures.
	CO- 4	**Apply** computer forensics methods, tools, and procedures for investigating cybercrime across platforms and devices.
	CO- 5	**Analyze** Indian and international cyber laws and assess the impact of legal frameworks on cybercrime control and punishment.

DEVOPS	**CO No**	**Course Outcome**
	CO- 1	**Analyze**, design, and implement DevOps workflows, apply Agile principles, and use automation tools to streamline software delivery
	CO- 2	**Make** use of source code effectively using GIT, collaborate in team environments, and ensure code quality through automated testing and analysis tools like SonarQube.
	CO- 3	**Design** and implement CI pipelines, automate builds using Jenkins, and manage distributed build environments effectively.
	CO- 4	**Build** containerized applications, automate deployment pipelines, and integrate testing tools.
	CO- 5	**Automate** system configuration, deploy containerized applications, and orchestrate infrastructure using Ansible and Kubernetes/OpenShift.

ML	**CO No**	**Course Outcome**
	CO- 1	**Understand** the basic concepts of machine learning, learning paradigms, data types, and stages involved in building and evaluating models.
	CO- 2	**Apply** distance-based models such as KNN for solving classification and regression problems using proximity measures.
	CO- 3	**Analyze** decision tree-based methods and Bayesian classifiers to assess their effectiveness in different machine learning scenarios.
	CO- 4	**Apply** linear models like logistic regression, SVMs, and multilayer perceptrons to real-world classification problems.
	CO- 5	**Design** clustering solutions using techniques such as K-means, fuzzy clustering, and EM-based clustering for unsupervised pattern discovery.

SPM	**CO No**	**Course Outcome**
	CO- 1	**Understand** the limitations of conventional software engineering and the economic motivation behind modern software management practices.
	CO- 2	**Apply** the phases of the software life cycle to define and manage project artifacts and stages effectively.
	CO- 3	**Analyze** workflows, milestones, and iterative planning techniques for model-based software architectures and agile project management.
	CO- 4	**Apply** process automation principles and metrics to monitor and control software project execution.
	CO- 5	**Analyze** Agile methodology and DevOps practices to assess their integration into modern software project delivery.

MAN	**CO No**	**Course Outcome**
	CO- 1	**Understand** the fundamental characteristics, challenges, and applications of MANETs.
	CO- 2	**Apply** various MAC and routing protocols in Ad Hoc Wireless Networks.
	CO- 3	**Analyze** security issues, attack models, and defense mechanisms in Ad Hoc Wireless Networks.
	CO- 4	**Design** energy-efficient architectures/protocols for WSNs considering constraints.
	CO- 5	**Analyze** security, key management, and tools for WSNs.

	CO No	Course Outcome
NLP	CO- 1	**Analyze** natural language text using formal models and computational tools for advanced NLP tasks like parsing, tagging, and semantic analysis.
	CO- 2	**Evaluate** word-level models apply PoS tagging algorithms and understand the statistical foundations behind modern NLP systems
	CO- 3	**Evaluate** syntactic parsers, handle ambiguity using probabilistic models, and represent complex grammatical constraints using feature-based approaches.
	CO- 4	**Interpret** semantic representations, disambiguate word meanings, and understand meaningful relationships in dialogue systems.
	CO- 5	**Analyze** the discourse structure, resolve referential ambiguity, and leverage lexical resources to support a wide range of NLP.

	CO No	Course Outcome
BDA	CO- 1	**Understand** the fundamental concepts of Big Data, its convergence with key technologies, and its applications in domains such as marketing, healthcare, and finance.
	CO- 2	**Apply** NoSQL models (key-value, document, and graph), and perform data operations using Cassandra, including data loading and retrieval.
	CO- 3	**Analyze** data processing using Hadoop components such as HDFS, MapReduce, and Hive, focusing on architecture, data flow, and optimization techniques.
	CO- 4	**Evaluate** Apache Spark features such as RDDs, DataFrames, Catalyst optimizer, and in- memory processing compared to traditional Hadoop approaches.
	CO- 5	**Analyze** stream processing using Spark Structured Streaming including concepts like event time, watermarks, windowing, and transformations on streaming data.

	CO No	Course Outcome
DOS	CO- 1	**Understand** the fundamental concepts, models, and design issues in distributed computing systems and distributed operating systems.
	CO- 2	**Apply** message-passing systems and remote procedure call mechanisms for communication in distributed environments.
	CO- 3	**Analyze** the architecture and implementation of distributed shared memory systems and synchronization mechanisms.
	CO- 4	**Analyze** global resource management strategies such as task assignment, load balancing, and process/thread migration in distributed systems.
	CO- 5	**Design** distributed file systems that incorporate file models, access semantics, replication, caching, and fault tolerance.

	CO No	Course Outcome
	CO- 1	Demonstrate the ability to set up and manage virtualization tools and cloud platforms
	CO- 2	Develop simple web service applications using cloud platforms and serverless computing frameworks

CC LAB	CO- 3	Implement inter-process communication (IPC) and machine-to- machine communication for cloud-based software systems
	CO- 4	Build cloud-based distributed applications using Hadoop and simulate cloud resource scheduling using CloudSim
	CO- 5	Apply containerization and orchestration to set up lightweight cloud environments and manage storage volumes

	CO No	**Course Outcome**
CNS LAB	CO- 1	Demonstrate the ability to perform fundamental cryptographic operations
	CO- 2	Implement and analyze encryption and decryption techniques using standard block cipher algorithms.
	CO- 3	Develop symmetric encryption algorithms for secure data transmission
	CO- 4	Analyze and implement public key cryptographic algorithms and generate message digests using hashing
	CO- 5	Demonstrate the ability to implement secure data integrity techniques through practical programming applications

	CO No	**Course Outcome**
SOFTSKILLS	CO- 1	**Demonstrate** effective self-introduction, analytical thinking, listening, and non-verbal/verbal communication skills.
	CO- 2	**Apply** time, anger, and stress management strategies with appropriate social and professional etiquette.
	CO- 3	**Use** correct grammar and standard formats for academic and professional writing and documentation.
	CO- 4	**Participate** confidently in mock interviews, group discussions, and prepare impactful resumes.
	CO- 5	**Build** healthy interpersonal relationships and adapt to different communication styles in team settings.

	CO No	**Course Outcome**
TP&IPR	CO- 1	Apply analytical thinking and communication skills effectively in academic and personal contexts.
	CO- 2	Demonstrate self-management and etiquette skills to function efficiently in professional environments.
	CO- 3	Use correct grammar and formatting in written communication including letters, emails, and minutes.
	CO- 4	Participate effectively in group discussions, interviews, and prepare professional resumes.
	CO- 5	Build and maintain healthy interpersonal relationships in team-oriented settings.