

**Department of Computer Science and Engineering (AI&ML)****Program: B.Tech****Regulation: R23****Batch: 2023-2027****Total no of Courses: 68****Course Outcomes**

Semester No:	I B.Tech -I Semester		
Course Title:	Linear Algebra & Calculus	Course Code:	C101
Course Outcome No.	Course Outcome Statement		
C101.1	Apply matrix operations to find rank, inverse, and solve systems of linear equations using different methods.		
C101.2	Analyze eigenvalues, eigenvectors, diagonalization, Cayley-Hamilton theorem, and quadratic forms of matrices.		
C101.3	Apply differentiation and integration theorems to solve problems involving functions of one variable.		
C101.4	Analyze functions of two variables using partial derivatives, Jacobians, maxima-minima, and Lagrange multipliers.		
C101.5	Apply double and triple integrals to find areas, volumes, and solve coordinate transformation problems.		
Semester No:	I B.Tech -I Semester		
Course Title:	Engineering Physics	Course Code:	C102
Course Outcome No.	Course Outcome Statement		
C102.1	Explain the principles of interference, diffraction, and polarization and their applications.		
C102.2	Apply crystallographic concepts and X-ray diffraction techniques to determine crystal structures.		
C102.3	Analyze the properties and behavior of dielectric and magnetic materials.		
C102.4	Analyze quantum mechanical concepts and free electron theories in explaining material properties.		
C102.5	Apply carrier transport and energy band concepts to solve semiconductor-related problems.		
Semester No:	I B.Tech -I Semester		
Course Title:	Communicative English	Course Code:	C103
Course Outcome No.	Course Outcome Statement		
C103.1	Understand and use basic listening, speaking, reading, writing, grammar, and vocabulary skills in everyday communication.		
C103.2	Apply language skills to comprehend texts, participate in discussions, and write well-structured paragraphs.		
C103.3	Analyze information from texts and audio sources through summarizing, note-making, paraphrasing, and effective communication.		
C103.4	Analyze different forms of communication and prepare formal documents such as letters and resumes using appropriate language.		



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C103.5	Create effective presentations and structured essays using correct grammar, vocabulary, and communication skills.		
Semester No:	I B.Tech -I Semester		
Course Title:	Basic Civil & Mechanical Engineering	Course Code:	C104
Course Outcome No.	Course Outcome Statement		
C104.1	Explain the basics of Civil Engineering, construction materials, and prefabricated construction.		
C104.2	Apply basic surveying concepts such as measurements, levelling, bearings, and contour mapping.		
C104.3	Analyze transportation systems, water resources, environmental engineering, mechanical engineering fields, and engineering materials.		
C104.4	Analyze manufacturing processes, thermal systems, engines, and modern manufacturing technologies.		
C104.5	Apply power plants, power transmission systems, and robotics concepts to develop simple engineering solutions.		
Semester No:	I B.Tech -I Semester		
Course Title:	Introduction to Programming	Course Code:	C105
Course Outcome No.	Course Outcome Statement		
C105.1	Explain problem-solving techniques, algorithms, and program development concepts.		
C105.2	Apply C programming fundamentals, operators, control statements, and loops to solve simple problems.		
C105.3	Analyze arrays, pointers, and dynamic memory allocation for efficient program development.		
C105.4	Apply functions, recursion, and string manipulation techniques to develop programs.		
C105.5	Analyze the use of structures, unions, file handling, and user-defined data types in programming applications.		
Semester No:	I B.Tech -I Semester		
Course Title:	Communicative English Lab	Course Code:	C106
Course Outcome No.	Course Outcome Statement		
C106.1	Improve pronunciation and speaking skills through practice of vowels, consonants, accent neutralization, JAM, and role plays.		
C106.2	Develop communication skills required for group discussions, debates, presentations, and conversational practice.		
C106.3	Create professional documents like resumes, cover letters, SOPs, and perform confidently in interviews.		
Semester No:	I B.Tech -I Semester		
Course Title:	Engineering Physics Lab	Course Code:	C107
Course Outcome No.	Course Outcome Statement		
C107.1	Apply the principles of optics and electromagnetism to perform experiments and		



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	determine related physical parameters.		
C107.2	Analyze semiconductor, magnetic, and electrical properties of materials using experimental techniques.		
C107.3	Evaluate the mechanical and magnetic properties of materials through experimentation and interpretation of results.		
Semester No:	I B.Tech -I Semester		
Course Title:	Engineering Workshop	Course Code:	C108
Course Outcome No.	Course Outcome Statement		
C108.1	Apply workshop safety practices and identify the tools, materials, and equipment used in wood working, sheet metal work, fitting, and electrical wiring operations.		
C108.2	Construct basic engineering components, joints, and wiring circuits using wood working, sheet metal, fitting, and electrical workshop techniques.		
C108.3	Analyze and perform manufacturing and joining processes using foundry, welding, and plumbing techniques for preparing moulds, welded joints, and pipe connections.		
Semester No:	I B.Tech -I Semester		
Course Title:	IT Workshop	Course Code:	C109
Course Outcome No.	Course Outcome Statement		
C109.1	Understand and perform basic computer hardware operations, operating system installation (Windows/Linux/BOSS), and internet configuration.		
C109.2	Use application software tools like MS Word, Excel, PowerPoint, and LaTeX to create documents, spreadsheets, presentations, and project reports.		
C109.3	Apply basic internet skills, cyber safety practices, and use AI tools like ChatGPT for simple tasks such as writing, searching, and translation.		
Semester No:	I B.Tech -I Semester		
Course Title:	Computer Programming Lab	Course Code:	C110
Course Outcome No.	Course Outcome Statement		
C110.1	Understand basic concepts of C programming such as variables, operators, conditional statements, loops, arrays, and functions.		
C110.2	Apply concepts like pointers, structures, dynamic memory allocation, recursion, and file handling to develop C programs.		
C110.3	Apply problem-solving skills to write, compile, and execute C programs for simple mathematical and real-world applications.		
Semester No:	I B.Tech -I Semester		
Course Title:	Health and Wellness, Yoga and Sports	Course Code:	C111
Course Outcome No.	Course Outcome Statement		
C111.1	Explain the concepts of health, fitness, nutrition, balanced diet, immunity, BMI, and their role in maintaining a healthy lifestyle.		
C111.2	Demonstrate yoga practices including Asanas, Pranayama, Meditation, Surya Namaskar, and apply yoga techniques for stress management and mental well-being.		
C111.3	Participate in sports and fitness activities and apply fitness components, warm-up exercises, and cardiorespiratory training for improving physical fitness.		



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Semester No:	I B.Tech -II Semester		
Course Title:	Differential Equations and Vector calculus	Course Code:	C112
Course Outcome No.	Course Outcome Statement		
C112.1	Solve first-order differential equations and apply them to engineering problems such as cooling, growth, decay, and electrical circuits.		
C112.2	Analyze higher-order differential equations and their applications in LCR circuits and simple harmonic motion.		
C112.3	Apply methods for forming and solving first-order and linear partial differential equations with constant coefficients.		
C112.4	Examine vector functions and evaluate gradient, divergence, curl, and vector identities.		
C112.5	Evaluate line, surface, and volume integrals and apply Green's, Stoke's, and Divergence theorems to solve problems.		
Semester No:	I B.Tech -II Semester		
Course Title:	Chemistry	Course Code:	C113
Course Outcome No.	Course Outcome Statement		
C113.1	Explain quantum mechanical concepts and molecular orbital theory to determine bonding and bond order in molecules		
C113.2	Apply the concepts of semiconductors, superconductors, supercapacitors, and nanomaterials in engineering applications.		
C113.3	Analyze electrochemical cells, batteries, fuel cells, and electrochemical sensors using electrochemical principles.		
C113.4	Analyze the preparation, properties, and applications of polymers, elastomers, conducting polymers, and biodegradable polymers.		
C113.5	Analyze spectroscopic and chromatographic techniques for material characterization and chemical analysis.		
Semester No:	I B.Tech -II Semester		
Course Title:	Engineering Graphics	Course Code:	C114
Course Outcome No.	Course Outcome Statement		
C114.1	Explain the principles of engineering drawing, scales, geometrical constructions, and curves.		
C114.2	Apply orthographic projection techniques for points, lines, and planes.		
C114.3	Analyze the projections of solids in different positions with respect to reference planes.		
C114.4	Analyze sectional views and developments of surfaces of engineering solids.		
C114.5	Create engineering drawings by converting orthographic and isometric views and using AutoCAD tools.		
Semester No:	I B.Tech -II Semester		
Course Title:	Basic Electrical & Electronics Engineering	Course Code:	C115
Course Outcome No.	Course Outcome Statement		
C115.1	Describe the basic concepts of DC and AC circuits, circuit laws, and electrical		



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	parameters.		
C115.2	Explain the construction, working, and applications of electrical machines and measuring instruments.		
C115.3	Apply the concepts of energy resources, power generation, electricity billing, safety measures, and semiconductor devices.		
C115.4	Analyze the operation of electronic circuits, rectifiers, amplifiers, and instrumentation systems.		
C115.5	Design simple digital electronic circuits using logic gates, Boolean algebra, adders, and sequential circuits.		
Semester No:	I B.Tech -II Semester		
Course Title:	Data Structures	Course Code:	C116
Course Outcome No.	Course Outcome Statement		
C116.1	Describe the fundamentals of linear data structures, abstract data types, searching techniques, and sorting algorithms.		
C116.2	Explain the representation, operations, advantages, and applications of singly, doubly, and circular linked lists.		
C116.3	Apply stack operations and implement stack-based solutions for expression evaluation, backtracking, and related problems.		
C116.4	Analyze the implementation and applications of queues and dequeues in scheduling, traversal, and other computing tasks.		
C116.5	Evaluate and design efficient data storage and retrieval solutions using binary search trees and hashing techniques.		
Semester No:	I B.Tech -II Semester		
Course Title:	Chemistry Lab	Course Code:	C117
Course Outcome No.	Course Outcome Statement		
C117.1	Perform electrochemical and analytical experiments to determine conductance, cell constants, and redox properties of solutions.		
C117.2	Apply laboratory techniques for electrochemical analysis, material synthesis, and characterization of engineering materials.		
C117.3	Analyze spectroscopic data and prepare nanomaterials while estimating chemical constituents using standard methods.		
Semester No:	I B.Tech -II Semester		
Course Title:	Electrical & Electronics Engineering workshop	Course Code:	C118
Course Outcome No.	Course Outcome Statement		
C118.1	Apply basic electrical and electronic workshop skills using tools, measuring instruments, and electronic components.		
C118.2	Analyze the characteristics and performance of semiconductor devices and rectifier circuits through experimentation.		
C118.3	Evaluate and implement analog and digital electronic circuits using amplifiers, logic gates, and flip-flops.		
Semester No:	I B.Tech -II Semester		
Course Title:	Data Structures Lab	Course Code:	C119
Course Outcome No.	Course Outcome Statement		
C119.1	Apply arrays, searching, sorting, and linked list concepts to solve data structure problems.		
C119.2	Analyze and implement linked lists, stacks, and queues for efficient data organization and processing.		



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C119.3	Evaluate and develop solutions using stack and queue applications, binary search trees, and hashing techniques.		
Semester No:	I B.Tech -II Semester		
Course Title:	NSS/NCC/Scouts & Guides/Community Service	Course Code:	C120
Course Outcome No.	Course Outcome Statement		
C120.1	Understand the importance of discipline, character and service motto.		
C120.2	Solve some societal issues by applying acquired knowledge, facts, and techniques.		
C120.3	Explore human relationships by analyzing social problems.		
C120.4	Determine to extend their help for the fellow beings and downtrodden people.		
C120.5	Develop leadership skills and civic responsibilities.		
Semester No:	II B.Tech -I Semester		
Course Title:	Discrete Mathematics & Graph Theory	Course Code:	C201
Course Outcome No.	Course Outcome Statement		
C201.1	Understand the basic concepts of statements, logical connectives, truth tables, tautologies, normal forms, and rules of inference.		
C201.2	Apply predicates, quantifiers, and predicate calculus rules to represent and solve logical reasoning problems.		
C201.3	Analyze counting techniques, relations, equivalence relations, posets, and lattices for solving discrete mathematical problems.		
C201.4	Evaluate algebraic structures such as semigroups, monoids, groups, subgroups, cosets, and verify their properties.		
C201.5	Create mathematical models and develop solutions for recurrence relations and generating functions using appropriate techniques.		
Semester No:	II B.Tech -I Semester		
Course Title:	Universal Human Values 2-Understanding Harmony & Ethical Human Conduct	Course Code:	C202
Course Outcome No.	Course Outcome Statement		
C202.1	Remember the concepts of value education, self-exploration, human aspirations, happiness, prosperity, and natural acceptance.		
C202.2	Explain the harmony between the self and the body and the importance of self-regulation and health.		
C202.3	Apply the values of trust, respect, justice, and relationships to establish harmony in family and society.		
C202.4	Analyze the interconnectedness and mutual fulfillment among nature, existence, and human beings.		
C202.5	Analyze professional ethics, human values, and value-based approaches for responsible living and societal development.		
Semester No:	II B.Tech -I Semester		



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Course Title:	Principles of Artificial Intelligence	Course Code:	C203
Course Outcome No.	Course Outcome Statement		
C203.1	Explain the fundamental concepts of Artificial Intelligence, intelligent agents, environments, rationality, and problem formulation		
C203.2	Apply uninformed and heuristic search techniques, game-playing strategies, and problem-solving methods to AI applications		
C203.3	Analyze knowledge representation schemes, rule-based systems, and reasoning mechanisms under certainty and uncertainty.		
C203.4	Assess first-order logic inference techniques and machine learning approaches for intelligent decision-making.		
C203.5	Develop AI-based solutions using search, reasoning, learning, and expert system methodologies for real-world problems.		
Semester No:	II B.Tech -I Semester		
Course Title:	Advanced Data Structures & Algorithms Analysis	Course Code:	C204
Course Outcome No.	Course Outcome Statement		
C204.1	Analyze algorithmic concepts, asymptotic notations, AVL trees, and B-trees along with their operations and applications.		
C204.2	Apply heap operations, graph traversal techniques, and divide-and-conquer strategies to solve computational problems efficiently.		
C204.3	Analyze greedy and dynamic programming algorithms to solve optimization and shortest path problems.		
C204.4	Analyze and solve combinatorial optimization problems using backtracking and branch-and-bound techniques.		
C204.5	Evaluate the complexity of computational problems and distinguish between NP-Hard and NP-Complete problems with suitable examples.		
Semester No:	II B.Tech -I Semester		
Course Title:	Object-Oriented Programming Through JAVA	Course Code:	C205
Course Outcome No.	Course Outcome Statement		
C205.1	Explain the fundamentals of object-oriented programming, Java program structure, data types, operators, and control statements.		
C205.2	Apply classes, objects, constructors, methods, and access control mechanisms to develop Java programs.		
C205.3	Analyze arrays, inheritance, interfaces, and polymorphism concepts to design object-oriented solutions.		
C205.4	Analyze the use of packages, Java libraries, exception handling, and file handling techniques in Java applications.		
C205.5	Evaluate and develop Java applications using strings, multithreading, JDBC, and JavaFX GUI components.		
Semester No:	II B.Tech -I Semester		
Course Title:	Advanced Data	Course Code:	C206



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	Structures and Algorithms Analysis Lab		
Course Outcome No.	Course Outcome Statement		
C206.1	Analyze advanced data structures (AVL trees, B-Trees, heaps) and algorithms (sorting, graph traversal, backtracking) for solving computational problems.		
C206.2	Analyze and compare algorithm performance for various problems, including shortest paths, scheduling, and combinatorial optimization.		
C206.3	Apply design strategies like greedy, dynamic programming, and branch and bound to solve complex computational problems		
Semester No:	II B.Tech -I Semester		
Course Title:	Object-Oriented Programming Through JAVA Lab	Course Code:	C207
Course Outcome No.	Course Outcome Statement		
C207.1	Apply object-oriented programming concepts such as classes, objects, methods, inheritance, and polymorphism to develop Java applications.		
C207.2	Analyze and implement exception handling, multithreading, packages, interfaces, and file operations in Java programs.		
C207.3	Apply JDBC connectivity and JavaFX GUI components to develop Java applications for real-world problems.		
Semester No:	II B.Tech -I Semester		
Course Title:	Python programming	Course Code:	C208
Course Outcome No.	Course Outcome Statement		
C208.1	Apply Python fundamentals including operators, control structures, functions, strings, lists, tuples, sets, and dictionaries to develop solutions for basic computational problems.		
C208.2	Develop Python programs using file handling techniques, arrays, matrices, and object-oriented programming concepts to solve real-world problems.		
C208.3	Apply Python libraries such as JSON, NumPy, Pandas, and Matplotlib for data analysis, manipulation, visualization, and introductory data science applications.		
Semester No:	II B.Tech -I Semester		
Course Title:	Environmental Science	Course Code:	C209
Course Outcome No.	Course Outcome Statement		
C209.1	Explain the multidisciplinary nature of environmental studies and analyze the use, exploitation, and conservation of natural resources.		
C209.2	Describe ecosystem structure and function, biodiversity concepts, and conservation strategies at global, national, and local levels.		
C209.3	Analyze the causes, effects, and control measures of various types of environmental pollution and solid waste management practices.		
C209.4	Analyze environmental issues, sustainable development practices, environmental legislation, and the role of public awareness in environmental protection.		
C209.5	Assess the relationship between human population and the environment, including health, welfare, and field-based environmental studies.		
Semester No:	II B.Tech -II Semester		
Course Title:	Managerial Economics &	Course Code:	C210



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	Financial Analysis		
Course Outcome No.	Course Outcome Statement		
C210.1	Understand the concepts of managerial economics including demand, elasticity, demand forecasting, and their managerial relevance.		
C210.2	Analyze production functions, cost behavior, and break-even analysis for cost optimization and decision making.		
C210.3	Analyze different business organizations and market structures along with pricing methods and strategies.		
C210.4	Apply capital budgeting techniques such as payback period, ARR, NPV, and IRR for investment decision making.		
C210.5	Analyze financial statements using accounting concepts and financial ratios to assess financial performance.		
Semester No:	II B.Tech -II Semester		
Course Title:	Probability & Statistics	Course Code:	C211
Course Outcome No.	Course Outcome Statement		
C211.1	Understand the fundamental concepts of descriptive statistics, including measures of central tendency, variability, skewness, kurtosis, and correlation analysis.		
C211.2	Comprehend the principles of probability, including axioms, laws, conditional probability, and mathematical expectation, to support probabilistic reasoning.		
C211.3	Analyze various probability distributions such as Binomial, Poisson, and Normal distributions, including their properties and applications.		
C211.4	Develop skills in estimation and hypothesis testing, including large sample tests for proportions and means, as well as constructing confidence intervals.		
C211.5	Apply small sample tests, including Student's t-distribution and F-test, to evaluate hypotheses related to sample means and variances for decision-making.		
Semester No:	II B.Tech -II Semester		
Course Title:	Machine Learning	Course Code:	C212
Course Outcome No.	Course Outcome Statement		
C212.1	Explain the basic concepts, stages, data types, and learning paradigms of Machine Learning.		
C212.2	Apply nearest neighbor-based algorithms and distance measures for classification and regression problems.		
C212.3	Analyze decision tree models, random forests, and Bayes classifiers for machine learning tasks.		
C212.4	Evaluate linear discriminant models, perceptrons, SVMs, regression techniques, and neural networks for prediction and classification.		
C212.5	Design a machine learning solution by selecting suitable clustering techniques and applying		
Semester No:	II B.Tech -II Semester		
Course Title:	Database Management Systems	Course Code:	C213
Course Outcome No.	Course Outcome Statement		
C213.1	Understand the fundamental concepts of database systems, data models, database architecture, and ER modeling.		
C213.2	Explain the relational data model, integrity constraints, relational algebra, relational calculus, and basic SQL commands.		
C213.3	Apply SQL queries, joins, views, subqueries, aggregation, and relational operations to manipulate and retrieve data.		



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C213.4	Analyze database schemas using normalization techniques, functional dependencies, and normal forms for database design.		
C213.5	Analyze transaction management, concurrency control, recovery mechanisms, and indexing techniques in database systems.		
Semester No:	II B.Tech -II Semester		
Course Title:	Digital Logic and Computer Organization	Course Code:	C214
Course Outcome No.	Course Outcome Statement		
C214.1	Analyze the concepts of data representation, binary codes, logic gates, and combinational circuits.		
C214.2	Explain sequential circuits, counters, registers, computer organization, and Von-Neumann architecture.		
C214.3	Apply computer arithmetic operations and processor organization concepts to solve computational problems.		
C214.4	Analyze memory organization, cache memory, virtual memory, and memory management techniques.		
C214.5	Analyze input/output organization, interrupts, DMA, buses, and interface circuits in computer systems.		
Semester No:	II B.Tech -II Semester		
Course Title:	Machine Learning Lab	Course Code:	C215
Course Outcome No.	Course Outcome Statement		
C215.1	Recall and explain fundamental data preprocessing techniques and machine learning algorithms such as attribute selection, missing value handling, discretization, KNN, decision trees, and clustering methods.		
C215.2	Apply various data preprocessing methods and implement machine learning algorithms to analyze datasets for classification, regression, and clustering tasks.		
C215.3	Develop and interpret models for real-world datasets, creating insights through classification, regression, and clustering techniques.		
Semester No:	II B.Tech -II Semester		
Course Title:	Database Management System Lab	Course Code:	C216
Course Outcome No.	Course Outcome Statement		
C216.1	Construct database schemas and apply SQL commands, operators, functions, and queries to retrieve and manipulate data effectively in relational databases.		
C216.2	Analyze and develop PL/SQL programs using control structures, procedures, functions, cursors, triggers, and exception handling mechanisms to automate database operations.		
C216.3	Apply database-driven applications and evaluate database performance using indexing techniques and JDBC-based connectivity solutions.		
Semester No:	II B.Tech -II Semester		
Course Title:	Full Stack Development -I	Course Code:	C217
Course Outcome No.	Course Outcome Statement		
C217.1	Recall and understand the fundamental HTML tags, CSS styles, and JavaScript functions used for designing and enhancing web pages.		
C217.2	Apply HTML, CSS, and JavaScript techniques to develop interactive web pages with forms, multimedia, tables, lists, and dynamic content.		



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C217.3	Evaluate and create comprehensive web applications by integrating multimedia, form validation, scripting, and styling to meet user requirements and improve usability.		
Semester No:	II B.Tech -II Semester		
Course Title:	Design Thinking & Innovation	Course Code:	C218
Course Outcome No.	Course Outcome Statement		
C218.1	Apply design thinking principles and tools to identify user needs and develop innovative solutions.		
C218.2	Analyze creativity, innovation, and product design processes to develop value-driven products.		
C218.3	Develop business models and prototypes using design thinking for entrepreneurship and strategic innovation.		
Semester No:	III B.Tech -I Semester		
Course Title:	Information Retrieval Systems	Course Code:	C301
Course Outcome No.	Course Outcome Statement		
C301.1	Explain the fundamentals of text retrieval, Boolean retrieval, dictionaries, postings, and index construction.		
C301.2	Apply vector space models, TF-IDF, and evaluation measures in information retrieval.		
C301.3	Analyze relevance feedback, query expansion, and query reformulation techniques.		
C301.4	Analyze probabilistic models, language models, BM25, KL-divergence, and smoothing techniques.		
C301.5	Analyze text classification and clustering techniques for information retrieval applications.		
Semester No:	III B.Tech -I Semester		
Course Title:	Computer Networks	Course Code:	C302
Course Outcome No.	Course Outcome Statement		
C302.1	Explain network models, topologies, transmission media, and switching techniques.		
C302.2	Apply multiplexing and data link layer protocols for reliable data communication.		
C302.3	Apply medium access control techniques and routing mechanisms in computer networks.		
C302.4	Analyze IP addressing, routing algorithms, and IEEE networking standards.		
C302.5	Analyze transport and application layer protocols, including TCP, UDP, DNS, FTP, and HTTP, for network communication.		
Semester No:	III B.Tech -I Semester		
Course Title:	Deep Learning with Applications	Course Code:	C303
Course Outcome No.	Course Outcome Statement		
C303.1	Explain the fundamentals of deep learning, linear classifiers, and optimization techniques		
C303.2	Apply neural networks, autoencoders, and convolutional neural networks for learning tasks.		
C303.3	Apply optimization and normalization techniques to improve deep neural network		



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	training.		
C303.4	Analyze deep learning architectures and their applications in computer vision tasks.		
C303.5	Evaluate advanced deep learning models such as LSTM, VAE, and GAN for real-world problems.		
Semester No:	III B.Tech -I Semester		
Course Title:	Software Engineering	Course Code:	C304
Course Outcome No.	Course Outcome Statement		
C304.1	Explain the fundamentals of software engineering, software processes, process models, and software development practices.		
C304.2	Analyze software requirements, SRS documents, and software design principles such as cohesion, coupling, and design approaches.		
C304.3	Apply function-oriented design techniques, object-oriented design concepts, and user interface design methodologies to software systems.		
C304.4	Apply coding standards, software testing techniques, debugging methods, and testing strategies for software quality assurance.		
C304.5	Analyze software reliability, quality management, maintenance processes, configuration management, and software reuse concepts		
Semester No:	III B.Tech -I Semester		
Course Title:	Internet of Things	Course Code:	C305
Course Outcome No.	Course Outcome Statement		
C305.1	Explain the fundamentals, architecture, enabling technologies, and components of IoT ecosystems.		
C305.2	Apply IoT communication protocols and technologies for connecting constrained devices and networks.		
C305.3	Analyze IoT design methodologies, embedded systems, and hardware platforms such as Arduino and Raspberry Pi.		
C305.4	Analyze IoT data analytics, data management, and cloud-based services for IoT applications.		
C305.5	Analyze IoT applications in homes, buildings, industries, security, and smart devices, with reference to Industry 4.0 concepts.		
Semester No:	III B.Tech -I Semester		
Course Title:	Information Retrieval & Deep Learning Lab	Course Code:	C306
Course Outcome No.	Course Outcome Statement		
C306.1	Implement information retrieval techniques for document indexing, retrieval, and classification.		
C306.2	Apply machine learning algorithms for document classification and clustering tasks.		
C306.3	Analyze deep learning models for classification, prediction, and sequence learning applications.		
Semester No:	III B.Tech -I Semester		
Course Title:	Computer Networks Lab	Course Code:	C307
Course Outcome No.	Course Outcome Statement		



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C307.1	Demonstrate data communication concepts using framing, error detection, flow control, and address resolution techniques.		
C307.2	Implement routing and broadcasting algorithms for efficient packet delivery in computer networks.		
C307.3	Develop network applications and protocol simulations using socket programming and client-server models.		
Semester No:	III B.Tech -I Semester		
Course Title:	NodesJS	Course Code:	C308
Course Outcome No.	Course Outcome Statement		
C308.1	Understand Node.js fundamentals including architecture, process model, modules, NPM, and web server concepts.		
C308.2	Apply Node.js core concepts such as file system operations, callbacks, and event-driven programming for backend development.		
C308.3	Develop full-stack backend applications using Express.js and MongoDB including routing, middleware, debugging, and REST API creation.		
Semester No:	III B.Tech -I Semester		
Course Title:	Tinkering Lab	Course Code:	C309
Course Outcome No.	Course Outcome Statement		
C309.1	Explain the problem statement, objectives, system architecture, hardware components, software tools, and working principles of the selected real-time application project such as Smart Parking, Home Automation, Face Recognition Door Lock, Drone Surveillance, or other innovative systems.		
C309.2	Develop and implement the selected project by integrating appropriate hardware devices, sensors, controllers, communication modules, programming techniques, and software technologies to achieve the desired functionality and performance.		
C309.3	Analyze and evaluate the performance, reliability, efficiency, and practical applicability of the developed system through testing, validation, and comparison with existing solutions, and suggest possible enhancements for real-world deployment.		
Semester No:	III B.Tech -I Semester		
Course Title:	Evaluation of Community Service Internship	Course Code:	C310
Course Outcome No.	Course Outcome Statement		
C310.1	Understand the importance of community service and social responsibility.		
C310.2	Identify and participate in community-based projects and initiatives.		
C310.3	Develop interpersonal and teamwork skills by working with community members.		
C310.4	Apply problem-solving skills to address real-life community issues.		
C310.5	Reflect on personal learning and growth through documentation and reporting of internship experiences.		
Semester No:	III B.Tech -II Semester		
Course Title:	Operating System	Course Code:	C311
Course Outcome No.	Course Outcome Statement		



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C311.1	Explain the objectives, functions, architecture, evolution, services, system calls, protection, and security mechanisms of operating systems		
C311.2	Apply process management, CPU scheduling, threads, synchronization mechanisms, and inter-process communication techniques to solve operating system problems.		
C311.3	Analyze deadlock handling techniques, protection mechanisms, and system security concepts in operating systems		
C311.4	Analyze memory management techniques including paging, segmentation, virtual memory, page replacement algorithms, and allocation strategies for efficient memory utilization.		
C311.5	Analyze file system implementation, disk scheduling algorithms, storage management, and dynamic memory allocation techniques to understand their impact on system performance.		
Semester No:	III B.Tech -II Semester		
Course Title:	Automata Theory & Compiler Design	Course Code:	C312
Course Outcome No.	Course Outcome Statement		
C312.1	Explain the concepts of formal languages, regular expressions, finite automata, and context-free grammars used in compiler design.		
C312.2	Apply top-down (LL (1)) and bottom-up (SLR, CLR, LALR) parsing techniques, syntax-directed translation, and intermediate code generation in compiler construction.		
C312.3	Analyze context-sensitive features, type checking, type conversion, and type equivalence in programming languages.		
C312.4	Analyze run-time storage organization, storage allocation strategies, and code optimization techniques for efficient program execution.		
C312.5	Analyze code generation methods, register allocation techniques, and DAG-based optimization for efficient target code generation.		
Semester No:	III B.Tech -II Semester		
Course Title:	Computer Vision	Course Code:	C313
Course Outcome No.	Course Outcome Statement		
C313.1	Explain the fundamentals of computer vision, image formation, geometric transformations, and digital cameras.		
C313.2	Apply feature detection, description, matching, tracking, edge detection, and line detection techniques.		
C313.3	Analyze different image segmentation techniques for solving computer vision applications.		
C313.4	Apply feature-based alignment, pose estimation, camera calibration, and geometric techniques in vision applications.		
C313.5	Analyze object, face, and pedestrian detection, recognition, and scene understanding methods.		
Semester No:	III B.Tech -II Semester		
Course Title:	Cryptography & Network Security	Course Code:	C314
Course Outcome No.	Course Outcome Statement		
C314.1	Explain the fundamentals of network security and cryptographic principles.		



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C314.2	Apply mathematical concepts and symmetric key cryptographic techniques to secure data.		
C314.3	Analyze public key cryptographic algorithms and key exchange mechanisms.		
C314.4	Analyze authentication techniques, digital signatures, certificates, and key management protocols.		
C314.5	Evaluate network security protocols, Cyberattacks, Malware, and legal aspects for secure communication.		
Semester No:	III B.Tech -II Semester		
Course Title:	Software Project Management	Course Code:	C315
Course Outcome No.	Course Outcome Statement		
C315.1	Explain the principles of software management, software economics, and process improvement.		
C315.2	Apply modern software engineering principles and iterative life cycle models in project development.		
C315.3	Analyze software architectures, process workflows, and project planning techniques.		
C315.4	Analyze project organization, cost estimation models, and project control metrics.		
C315.5	Analyze effort estimation, scheduling, quality planning, and risk management techniques for software projects.		
Semester No:	III B.Tech -II Semester		
Course Title:	Block Chain Technologies	Course Code:	C316
Course Outcome No.	Course Outcome Statement		
C316.1	Explain blockchain fundamentals, cryptographic hash functions, SHA-256, Merkle trees, and basic blockchain working mechanisms.		
C316.2	Apply digital signature concepts using ECDSA and explain public key identity and simple cryptocurrency systems.		
C316.3	Analyze decentralization, distributed consensus, proof of work, and Bitcoin transaction mechanisms.		
C316.4	Analyze Bitcoin storage systems including wallets, exchanges, payment services, and transaction fee models.		
C316.5	Analyze Bitcoin mining strategies, incentives, hardware, and anonymity techniques such as mixing and Zero Coin / Zero Cash.		
Semester No:	III B.Tech -II Semester		
Course Title:	Computer Vision Lab	Course Code:	C317
Course Outcome No.	Course Outcome Statement		
C317.1	Apply image processing and feature extraction techniques using OpenCV.		
C317.2	Implement computer vision algorithms for image segmentation, alignment, calibration, and object detection.		
C317.3	Analyze and evaluate computer vision applications using machine learning and deep learning techniques.		
Semester No:	III B.Tech -II Semester		
Course Title:	Operating System lab	Course Code:	C318
Course Outcome No.	Course Outcome Statement		
C318.1	Understand CPU scheduling, memory management, deadlocks, file allocation, and		



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	process synchronization concepts		
C318.2	Implement operating system algorithms using system calls, threads, semaphores, and memory management techniques		
C318.3	Analyze the performance of scheduling, deadlock handling, page replacement, and synchronization algorithms.		
Semester No:	III B.Tech -II Semester		
Course Title:	Soft skills	Course Code:	C319
Course Outcome No.	Course Outcome Statement		
C319.1	Apply grammar, reading comprehension, and writing skills to produce effective written communication in academic and professional contexts.		
C319.2	Analyze communication situations and participate effectively in group discussions by applying interpersonal, teamwork, leadership, and presentation skills.		
C319.3	Create professional resumes, cover letters, and interview responses to demonstrate employability, communication, and professional skills.		
Semester No:	III B.Tech -II Semester		
Course Title:	Technical Paper Writing & IPR	Course Code:	C320
Course Outcome No.	Course Outcome Statement		
C320.1	Explain the concepts of technical writing, research paper structure, audience, purpose, and common writing practices.		
C320.2	Apply the research process, literature review techniques, citation styles, and writing tools for preparing technical documents.		
C320.3	Analyze publication ethics, plagiarism, authorship responsibilities, and peer review practices in research.		
C320.4	Analyze intellectual property rights, patent concepts, and national and international IPR frameworks for innovation and research.		
C320.5	Develop patent search strategies and prepare patent application documents by applying patent filing procedures and IPR principles.		
Semester No:	IV B.Tech -I Semester		
Course Title:	Natural Language Programming	Course Code:	C401
Course Outcome No.	Course Outcome Statement		
C401.1	Explain the fundamentals of morphology and document structure in natural language processing.		
C401.2	Apply syntactic parsing techniques and parsing algorithms for sentence analysis.		
C401.3	Analyze semantic parsing methods and word sense representation techniques.		
C401.4	Evaluate predicate-argument structures and meaning representation models for semantic interpretation.		
C401.5	Design language models and discourse processing techniques for multilingual natural language applications		
Semester No:	IV B.Tech -I Semester		
Course Title:	Management Science Human Resource Management Entrepreneurship &	Course Code:	C402



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	Incubation		
Course Outcome No.	Course Outcome Statement		
C402.1	Remember the concepts, characteristics, importance, and role of entrepreneurship in the Indian economy.		
C402.2	Understand business opportunities, idea generation, creativity, innovation, and design thinking.		
C402.3	Apply feasibility analysis techniques to prepare a simple business plan using Business Canvas and Lean Canvas.		
C402.4	Analyze the role of business incubators, startups, and startup strategies through case studies.		
C402.5	Analyze sources of finance and develop a basic business model or startup plan for a new venture.		
Semester No:	IV B.Tech -I Semester		
Course Title:	NoSQL databases	Course Code:	C403
Course Outcome No.	Course Outcome Statement		
C403.1	Remember the fundamental concepts, architecture, and different types of NoSQL databases including key/value, document, column-oriented, and graph databases.		
C403.2	Explain the principles of NoSQL data models, language bindings, and CRUD operations for managing non-relational databases.		
C403.3	Apply NoSQL database operations, querying techniques, and data manipulation methods using document, key/value, and column-oriented databases.		
C403.4	Analyze NoSQL storage architectures, schema evolution, data consistency models, and query mechanisms in distributed databases.		
C403.5	Evaluate indexing, ordering techniques, and database performance strategies to optimize NoSQL database applications		
Semester No:	IV B.Tech -I Semester		
Course Title:	Reinforcement Learning	Course Code:	C404
Course Outcome No.	Course Outcome Statement		
C404.1	Recall the fundamental concepts of Reinforcement Learning, Markov Decision Processes, Bellman equations, value functions, policies, and exploration-exploitation strategies.		
C404.2	Describe tabular reinforcement learning methods, Dynamic Programming, Monte Carlo methods, Temporal-Difference learning, and Deep Q-Network architectures.		
C404.3	Apply reinforcement learning algorithms, including Q-learning, SARSA, DQN, and policy gradient methods, to solve sequential decision-making problems.		
C404.4	Analyze model-based reinforcement learning approaches, planning techniques, actor-critic methods, and policy optimization algorithms for different learning environments.		
C404.5	Analyze meta-learning, multi-agent reinforcement learning, partially observable environments, ethics, and real-world applications of reinforcement learning.		
Semester No:	IV B.Tech -I Semester		
Course Title:	Soft Computing Techniques	Course Code:	C405
Course Outcome No.	Course Outcome Statement		
C405.1	Remember the fundamental concepts, techniques, and applications of Soft Computing, including hard and soft computing paradigms.		
C405.2	Explain the principles, architectures, and learning mechanisms of Artificial Neural Networks and their applications.		



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C405.3	Apply fuzzy set theory, fuzzy logic, and rule-based systems to solve decision-making and control problems.		
C405.4	Analyze genetic algorithms and hybrid soft computing techniques for solving optimization and engineering problems.		
C405.5	Analyze hybrid soft computing models, including GA-based Backpropagation and Fuzzy Backpropagation Networks, for intelligent systems and real-world applications.		
Semester No:	IV B.Tech -I Semester		
Course Title:	Product Design and Development	Course Code:	C406
Course Outcome No.	Course Outcome Statement		
C406.1	Remember the fundamentals of product development process, customer needs, and product specifications		
C406.2	Understand concept generation, concept selection, concept testing, and innovation methods		
C406.3	Apply product architecture, industrial design, and product planning techniques in product development.		
C406.4	Analyze design for manufacturing (DFM), prototyping methods, and their impact on product development.		
C406.5	Evaluate product development economics and sustainable product development using life cycle assessment.		
Semester No:	IV B.Tech -I Semester		
Course Title:	Prompt Engineering	Course Code:	C407
Course Outcome No.	Course Outcome Statement		
C407.1	Understand the concepts of prompt engineering, different types of large language models, prompting techniques, and best practices for designing effective prompts.		
C407.2	Apply prompt engineering principles to develop task-specific prompts for text generation, summarization, question answering, classification, and automation using LLM APIs.		
C407.3	Analyze the quality and effectiveness of prompts by evaluating outputs, identifying limitations and hallucinations, improving prompt robustness, and designing prompt-based solutions for real-world applications.		
Semester No:	IV B.Tech -I Semester		
Course Title:	Gender Sensitization	Course Code:	C408
Course Outcome No.	Course Outcome Statement		
C408.1	Remember the fundamental concepts of gender, gender socialization, and gender-related terminology.		
C408.2	Explain gender roles, gender relations, discrimination, and the impact of gender diversity in society.		
C408.3	Apply the concepts of gender equality, human rights, and sustainable development to analyze workplace and social issues.		
C408.4	Analyze different forms of gender-based violence, labour division, media representation, and their social consequences.		
C408.5	Analyze gender-sensitive practices and equitable solutions for inclusive relationships, culture, and social development.		
Semester No:	IV B.Tech -I Semester		
Course Title:	Evaluation of Industry	Course Code:	C409



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	Internship		
Course Outcome No.	Course Outcome Statement		
C409.1	Gain practical hands-on experience in real-world engineering environments through industry internships, applying theoretical knowledge to solve practical problems		
C409.2	Develop professional skills such as teamwork, time management, and ethical practices during the internship period		
C409.3	Analyze and evaluate industry practices and standards, and prepare a comprehensive internship report		
Semester No:	IV B.Tech -II Semester		
Course Title:	Full semester Internship & Project Work	Course Code:	C410
Course Outcome No.	Course Outcome Statement		
C410.1	Analyze existing literature and requirements to identify gaps and formulate a clear understanding of the problem domain.		
C410.2	Design and develop system architecture and components to implement an effective solution based on identified requirements.		
C410.3	Evaluate the developed system through testing and assessment, ensuring functionality, performance, and readiness for deployment.		

HOD-CSE (AI&ML)