

**Department of Computer Science and Engineering (DS)****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.		
C103.5	Create effective presentations and structured essays using correct grammar, vocabulary,		



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	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 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		



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	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.		
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		



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	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 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		



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	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.		
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	Course Code:	C120



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	&Guides/Community Service		
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		
Course Title:	Introduction to Data Science	Course Code:	C203
Course Outcome No.	Course Outcome Statement		
C203.1	Explain the fundamentals of data science, data science process, big data ecosystem, and applications of data science.		
C203.2	Apply machine learning techniques and Python tools for data modeling, feature engineering, and handling large datasets.		



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C203.3	Analyze big data processing techniques, Hadoop framework, NoSQL databases, and their applications in real-world case studies.		
C203.4	Analyze the use of graph databases, text analytics tools, and data science libraries for solving data-driven problems.		
C203.5	Apply data visualization techniques, dashboard development tools, and data science solutions for real-world applications.		
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:	Data Science Lab	Course Code:	C206
Course Outcome No.	Course Outcome Statement		
C206.1	Apply NumPy and Pandas libraries to create, manipulate, process, and analyze data in Python.		
C206.2	Analyze datasets using data preprocessing techniques, file handling methods, and web scraping tools.		
C206.3	Evaluate and visualize data using Matplotlib, NLTK, Scikit-Learn, and other Python libraries for data science applications.		
Semester No:	II B.Tech -I Semester		



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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:	Probability and Statistics	Course Code:	C210
Course Outcome No.	Course Outcome Statement		
C210.1	Define and describe statistical concepts, data collection methods, measures of central tendency, dispersion, correlation, and regression		
C210.2	Explain and apply probability concepts, probability laws, conditional probability, Bayes' theorem, random variables, and expectation.		
C210.3	Apply probability distributions such as Binomial, Poisson, and Normal distributions to solve problems.		
C210.4	Analyze estimation methods and large sample hypothesis testing for means and proportions.		
C210.5	Evaluate statistical hypotheses using t-tests, F-tests, and χ^2 -tests for decision making.		
Semester No:	II B.Tech -II Semester		



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Course Title:	Statistical methods for Data science	Course Code:	C211
Course Outcome No.	Course Outcome Statement		
C211.1	Recall the concepts of random variables, probability distributions, population, sample, parameters, statistics, and properties of estimators.		
C211.2	Explain the principles of point estimation methods such as Maximum Likelihood, Method of Moments, Least Squares, and Minimum Chi-square estimation.		
C211.3	Apply interval estimation techniques to construct confidence intervals for population parameters.		
C211.4	Analyze hypothesis testing procedures including Neyman-Pearson lemma, most powerful tests, and likelihood ratio tests.		
C211.5	Evaluate statistical hypotheses using t-tests, F-tests, and Chi-square tests for decision making.		
Semester No:	II B.Tech -II Semester		
Course Title:	Data Engineering	Course Code:	C212
Course Outcome No.	Course Outcome Statement		
C212.1	Explain the concepts of Data Engineering, Data Engineering Life Cycle, Data Maturity, and the roles and responsibilities of a Data Engineer.		
C212.2	Describe the stages of the Data Engineering Life Cycle and the supporting concepts such as Security, Data Management, DataOps, Architecture, and Orchestration.		
C212.3	Apply data architecture principles to identify and work with various data sources, APIs, databases, logs, and change data capture techniques.		
C212.4	Analyze different data storage systems, data warehouses, data lakes, lakehouses, and data ingestion approaches.		
C212.5	Evaluate query processing, data modeling, transformations, and data-serving techniques for analytics and machine learning applications.		
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.		
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		



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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:	Data Engineering Lab	Course Code:	C215
Course Outcome No.	Course Outcome Statement		
C215.1	Install, configure, and utilize data engineering tools and programming techniques to read, write, and manage data from files and databases.		
C215.2	Analyze, clean, transform, and integrate data using Python, Airflow, NiFi, and visualization tools to develop reliable data pipelines and dashboards.		
C215.3	Develop and deploy production-ready data pipelines by applying version control, monitoring, testing, and deployment strategies in enterprise environments.		
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:	Exploratory Data Analysis with Python	Course Code:	C217
Course Outcome No.	Course Outcome Statement		
C217.1	Apply Python tools and EDA techniques to load, explore, and visualize datasets.		
C217.2	Analyze datasets using data cleaning, transformation, statistical measures, and exploratory analysis techniques.		
C217.3	Develop and evaluate predictive models using statistical and machine learning methods.		
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.		



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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:	Operating System	Course Code:	C301
Course Outcome No.	Course Outcome Statement		
C301.1	Recall and describe the fundamental concepts of Operating Systems, including types of operating systems, operating system services, system calls, and operating system		
C301.2	Explain and interpret process management concepts such as process creation, process scheduling, inter-process communication, multithreading models, and scheduling algorithms.		
C301.3	Apply synchronization mechanisms such as semaphores, monitors, and synchronization hardware to solve critical section and process coordination problems.		
C301.4	Analyze deadlock situations and memory management techniques, including paging, segmentation, virtual memory, and page replacement algorithms, to improve system performance.		
C301.5	Analyze file systems, disk scheduling, storage management, and Android OS services based on system requirements and performance.		
Semester No:	III B.Tech -I Semester		
Course Title:	Machine Learning	Course Code:	C302
Course Outcome No.	Course Outcome Statement		
C302.1	Explain the basic concepts, stages, data types, and learning paradigms of Machine Learning.		
C302.2	Apply nearest neighbor-based algorithms and distance measures for classification and regression problems.		
C302.3	Analyze decision tree models, random forests, and Bayes classifiers for machine learning tasks.		
C302.4	Evaluate linear discriminant models, perceptrons, SVMs, regression techniques, and neural networks for prediction and classification.		
C302.5	Design a machine learning solution by selecting suitable clustering techniques and applying		
Semester No:	III B.Tech -I Semester		
Course Title:	Computer Networks	Course Code:	C303
Course Outcome No.	Course Outcome Statement		
C303.1	Explain the fundamentals of computer networks, protocol architectures, and reference models.		
C303.2	Analyze data link layer protocols, error control mechanisms, and Ethernet-based communication technologies.		
C303.3	Analyze routing, addressing, internetworking, and traffic management techniques in computer networks.		
C303.4	Apply transport layer protocols and socket programming concepts to support reliable end-to-end communication.		



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C303.5	Evaluate application layer services and protocols for web, e-mail, content delivery, and peer-to-peer networking applications.		
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:	Managerial Economics & Financial Analysis	Course Code:	C305
Course Outcome No.	Course Outcome Statement		
C305.1	Explain the concepts of Managerial Economics, demand, demand elasticity, and demand forecasting methods.		
C305.2	Apply production functions, cost concepts, and break-even analysis to solve business problems		
C305.3	Explain different forms of business organizations and analyze various market structures and pricing methods.		
C305.4	Apply capital budgeting techniques such as Payback Period, ARR, NPV, and IRR for project evaluation.		
C305.5	Analyze financial statements and interpret financial ratios for assessing business performance.		
Semester No:	III B.Tech -I Semester		
Course Title:	Machine Learning Lab	Course Code:	C306
Course Outcome No.	Course Outcome Statement		
C306.1	Explain and apply data preprocessing techniques, regression models, and classification algorithms for solving machine learning problems.		
C306.2	Implement supervised machine learning algorithms such as Decision Trees, Random Forests, SVM, KNN, and Naïve Bayes for prediction and classification tasks.		
C306.3	Apply clustering, dimensionality reduction, and model evaluation techniques to analyze and improve machine learning model performance.		
Semester No:	III B.Tech -I Semester		
Course Title:	Computer Networks Lab	Course Code:	C307
Course Outcome No.	Course Outcome Statement		
C307.1	Apply network cabling, IP addressing, network device configuration, LAN/WLAN setup, and network diagnostic commands for establishing and troubleshooting computer		



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	networks.		
C307.2	Implement network communication applications using Java sockets, Java RMI, routing protocols, and packet analysis tools for data transmission and network monitoring.		
C307.3	Analyze the performance of wired and wireless network topologies using simulation tools by evaluating throughput, delay, jitter, and packet loss under different traffic conditions.		
Semester No:	III B.Tech -I Semester		
Course Title:	MEAN Stack Technologies	Course Code:	C308
Course Outcome No.	Course Outcome Statement		
C308.1	Explain HTML5 elements, JavaScript concepts, form validation, DOM manipulation, and API integration for web page development.		
C308.2	Develop server-side applications using Node.js, Express.js, RESTful APIs, MongoDB connectivity, and session management techniques.		
C308.3	Apply MongoDB CRUD operations and TypeScript programming concepts to build modular database-driven applications.		
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:	Massive Data Analytics	Course Code:	C311
Course Outcome No.	Course Outcome Statement		
C311.1	Understand the basic concepts of Big Data, its challenges, data types, analytics tools, and its role in AI/ML, IoT, Data Lakes, and Data Warehouses.		
C311.2	Explain stream processing concepts and apply techniques such as sampling, filtering, and		



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	counting for analyzing real-time data streams and applications		
C311.3	Apply the architecture of Apache Hadoop, HDFS, and MapReduce, and analyze how Hadoop processes large-scale data.		
C311.4	Analyze Big Data frameworks such as Apache Pig, Apache Hive, Apache HBase, and Apache zoo keeper for storing, querying, and processing data.		
C311.5	Analyze datasets using predictive analytics, regression models, and visualization techniques to support decision-making and insights generation.		
Semester No:	III B.Tech -II Semester		
Course Title:	Deep Learning	Course Code:	C312
Course Outcome No.	Course Outcome Statement		
C312.1	Explain the fundamentals of deep learning, Bayesian learning, decision surfaces, linear classifiers, and gradient descent optimization techniques.		
C312.2	Apply neural network models such as Multilayer Perceptron, Backpropagation, Autoencoders, and CNN for solving learning problems.		
C312.3	Analyze optimization algorithms and training techniques such as Momentum, RMSProp, Adam, dropout, and normalization methods in deep networks.		
C312.4	Examine recent deep learning architectures such as Residual Networks, Skip Connections, and CNN variants for image-based tasks.		
C312.5	Evaluate advanced models such as LSTM, Variational Autoencoders, and GANs for sequence and generative learning applications.		
Semester No:	III B.Tech -II Semester		
Course Title:	Automata Theory & Compiler Design	Course Code:	C313
Course Outcome No.	Course Outcome Statement		
C313.1	Explain the concepts of formal languages, regular expressions, finite automata, and context-free grammars used in compiler design.		
C313.2	Apply top-down (LL (1)) and bottom-up (SLR, CLR, LALR) parsing techniques, syntax-directed translation, and intermediate code generation in compiler construction.		
C313.3	Analyze context-sensitive features, type checking, type conversion, and type equivalence in programming languages.		
C313.4	Analyze run-time storage organization, storage allocation strategies, and code optimization techniques for efficient program execution.		
C313.5	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:	Internet of Things	Course Code:	C314
Course Outcome No.	Course Outcome Statement		
C314.1	Explain the concepts of the Internet of Things (IoT), M2M communication, Internet connectivity, and application layer protocols.		
C314.2	Apply IoT architectures, communication technologies, business models, and standardization concepts for connected systems.		
C314.3	Analyze web connectivity, communication protocols, and network design principles for connected IoT devices.		



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C314.4	Analyze IoT data acquisition, storage, analytics, business processes, and enterprise integration for IoT applications.		
C314.5	Design IoT-based solutions using cloud platforms, sensors, RFID, wireless sensor networks, and cloud-based IoT services.		
Semester No:	III B.Tech -II Semester		
Course Title:	AI chatbot	Course Code:	C315
Course Outcome No.	Course Outcome Statement		
C315.1	Explain the fundamentals of chatbots, conversational AI, chatbot architecture, and their applications.		
C315.2	Apply NLP techniques such as tokenization, intent recognition, entity extraction, and text vectorization for chatbot development.		
C315.3	Develop chatbot applications using popular frameworks and tools, and integrate them with messaging platforms.		
C315.4	Analyze and implement machine learning and deep learning techniques for conversational agents.		
C315.5	Design and deploy chatbot solutions while addressing ethical issues, personalization, and real-world applications.		
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:	Deep Learning Lab	Course Code:	C317
Course Outcome No.	Course Outcome Statement		
C317.1	Apply numerical methods, eigenvalue decomposition, and PCA for matrix problems and dimensionality reduction in Python.		
C317.2	Design and implement Perceptron, Multilayer Neural Networks, and Recurrent/LSTM networks for classification tasks.		
C317.3	Develop and implement Auto encoders and Convolutional Neural Networks for real-world problems like fraud detection and image classification.		
Semester No:	III B.Tech -II Semester		
Course Title:	Massive Data Analytics Lab	Course Code:	C318
Course Outcome No.	Course Outcome Statement		
C318.1	Setup Hadoop and Spark environments and perform basic data operations using HDFS,		



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	MapReduce, Pig, and Hive.		
C318.2	Develop and execute Spark applications using RDDs, DataFrames, Spark Streaming, and MLlib for data processing and analysis.		
C318.3	Create visualizations and dashboards using Power BI, Tableau, or Python to interpret and present big data insights.		
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:	Data Wrangling & Visualization	Course Code:	C401
Course Outcome No.	Course Outcome Statement		
C401.1	Explain the fundamentals of data wrangling, data types, data sources, data quality issues, and data wrangling tools.		
C401.2	Apply data cleaning and preprocessing techniques to handle missing data, errors, duplicates, outliers, and categorical data.		
C401.3	Apply data transformation and feature engineering techniques using Pandas and NumPy to prepare datasets for analysis.		
C401.4	Analyze datasets using appropriate visualization principles, chart types, and visualization tools to communicate data insights.		
C401.5	Evaluate advanced visualization techniques and dashboards using Tableau, Power BI, Plotly, and Streamlit for effective data storytelling.		
Semester No:	IV B.Tech -I Semester		
Course Title:	Management Science	Course Code:	C402



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	Human Resource Management Entrepreneurship & 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



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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.		
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		



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	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 Internship	Course Code:	C409
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.		

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