

**Department of Computer Science and Engineering (AI&ML)****Program: B.Tech****Regulation: R20****Batch: 2021-2025****Total no of Courses: 67****Course Outcomes**

Semester No:	I B.Tech–I Semester		
Course Title:	Communicative English	Course Code:	C101
Course Outcome No.	Course Outcome Statement		
C101.1	Develop basic listening, speaking, reading, and writing skills using simple English.		
C101.2	Understand and communicate ideas clearly through discussions, summaries, and correct grammar usage.		
C101.3	Enhance critical reading and formal writing skills for academic and professional communication.		
C101.4	Apply English effectively in real-life and academic situations, including interpreting data and role-based communication.		
C101.5	Demonstrate advanced communication skills through presentations, academic writing, and error-free language usage.		
Semester No:	I B.Tech–I Semester		
Course Title:	MATHEMATICS-I	Course Code:	C102
Course Outcome No.	Course Outcome Statement		
C102.1	Understand and apply tests for series convergence and use mean value theorems.		
C102.2	Solve simple first-order differential equations and apply them to real-life problems.		
C102.3	Solve higher-order differential equations and apply to circuits and motion problems.		
C102.4	Learn partial derivatives and apply them to find maxima, minima, and function relations.		
C102.5	Compute double and triple integrals and use them to find areas and volumes.		
Semester No:	I B.Tech–I Semester		
Course Title:	Applied Chemistry	Course Code:	C103
Course Outcome No.	Course Outcome Statement		
C103.1	Understand the concepts, properties, and applications of polymers, plastics, elastomers, and composite materials.		
C103.2	Apply the principles of electrochemical cells, batteries, fuel cells, and		



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	corrosion control.		
C103.3	Analyze the preparation and applications of semiconductors, nanomaterials, liquid crystals, and superconductors.		
C103.4	Evaluate spectroscopic techniques and non-conventional energy sources for engineering applications.		
C103.5	Create solutions using computational chemistry, molecular modeling, and molecular machines.		
Semester No:	I B.Tech–I Semester		
Course Title:	Programming for Problem Solving using C	Course Code:	C104
Course Outcome No.	Course Outcome Statement		
C104.1	Understand the basics of computers and write simple C programs using variables, data types, and expressions.		
C104.2	Apply decision-making, looping, and bitwise operations to solve problems in C.		
C104.3	Apply arrays, strings, structures, and unions to develop C programs for data handling.		
C104.4	Analyze the use of pointers and memory allocation in solving programming problems.		
C104.5	Apply functions, recursion, and file handling techniques to develop structured C programs.		
Semester No:	I B.Tech–I Semester		
Course Title:	Computer Engineering Workshop	Course Code:	C105
Course Outcome No.	Course Outcome Statement		
C105.1	Assemble and disassemble components of a PC		
C105.2	Construct a fully functional virtual machine, Summarize various Linux operating system commands,		
C105.3	Recognize characters & extract text from scanned images, Create audio files and podcasts		
Semester No:	I B.Tech–I Semester		
Course Title:	English Communication Skills Laboratory	Course Code:	C106
Course Outcome No.	Course Outcome Statement		
C106.1	Apply correct pronunciation rules including vowels, consonants, phonetic transcription, word stress (di-syllabic and poly-syllabic words), weak and strong forms, and contrastive stress to minimize common pronunciation errors.		



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C106.2	Demonstrate effective spoken communication by using appropriate rhythm, intonation, stress in compound words, and accent neutralization while responding to listening tasks and short audio texts.		
C106.3	Develop reading and writing skills by analyzing newspaper texts, identifying key terms and structures, and using them effectively in report writing.		
Semester No:	I B.Tech–I Semester		
Course Title:	Applied Chemistry Lab	Course Code:	C107
Course Outcome No.	Course Outcome Statement		
C107.1	Understand and perform basic volumetric, redox, and complexometric titrations to determine the concentration of unknown solutions.		
C107.2	Apply instrumental methods such as pH-metry, conductometry, potentiometry, and colorimetry to analyze chemical substances.		
C107.3	Develop practical laboratory skills to estimate metal ions, hardness of water, vitamins, and other chemical constituents in real samples.		
Semester No:	I B.Tech–ISEMESTER		
Course Title:	Programming for Problem Solving using C Lab	Course Code:	C108
Course Outcome No.	Course Outcome Statement		
C108.1	Understand and write basic C programs using variables, operators, control statements, and functions to solve simple problems.		
C108.2	Apply arrays, strings, pointers, structures, and dynamic memory allocation to develop intermediate-level C programs.		
C108.3	Develop file handling and modular programming skills to build structured and efficient C applications.		
Semester No:	I B.Tech–I Semester		
Course Title:	Environmental Science	Course Code:	C109
Course Outcome No.	Course Outcome Statement		
C109.1	Explain the multidisciplinary nature of Environmental Studies, concepts of sustainability, global environmental challenges (climate change, ozone depletion, acid rain, population growth), and the structure and functioning of various ecosystems.		
C109.2	Analyze the use, over-exploitation, and conservation of natural resources (forest, water, mineral, food, energy, and land resources) and evaluate sustainable resource management practices.		
C109.3	Describe biodiversity at genetic, species, and ecosystem levels; assess threats to biodiversity; and explain conservation strategies with reference to India as a mega-diverse nation.		
C109.4	Identify causes, effects, and control measures of environmental pollution		



	(air, water, soil, noise, nuclear) and solid waste management, and examine relevant environmental protection laws and regulations in India.		
C109.5	Evaluate environmental management practices including Environmental Impact Assessment (EIA), environmental audit, sustainable development strategies, and demonstrate awareness through field visits, report preparation, and presentations.		
Semester No:	I B.Tech–II Semester		
Course Title:	MATHEMATICS - II	Course Code:	C110
Course Outcome No.	Course Outcome Statement		
C110.1	Apply matrix operations to find rank, solve linear equations, and compute eigenvalues and eigenvectors.		
C110.2	Analyze matrices using Cayley–Hamilton theorem and evaluate quadratic forms and their transformations.		
C110.3	Apply iterative methods to solve algebraic and simultaneous equations numerically.		
C110.4	Analyze interpolation techniques to estimate values and assess errors in numerical methods.		
C110.5	Evaluate numerical methods for differentiation, integration, and solving differential equations.		
Semester No:	I B.Tech–II Semester		
Course Title:	Applied Physics	Course Code:	C111
Course Outcome No.	Course Outcome Statement		
C111.1	Understand the principles of interference, diffraction, and polarization and their applications.		
C111.2	Apply the concepts of lasers and optical fibers in engineering applications.		
C111.3	Analyze quantum mechanics, free electron theory, and band theory to understand material behavior.		
C111.4	Evaluate the properties and applications of dielectric and magnetic materials.		
C111.5	Design basic applications using semiconductor and superconductor concepts.		
Semester No:	I B.Tech–II Semester		
Course Title:	Digital Logic Design	Course Code:	C112
Course Outcome No.	Course Outcome Statement		
C112.1	Explain digital systems, binary number systems, codes, and arithmetic operations.		
C112.2	Apply Boolean algebra principles and simplify Boolean expressions using K-Maps and logic gates.		
C112.3	Analyze and design combinational circuits such as adders, multiplexers, encoders, decoders, and code converters.		



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C112.4	Describe sequential circuits including latches and flip-flops and their conversions.		
C112.5	Explain the operation and design of registers and different types of counters.		
Semester No:	I B.Tech–II Semester		
Course Title:	Python Programming	Course Code:	C113
Course Outcome No.	Course Outcome Statement		
C113.1	Identify the basic concepts of Python programming, data types, operators, expressions, decision-making, and looping constructs.		
C113.2	Explain control statements, string operations, text file handling, and their applications in Python programming.		
C113.3	Apply functions, lists, dictionaries, modules, and recursion to develop Python programs.		
C113.4	Analyze file handling techniques and object-oriented programming concepts to develop structured Python applications		
C113.5	Evaluate Python programs by applying exception handling, GUI programming, and programming concepts for developing reliable applications.		
Semester No:	I B.Tech–II Semester		
Course Title:	Data Structures	Course Code:	C114
Course Outcome No.	Course Outcome Statement		
C114.1	Understand data structures, algorithms, and apply searching and sorting techniques.		
C114.2	Apply linked list operations and use them to solve problems like polynomial and sparse matrix representations.		
C114.3	Apply stack and queue operations in solving problems such as expression evaluation and conversions.		
C114.4	Analyze tree structures and perform operations on binary search trees and AVL trees.		
C114.5	Evaluate graph algorithms for traversal, shortest path, and minimum spanning tree problems.		
Semester No:	I B.Tech–II Semester		
Course Title:	Applied Physics Lab	Course Code:	C115
Course Outcome No.	Course Outcome Statement		
C115.1	Apply fundamental principles of optics to determine physical parameters such as thickness (wedge method), radius of curvature (Newton’s rings), wavelength (diffraction grating and laser), and dispersive power of a prism.		
C115.2	Investigate electrical and magnetic properties of materials by performing experiments on dielectric constant, B–H curve, Hall effect, magnetic field measurements, and semiconductor resistivity using four-probe method.		



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C115.3	Analyze semiconductor and modern physics concepts by estimating Planck's constant (photoelectric effect), energy gap of p-n junction diode, temperature dependence of resistance, and properties of superconductors.		
Semester No:	I B.Tech-II Semester		
Course Title:	Python Programming Lab	Course Code:	C116
Course Outcome No.	Course Outcome Statement		
C116.1	Develop basic Python programs using input/output statements, control structures, loops, strings, and functions to solve simple problems.		
C116.2	Apply lists, files, exception handling, and modular programming concepts to build intermediate-level Python applications.		
C116.3	Design and implement object-oriented programs using classes, methods, and file handling to solve real-world problems.		
Semester No:	I B.Tech-II Semester		
Course Title:	Data Structures Lab	Course Code:	C117
Course Outcome No.	Course Outcome Statement		
C117.1	Apply searching and sorting algorithms to efficiently organize and retrieve data using C programming.		
C117.2	Apply linear data structures and their operations to solve computational problems using C programming.		
C117.3	Analyze and implement Binary Search Trees and tree traversal techniques for efficient data organization and retrieval.		
Semester No:	I B.Tech-II Semester		
Course Title:	Constitution of India	Course Code:	C118
Course Outcome No.	Course Outcome Statement		
C118.1	Describe the features, principles, and constitutional provisions of the Indian Constitution.		
C118.2	Explain the structure, powers, and functions of the Union Government and Judiciary.		
C118.3	Apply constitutional provisions to understand the structure and functions of the State Government.		
C118.4	Analyze the roles and functions of local self-government institutions and district administration.		
C118.5	Evaluate the roles and functions of the Election Commission and constitutional welfare commissions.		
Semester No:	II B.Tech-I Semester		
Course Title:	Mathematics III	Course Code:	C201
Course Outcome No.	Course Outcome Statement		
C201.1	Apply vector differentiation and integration concepts and use Green's,		



	Stokes', and Gauss divergence theorems to solve problems.		
C201.2	Apply Laplace and inverse Laplace transforms to solve ordinary differential equations with initial conditions.		
C201.3	Analyze periodic functions using Fourier series and Fourier transforms.		
C201.4	Apply standard methods to solve first-order partial differential equations.		
C201.5	Apply methods to solve second-order partial differential equations and model basic wave, heat, and Laplace equations.		
Semester No:	II B.Tech–I Semester		
Course Title:	Mathematical Foundations of Computer Science	Course Code:	C202
Course Outcome No.	Course Outcome Statement		
C202.1	Apply basic concepts of propositional and predicate logic to solve simple logical problems.		
C202.2	Use concepts of sets, relations, functions, and algebraic structures to solve basic problems.		
C202.3	Apply counting techniques and number theory concepts to solve simple mathematical problems.		
C202.4	Formulate and solve basic recurrence relations using standard methods.		
C202.5	Apply fundamental graph theory concepts and algorithms to solve simple graph problems.		
Semester No:	II B.Tech–I Semester		
Course Title:	Introduction to Artificial Intelligence and Machine Learning	Course Code:	C203
Course Outcome No.	Course Outcome Statement		
C203.1	Explain the fundamentals of Artificial Intelligence, intelligent agents, rationality, and environment types.		
C203.2	Apply problem-solving strategies and search algorithms (uninformed, informed, and local search) to solve AI problems.		
C203.3	Analyze knowledge representation techniques using logic, ontologies, and reasoning systems.		
C203.4	Explain machine learning concepts and implement concept learning methods such as FIND-S and Candidate Elimination.		
C203.5	Analyze and evaluate decision tree learning algorithms and their effectiveness for solving real-world problems.		
Semester No:	II B.Tech–I Semester		
Course Title:	Object Oriented Programming with Java	Course Code:	C204



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Course Outcome No.	Course Outcome Statement		
C204.1	Develop basic Java programs using data types, operators, and control statements.		
C204.3	Apply object-oriented concepts such as classes, objects, methods, inheritance, and interfaces in Java programs.		
C204.3	Implement arrays, inheritance, and interfaces to develop structured Java applications.		
C204.4	Use packages, Java libraries, and exception handling mechanisms in Java applications.		
C204.5	Develop Java applications using string handling, multithreading, and JDBC connectivity.		
Semester No:	II B.Tech–I Semester		
Course Title:	Database Management Systems	Course Code:	C205
Course Outcome No.	Course Outcome Statement		
C205.1	Explain database basics, architecture, and differences between DBMS and file systems.		
C205.2	Apply relational model concepts and perform basic SQL operations for data handling.		
C205.3	Analyze requirements to design ER models and use advanced SQL queries such as joins and subqueries.		
C205.4	Evaluate database designs using normalization techniques to reduce redundancy.		
C205.5	Recall concepts of transactions, concurrency control, and indexing techniques in databases.		
Semester No:	II B.Tech–I Semester		
Course Title:	Introduction to Artificial Intelligence and Machine Learning Lab	Course Code:	C206
Course Outcome No.	Course Outcome Statement		
C206.1	Apply AI search strategies and heuristic algorithms to solve classical artificial intelligence problems.		
C206.2	Apply concept learning algorithms to generate hypotheses from training datasets.		
C206.3	Analyze and implement machine learning models for classification and regression using suitable datasets.		
Semester No:	II B.Tech–I Semester		
Course Title:	Object Oriented Programming with Java Lab	Course Code:	C207
Course Outcome No.	Course Outcome Statement		



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C207.1	Develop basic Java programs using control statements, arrays, strings, classes, and methods to solve simple problems.		
C207.2	Apply object-oriented programming concepts such as inheritance, polymorphism, interfaces, exception handling, and packages in Java applications.		
C207.3	Implement advanced Java features including multithreading, synchronization, applets, and event handling to build interactive programs.		
Semester No:	II B.Tech–I Semester		
Course Title:	Database Management Systems Lab	Course Code:	C208
Course Outcome No.	Course Outcome Statement		
C208.1	Understand and write SQL queries to create, modify, retrieve, and manage data in database tables using constraints and functions.		
C208.2	Develop PL/SQL programs using control statements, cursors, procedures, functions, and exception handling.		
C208.3	Implement advanced database features such as triggers, indexing, and transaction control (COMMIT, ROLLBACK, SAVEPOINT) to manage data efficiently.		
Semester No:	II B.Tech–I Semester		
Course Title:	Mobile App Development	Course Code:	C209
Course Outcome No.	Course Outcome Statement		
C209.1	Understand Android platform basics and develop simple mobile applications using Android development tools.		
C209.2	Develop Android applications using GUI components, layouts, event handling, databases, and notifications.		
C209.3	Implement Android applications using advanced features such as GPS, multithreading, file storage, messaging, and email services.		
Semester No:	II B.Tech–I Semester		
Course Title:	Essence of Indian Traditional Knowledge	Course Code:	C210
Course Outcome No.	Course Outcome Statement		
C210.1	Identify the nature, characteristics, scope, and importance of Traditional Knowledge and its role in society.		
C210.2	Explain the basic structure and components of the Indian Knowledge System.		
C210.3	Apply the concepts of the Indian Knowledge System in understanding indigenous knowledge, yoga, and holistic healthcare.		
C210.4	Analyze the need, significance, and methods for the protection of Traditional Knowledge.		



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C210.5	Evaluate the impact of Indian philosophical and artistic traditions on society and culture.		
Semester No:	II B.Tech–I Semester		
Course Title:	Community Service Project	Course Code:	C211
Course Outcome No.	Course Outcome Statement		
C211.1	Identify local socio-economic problems and survey community resources.		
C211.2	Design and execute action plans to solve specific, real-world problems.		
C211.3	Measure project results and understand the value of civic engagement		
Semester No:	II B.Tech–II Semester		
Course Title:	Probability and Statistics	Course Code:	C212
Course Outcome No.	Course Outcome Statement		
C212.1	Apply measures of central tendency and variability for data analysis using basic statistical concepts.		
C212.2	Analyze relationships between variables using correlation and regression techniques and fit simple curves.		
C212.3	Apply probability concepts and standard probability distributions to solve simple problems.		
C212.4	Explain sampling methods, estimation techniques, and basic theoretical distributions used in statistics.		
C212.5	Analyze means and proportions using hypothesis testing methods in statistical problems.		
Semester No:	II B.Tech–II Semester		
Course Title:	Computer Organization	Course Code:	C213
Course Outcome No.	Course Outcome Statement		
C213.1	Understand the basic organization of computers, data representation, and computer arithmetic operations.		
C213.2	Apply register transfer concepts and understand micro-operations, instruction codes, and basic computer design.		
C213.3	Develop a detailed understanding of architecture and functionality of central processing unit		
C213.4	Exemplify in a better way the I/O and memory organization		
C213.5	Illustrate concepts of parallel processing, pipelining and inter processor communication		
Semester No:	II B.Tech–II Semester		
Course Title:	Data Warehousing and Mining	Course Code:	C214
Course Outcome No.	Course Outcome Statement		



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C214.1	Understand the basic concepts of data warehousing and OLAP, including architecture, multidimensional models, and their role in data mining.		
C214.2	Explain data mining concepts, tasks, and challenges, and apply basic data preprocessing techniques such as sampling, transformation, and feature selection.		
C214.3	Apply classification techniques like decision trees and Naïve Bayes, and evaluate model performance using methods like cross-validation.		
C214.4	Understand and apply association rule mining techniques such as Apriori and FP-Growth to discover frequent patterns.		
C214.5	Explain and apply clustering algorithms like K-means, hierarchical clustering, and DBSCAN, and analyze their strengths and weaknesses.		
Semester No:	II B.Tech–II Semester		
Course Title:	Formal Languages and Automata Theory	Course Code:	C215
Course Outcome No.	Course Outcome Statement		
C215.1	Understand the concepts of DFA, NFA, and ϵ -NFA and design finite automata for simple languages.		
C215.2	Apply regular expressions and regular grammars and understand their equivalence with finite automata.		
C215.3	Apply context-free grammars, derivations, and normal forms in language design.		
C215.4	Analyze the relationship between pushdown automata and context-free grammars.		
C215.5	Explain concepts of Turing machines, decidability, and complexity classes such as P and NP.		
Semester No:	II B.Tech–II Semester		
Course Title:	Managerial Economics and Financial Accountancy	Course Code:	C216
Course Outcome No.	Course Outcome Statement		
C216.1	Explain concepts of managerial economics, demand, elasticity, demand forecasting, and supply laws.		
C216.2	Apply production theories, cost concepts, and break-even analysis to solve managerial problems.		
C216.3	Analyze market structures, pricing strategies, and theories of the firm in decision-making.		
C216.4	Apply accounting principles and financial statement analysis techniques including ratio, funds flow, and cash flow analysis.		
C216.5	Evaluate capital budgeting decisions using traditional and modern appraisal methods.		
Semester No:	II B.Tech–II Semester		



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Course Title:	R Programming Lab	Course Code:	C217
Course Outcome No.	Course Outcome Statement		
C217.1	Understand basic R programming concepts such as data types, operators, vectors, lists, matrices, and control structures.		
C217.2	Apply R for data handling, file operations, descriptive statistics, probability distributions, and regression analysis.		
C217.3	Perform data visualization, data transformation, and basic data cleaning techniques using R for real-world datasets.		
Semester No:	II B.Tech–II Semester		
Course Title:	Data Mining using Python Lab	Course Code:	C218
Course Outcome No.	Course Outcome Statement		
C218.1	Use Python to do basic data preprocessing like loading data, handling missing values, encoding categories, scaling features, and splitting data.		
C218.2	Calculate similarity measures and build simple machine learning models like regression and classification using Python.		
C218.3	Apply basic clustering and pattern mining techniques to find patterns in data using Python.		
Semester No:	II B.Tech–II Semester		
Course Title:	Web Application Development Lab	Course Code:	C219
Course Outcome No.	Course Outcome Statement		
C219.1	Understand and implement authentication mechanisms using Java Servlet and JSP with database connectivity.		
C219.2	Develop full-stack web applications using JSP/Node.js with React.js for real-world systems like online book shop, examination, and ticket reservation.		
C219.3	Design and implement database-driven web applications such as online banking, library, job portal, and auction systems.		
Semester No:	II B.Tech–II Semester		
Course Title:	Natural Language Processing with Python	Course Code:	C220
Course Outcome No.	Course Outcome Statement		
C220.1	Apply basic text preprocessing techniques like cleaning, stemming, lemmatization, and POS tagging.		
C220.2	Implement text representation methods such as TF-IDF, word embeddings, topic modeling, and similarity measures.		
C220.3	Apply machine learning techniques for text classification and real-world		



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	applications like sentiment analysis and hate speech detection.		
Semester No:	III B.Tech–I Semester		
Course Title:	Compiler Design	Course Code:	C301
Course Outcome No.	Course Outcome Statement		
C301.1	Understand the basic concepts of lexical analysis, tokens, regular expressions, and finite automata used in compilers.		
C301.2	Explain syntax analysis and apply top-down parsing techniques like LL (1) and recursive descent parsing.		
C301.3	Apply bottom-up parsing techniques (SLR, LALR, and CLR) and understand syntax-directed translation and intermediate code generation.		
C301.4	Explain runtime environment concepts and apply code optimization techniques in compilers.		
C301.5	Understand code generation concepts and apply basic register allocation and code generation methods.		
Semester No:	III B.Tech–I Semester		
Course Title:	Operating Systems	Course Code:	C302
Course Outcome No.	Course Outcome Statement		
C302.1	Understand the basic concepts of operating systems, their structure, services, and system calls.		
C302.2	Explain process management, multithreading, scheduling, and apply inter-process communication techniques.		
C302.3	Understand memory management techniques like paging, segmentation, and virtual memory.		
C302.4	Explain deadlock handling methods and understand file systems and disk management concepts.		
C302.5	Understand system protection and security mechanisms, including authentication and threats in operating systems.		
Semester No:	III B.Tech–I Semester		
Course Title:	Machine Learning	Course Code:	C303
Course Outcome No.	Course Outcome Statement		
C303.1	Identify the basic concepts of Artificial Intelligence, Machine Learning, Deep Learning, and statistical learning.		
C303.2	Explain statistical learning, supervised and unsupervised learning, and how to measure training/test errors and risks.		
C303.3	Apply ensemble learning methods and support vector machine techniques to solve learning problems.		
C303.4	Analyze clustering and dimensionality reduction techniques for extracting meaningful information from data.		
C303.5	Evaluate neural network and deep learning models based on their		



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	performance and suitability for different applications.		
Semester No:	III B.Tech–I Semester		
Course Title:	Software Engineering	Course Code:	C304
Course Outcome No.	Course Outcome Statement		
C304.1	Describe the fundamentals of software engineering, software processes, and different process models.		
C304.2	Explain agile methodologies and apply basic requirements engineering techniques to gather and analyze software requirements.		
C304.3	Develop requirement models using UML, data modeling, and scenario-based approaches.		
C304.4	Analyze software design concepts, architectural styles, and component-level design principles.		
C304.5	Explain software testing strategies, quality assurance concepts, and basic debugging techniques.		
Semester No:	III B.Tech–I Semester		
Course Title:	Internet of Things and Applications	Course Code:	C305
Course Outcome No.	Course Outcome Statement		
C305.1	Describe the basic concepts of IoT, including architecture, networking fundamentals, cloud role, and security aspects.		
C305.2	Explain IoT hardware components such as Arduino, Raspberry Pi, ARM processors, and embedded system architectures.		
C305.3	Apply IoT communication protocols and develop simple IoT applications using tools like Python, Node.js, or Arduino.		
C305.4	Analyze device integration, data acquisition, storage, authentication, and authorization in IoT-based solutions.		
C305.5	Evaluate IoT applications in real-world scenarios and assess the role of cloud computing in IoT systems.		
Semester No:	III B.Tech–I Semester		
Course Title:	Operating Systems & Compiler Design Lab	Course Code:	C306
Course Outcome No.	Course Outcome Statement		
C306.1	Apply Operating System concepts such as CPU scheduling, memory management, page replacement, process synchronization, and deadlock handling by simulating them using C programs.		
C306.2	Develop C programs to implement inter-process communication, producer-consumer problem, and Banker’s algorithm.		
C306.3	Analyze compiler design concepts by implementing lexical analysis, parsing techniques, FIRST and FOLLOW sets, and using LEX and YACC tools.		
Semester No:	III B.Tech–I Semester		



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Course Title:	Machine Learning Lab	Course Code:	C307
Course Outcome No.	Course Outcome Statement		
C307.1	Understand and implement basic machine learning algorithms such as FIND-S, Candidate Elimination, ID3, Linear Regression, Logistic Regression, and k-NN using real datasets.		
C307.2	Apply classification, clustering, and probabilistic models like Naïve Bayes, EM, k-Means, Bayesian Networks, Artificial Neural Networks, and Support Vector Machines.		
C307.3	Perform data preprocessing and exploratory data analysis using techniques like encoding, cross-validation, PCA, bias-variance analysis, and visualization tools such as Pandas and Matplotlib.		
Semester No:	III B.Tech–I Semester		
Course Title:	Continuous Integration and Continuous Delivery using DevOps	Course Code:	C308
Course Outcome No.	Course Outcome Statement		
C308.1	Understand SDLC, Agile methodology, and Extreme Programming concepts.		
C308.2	Apply DevOps tools such as Git, Maven, and static code analysis.		
C308.3	Implement CI/CD pipelines using Jenkins.		
Semester No:	III B.Tech–I Semester		
Course Title:	Summer Internship	Course Code:	C309
Course Outcome No.	Course Outcome Statement		
C309.1	Gain practical hands-on experience in real-world engineering environments through industry internships, applying theoretical knowledge to solve practical problems		
C309.2	Develop professional skills such as teamwork, time management, and ethical practices during the internship period		
C309.3	Analyze and evaluate industry practices and standards, and prepare a comprehensive internship report		
Semester No:	III B.Tech–I Semester		
Course Title:	Employability skills-1	Course Code:	C310
Course Outcome No.	Course Outcome Statement		
C310.1	Understand analytical thinking, listening skills, self-analysis, and basic communication skills.		
C310.2	Explain self-management skills, leadership qualities, and different types of		



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	etiquette.		
C310.3	Develop basic writing and verbal ability skills such as note making, email writing, and vocabulary usage.		
C310.4	Demonstrate participation in group discussions for effective communication.		
C310.5	Prepare resumes and demonstrate basic interview skills.		
Semester No:	III B.Tech–II Semester		
Course Title:	Computer Networks	Course Code:	C311
Course Outcome No.	Course Outcome Statement		
C311.1	Describe network types, topologies, reference models, and transmission media.		
C311.2	Explain data link layer functions, error control mechanisms, and protocols such as HDLC and PPP.		
C311.3	Apply media access control methods and implement concepts of Ethernet and multiple access techniques.		
C311.4	Analyze network layer design issues including routing, congestion control, IP addressing, and internetworking.		
C311.5	Evaluate the performance and functionality of TCP/UDP protocols and application layer services like HTTP, DNS, FTP, and e-mail.		
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, machine learning paradigms, model evaluation, and issues such as overfitting and underfitting.		
C312.2	Apply deep learning concepts including artificial neural networks and techniques for training and improving deep networks.		
C312.3	Analyze neural network architectures and implement classification models using deep learning frameworks such as Keras and TensorFlow.		
C312.4	Apply convolutional and recurrent neural networks using PyTorch for solving vision and sequence learning problems.		
C312.5	Analyze and evaluate advanced deep learning applications and models including GANs, reinforcement learning, autoencoders, and deep generative models.		
Semester No:	III B.Tech–II Semester		
Course Title:	Design and Analysis of Algorithms	Course Code:	C313
Course Outcome No.	Course Outcome Statement		
C313.1	Describe basic algorithm concepts and methods to measure their efficiency.		
C313.2	Apply divide-and-conquer and greedy strategies to solve computational		



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	problems.		
C313.3	Apply dynamic programming techniques to solve optimization problems.		
C313.4	Analyze problems using backtracking techniques to determine feasible solutions.		
C313.5	Explain the concepts of NP-hard and NP-complete problems and their computational implications.		
Semester No:	III B.Tech–II Semester		
Course Title:	Software Project Management	Course Code:	C314
Course Outcome No.	Course Outcome Statement		
C314.1	Describe software management models and approaches to improve processes and quality.		
C314.2	Explain software life cycle phases and associated artifacts.		
C314.3	Apply software architectures, workflows, and iterative planning in project scenarios.		
C314.4	Analyze project organization, process automation, and software metrics for effective management.		
C314.5	Evaluate agile methodologies, Scrum practices, and DevOps tools for software development.		
Semester No:	III B.Tech–II Semester		
Course Title:	Fundamentals of Micro Processor and Micro Controller	Course Code:	C315
Course Outcome No.	Course Outcome Statement		
C315.1	Explain the architecture, functional units, memory organization, I/O concepts, and interrupt structure of 8085 and 8086 microprocessors.		
C315.2	Apply knowledge of 8086 instruction set, addressing modes, and assembler directives to develop simple assembly language programs.		
C315.3	Analyze interfacing techniques of memory and peripheral devices such as 8255, 8251, 8237, and interrupt controllers with 8086 microprocessor.		
C315.4	Explain the architecture, instruction set, memory organization, and interrupt handling of 8051 microcontroller and compare it with 8085.		
C315.5	Develop and implement microcontroller-based programs for real-time applications such as motor control, keyboard/display interfacing, and automation systems.		
Semester No:	III B.Tech–II Semester		
Course Title:	Computer Networks Lab	Course Code:	C316
Course Outcome No.	Course Outcome Statement		
C316.1	Understand and implement data link layer protocols, error detection and correction techniques, and flow control mechanisms using C programs.		



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C316.2	Simulate and analyze routing algorithms, congestion control techniques, and network protocols using tools like NS2.		
C316.3	Use networking tools such as Wireshark and Nmap to capture, analyze, and monitor network traffic in a Local Area Network.		
Semester No:	III B.Tech–II Semester		
Course Title:	Algorithms for Efficient Coding Lab	Course Code:	C317
Course Outcome No.	Course Outcome Statement		
C317.1	Understand and implement Divide and Conquer algorithms such as Binary Search, Merge Sort, and Quick Sort, and analyze their running time.		
C317.2	Apply Greedy and Dynamic Programming techniques to solve problems like Minimum Spanning Tree, Shortest Path, Optimal Binary Search Tree, and Traveling Salesperson Problem.		
C317.3	Develop and analyze Backtracking algorithms for problems such as 8-Queens, Graph Coloring, Hamiltonian Cycle, and Knapsack.		
Semester No:	III B.Tech–II Semester		
Course Title:	Deep Learning with Tensor flow	Course Code:	C318
Course Outcome No.	Course Outcome Statement		
C318.1	Implement fundamental neural network models and preprocessing techniques such as multilayer perceptrons and encoding methods for structured and textual data.		
C318.2	Design and apply deep learning models for classification and prediction tasks on textual and numerical datasets.		
C318.3	Develop and utilize convolutional neural networks and transfer learning techniques for image classification tasks.		
Semester No:	III B.Tech–II Semester		
Course Title:	MEAN Stack Technologies- Module I- HTML 5, JavaScript, Node.js, Express.js and TypeScript	Course Code:	C319
Course Outcome No.	Course Outcome Statement		
C319.1	Design and develop structured web pages using HTML5 elements, forms, tables, and media components.		
C319.2	Implement interactive web functionalities using core JavaScript concepts such as variables, control statements, functions, arrays, and objects.		
C319.3	Develop basic full-stack web applications using Node.js, Express.js, and TypeScript with modular and server-side programming concepts.		
Semester No:	III B.Tech–II Semester		



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Course Title:	Employability skills-ii	Course Code:	C320
Course Outcome No.	Course Outcome Statement		
C320.1	Understand basic numerical ability concepts such as number system, averages, ratios, percentages, and profit & loss.		
C320.2	Apply arithmetic concepts to solve problems related to ages, time & work, pipes & cisterns, time & distance, boats, and trains.		
C320.3	Solve problems involving interest, calendar, clock, permutations, combinations, and probability.		
C320.4	Understand and solve basic mensuration problems related to geometry, areas, and volumes.		
C320.5	Interpret data using tables, bar graphs, pie charts, and line graphs.		
Semester No:	IV B Tech I Semester		
Course Title:	Block Chain Technologies	Course Code:	C401
Course Outcome No.	Course Outcome Statement		
C401.1	Explain the fundamental concepts of blockchain technology, cryptocurrencies, distributed trust, cryptographic principles, and their role in digital transformation.		
C401.2	Apply hashing techniques, public key cryptography, blockchain architectures, and digital identity mechanisms to analyze blockchain-based applications and use cases.		
C401.3	Analyze the Bitcoin blockchain, scripting mechanisms, mining process, and blockchain-based applications in micropayments, scientific computing, and other domains.		
C401.4	Analyze Ethereum, IOTA, consensus mechanisms, permissioned blockchains, Hyperledger, and blockchain-based token and currency models for decentralized systems.		
C401.5	Evaluate the technical, business, regulatory, and societal challenges of blockchain technology and assess its applications in e-governance, land registration, and healthcare systems.		
Semester No:	IV B Tech I Semester		
Course Title:	Cloud Computing	Course Code:	C402
Course Outcome No.	Course Outcome Statement		
C402.1	Illustrate system models, scalable computing concepts, and performance, security, and energy issues in distributed and cloud environments.		
C402.2	Classify virtualization levels and explain virtualization mechanisms for CPU, memory, I/O, clusters, and data centers.		
C402.3	Analyze cloud platform architecture, service models, and programming on AWS and Microsoft Azure.		
C402.4	Design resource management strategies and scheduling algorithms for cloud		



	computing environments.		
C402.5	Evaluate storage systems, distributed file systems, and parallel file systems including Google File System.		
Semester No:	IV B Tech I Semester		
Course Title:	AI Chatbots	Course Code:	C403
Course Outcome No.	Course Outcome Statement		
C403.1	Understand the basics of chatbots, their business benefits, data sources, and privacy aspects including GDPR.		
C403.2	Develop Chatbot approaches and identify key concepts such as intent, entity, utterance, and conversational flow.		
C403.3	Analyze business considerations, success metrics, and solution architecture for developing chatbot applications.		
C403.4	Differentiate Natural Language Processing (NLP), Natural Language Understanding (NLU), and Natural Language Generation (NLG) in chatbot systems.		
C403.5	Identify and use chatbot development tools such as Microsoft Bot Framework, Rasa, and Dialogflow, and understand chatbot integration with APIs and enterprise systems.		
Semester No:	IV B Tech I Semester		
Course Title:	Data Communication	Course Code:	C404
Course Outcome No.	Course Outcome Statement		
C404.1	Describe the basic concepts of data communication, network models (OSI and TCP/IP), Internet structure, addressing, and wireless networks like WiFi (802.11).		
C404.2	Explain data link layer functions such as error detection and correction, framing, flow control, multiple access protocols, and IEEE 802.11 MAC protocol.		
C404.3	Apply routing and forwarding concepts, including IPv4 and IPv6 addressing, in understanding router operations in the Internet.		
C404.4	Analyze transport layer protocols such as UDP and TCP, including reliable data transfer, flow control, and congestion control mechanisms.		
C404.5	Evaluate network application principles and the working of protocols such as FTP, SMTP, HTTP, and DNS.		
Semester No:	IV B.Tech–I Semester		
Course Title:	Basic Electronics	Course Code:	C405
Course Outcome No.	Course Outcome Statement		
C405.1	Describe semiconductor fundamentals, diode characteristics, and basic rectifier and power supply applications.		
C405.2	Explain the working principles and applications of special-purpose diodes		



	such as Zener, Varactor, and optical diodes.		
C405.3	Apply the characteristics of BJTs to analyze their use as amplifiers and switches in practical circuits.		
C405.4	Analyze the operation and characteristics of JFET and MOSFET devices for different circuit conditions.		
C405.5	Evaluate the performance and applications of thyristors, SCR, UJT, IGBT, and optoelectronic devices in electronic systems.		
Semester No:	IV B Tech I Semester		
Course Title:	Universal Human Values 2: Understanding Harmony	Course Code:	C406
Course Outcome No.	Course Outcome Statement		
C406.1	Understand the purpose of value education, basic human aspirations, and the importance of right understanding for achieving happiness and prosperity.		
C406.2	Explain the relationship between ‘Self’ (I) and ‘Body’ and understand the importance of health, self-discipline (Sanyam), and prosperity in human life.		
C406.3	Apply human values such as trust, respect, justice, and harmony in relationships and society.		
C406.4	Analyze harmony in nature, interconnectedness among living beings, and environmental balance.		
C406.5	Evaluate and apply human values and ethical principles in professional life to contribute to a responsible and sustainable society.		
Semester No:	IV B Tech I Semester		
Course Title:	Machine Learning with Go (Infosys Spring Board)	Course Code:	C407
Course Outcome No.	Course Outcome Statement		
C407.1	Implement data handling and visualization techniques using Go.		
C407.2	Apply statistical measures and performance evaluation metrics using Go.		
C407.3	Build basic machine learning and time series models using Go.		
Semester No:	IV B Tech I Semester		
Course Title:	Summer Internship	Course Code:	C408
Course Outcome No.	Course Outcome Statement		
C408.1	Gain practical hands-on experience in real-world engineering environments through industry internships, applying theoretical knowledge to solve practical problems		
C408.2	Develop professional skills such as teamwork, time management, and ethical practices during the internship period		
C408.3	Analyze and evaluate industry practices and standards, and prepare a		



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	comprehensive internship report		
Semester No:	IV B.Tech -II Semester		
Course Title:	Full semester Internship & Project Work	Course Code:	C409
Course Outcome No.	Course Outcome Statement		
C409.1	Analyze existing literature and requirements to identify gaps and formulate a clear understanding of the problem domain.		
C409.2	Design and develop system architecture and components to implement an effective solution based on identified requirements.		
C409.3	Evaluate the developed system through testing and assessment, ensuring functionality, performance, and readiness for deployment.		

HOD-CSE (AI&ML)