Department of Artificial Intelligence and Machine Learning

Second Year of AIML (2025 Pattern)

(With effect from Academic Year 2026-27)

Term-I

Course Outcomes

25AIPCC201	**Foundation of Artificial Intelligence**	**CO1**	Explain the fundamentals of AI and its various applications in real-world scenarios.
		CO2	Build smart system using different informed search / uninformed search or heuristic approaches
		CO3	Design AI systems using adversarial search algorithms and solve problems using constraint satisfaction techniques for structured environments
		CO4	Apply knowledge and reasoning algorithms for real-world problem-solving.
		CO5	Represent complex problems with expressive yet carefully constrained language of representation.
25AIPCC202	**Discrete Mathematics and Graph Theory**	**CO1**	Apply propositional and predicate logic to construct and evaluate valid mathematical arguments
		CO2	Analyze problems using sets, relations, and functions for mathematical modeling.
		CO3	Solve combinatorial problems using counting techniques, permutations, combinations, and recurrence relations.
		CO4	Represent and analyze problems using graph theory concepts such as paths, cycles, and connectivity
		CO5	Apply trees, spanning trees, and graph traversal algorithms to solve problems in computing and networks.
25AIPCC203	**Data Structures and Algorithm**	**CO1**	Discriminate the usage of various structures in approaching the problem solution.
		CO2	Design the algorithms to solve the programming problems.
		CO3	Apply appropriate data structure and efficient algorithms to approach the problems of various domain.
		CO4	Use effective and efficient data structures in solving various AIML domain problems.
		CO5	Analyze the algorithmic solutions for resource requirements and optimization.
25RAMDM201	**Digital Electronics and Logic Design**	**CO1**	Design combinational logic circuits.
		CO2	Explain different sequential circuits.
		CO3	Develop finite state machine models.
		CO4	Illustrate performance parameters of digital ICs.
		CO5	Describe memory systems and data converters.
		CO1	Explain core management functions and classical as well as modern management theories.

25OEC201A	**Principles of Management and Organizational Behaviour**	**CO2**	Analyze individual behavior, personality, perception, and motivation in organizational settings.
		CO3	Apply capital budgeting methods for evaluating engineering investment decisions.
		CO4	Evaluate cost of capital and capital structure decisions.
		CO5	Apply working capital and financial planning concepts for engineering projects..
25OEC201B	**Circular Economy for Sustainable Development**	**CO1**	Explain the fundamental principles of circular economy and sustainable development, and deffremtiate between linear and circular economic systems.
		CO2	Analyse global environmental challenges and evaluate the role of Sustainable Development Goals(SDGs) in addressing sustainability issues.
		CO3	Apply life cycle thinking, material flow analysis, and resource efficiency tools to assess environmental imapcts of products and processes.
		CO4	Design and evaluate circular business models incorporating strategies such as reuse,recycling,remanufracturing and extended producer responsibility.
		CO5	Assess sustainability policies, governance mechanisms, and technological interventions to propose practical solutions for sustainable development .
25OEC201C	**Start-up Management &Venture Creation**	**CO1**	Explain concepts, types, and lifecycle stages of start-ups and new ventures.
		CO2	Identify and analyze start up opportunities using market and customer discovery tools.
		CO3	Develop suitable business models and assess technical and financial feasibility of ventures.
		CO4	Apply knowledge of funding, legal, IPR, and government policies for startup creation.
		CO5	Prepare and present a startup business plan demonstrating teamwork, communication, ethics, and lifelong learning.
25OEC201D	**Health and Nutrition for Professionals**	**CO1**	Explain the basic concepts of health and nutrition.
		CO2	Understand nutritional requirements and balanced diet.
		CO3	Identify lifestyle diseases and preventive measures.
		CO4	Apply principles of healthy living and stress management.
		CO5	Analyze the role of nutrition in improving professional productivity.
25OEC201E	**French Language Module-I**	**CO1**	Identify basic French vocabulary and pronunciation.
		CO2	Use simple French expressions for self-introduction and basic interactions.
		CO3	Read and write simple French sentences.
		CO4	Communicate in familiar everyday situations using basic French.
		CO5	Demonstrate awareness of French culture and etiquette.
		CO1	Identify basic German vocabulary and pronunciation.

25OEC201F	**German Language Module-I**	**CO2**	Use simple German expressions for basic communication.
		CO3	Read and write elementary German sentences.
		CO4	Apply common German phrases in everyday situations.
		CO5	Demonstrate awareness of German culture and traditions.
25OEC201G	**Japanese Language Module-I**	**CO1**	Identify basic Japanese pronunciation, scripts, and vocabulary.
		CO2	Use simple Japanese expressions for basic communication.
		CO3	Read and write basic Japanese characters and sentences.
		CO4	Participate in elementary conversations using simple Japanese expressions.
		CO5	Demonstrate awareness of Japanese culture and etiquette.
25AIPCC201L	**Artificial Intelligence Lab**	**CO1**	Apply heuristic search algorithms for solving classical AI problems.
		CO2	Analyze and implement AI decision-making and planning techniques.
		CO3	Design expert systems using rule-based approaches and PROLOG.
		CO4	Apply NLP and predicate logic for intelligent system development.
25AIPCC203L	**Data Structures and Algorithm Lab**	**CO1**	Identify suitable data structures and algorithms for problem solving.
		CO2	Apply and analyze non-linear data structures for complex problems.
		CO3	Analyze data structure efficiency for effective engineering solutions.
25AIVSE201	**Digital Marketing and Social Media**	**CO1**	Understand the core concepts of Digital, Email, and Mobile Marketing.
		CO2	Apply digital marketing tools and techniques, including SEO and social media marketing, for effective campaigns.
		CO3	Implement strategic digital advertising using tools like Mailchimp, WordPress, Google Ads, Canva, and YouTube to create engaging content and campaigns..
25HSM201B	**Entrepreneurship Development and IPR**	**CO1**	Explain concepts of entrepreneurship, innovation, and their role in economic and societal development.
		CO2	Identify entrepreneurial opportunities using creativity, design thinking, and market analysis tools.
		CO3	Analyze feasibility of a business idea considering technical, financial, legal, and social aspects.
		CO4	Apply knowledge of startup ecosystem, IPR, funding, and government initiatives to venture creation.
		CO5	Develop and present a basic business plan demonstrating teamwork, communication, ethics, and lifelong learning attitude.
		CO1	Explain the fundamentals, life cycle, and organizational aspects of project management.

25HSM201C	**Project Management & Business Planning**	**CO2**	Apply project planning and scheduling techniques such as WBS, CPM, and PERT.
		CO3	Analyze project costs, budgeting methods, and risk management strategies.
		CO4	Identify business opportunities and develop feasible business models.
		CO5	Prepare and evaluate a complete business plan for new ventures or engineering projects.
25VEC201	**Universal Human Values**	**CO1**	Explain the concept of human values and self-exploration, and recognize their importance in personal life, professional life, and the role of engineers in society.
		CO2	Understand the importance of sustainable development, environmental responsibility, and ecological balance, and evaluate the impact of technology on society and nature.
		CO3	Apply values such as trust, respect, empathy, and responsibility to maintain harmony in family and society and practice ethical behavior in social interactions.
		CO4	Demonstrate professional ethics, value-based decision making, leadership, and teamwork in engineering practice for the welfare of society.
		CO5	Understand the relationship between self and body, differentiate their needs, and develop self-awareness and balanced lifestyle practices for personal well-being.
25AIELC201	**Community Engagement Project**	**CO1**	Identify and analyze local community needs and challenges by engaging with stake- holders and evaluating real-world problems.
		CO2	Design and implement practical, creative, and context-specific solutions using engineering principles to address community issues.
		CO3	Reflect and evaluate the effectiveness of their interventions and articulate lessons learned through reports and presentations.

Term-II

Course Outcomes

25AIPCC204	**Database Management System**	**CO1**	Explain the fundamentals of database management systems, including data models, ER modeling, and database design.
		CO2	Develop and execute SQL and PL/SQL programs to manage and manipulate relational data.
		CO3	Apply normalization techniques to improve database design and ensure data integrity.
		CO4	Analyze transaction management concepts and concurrency control techniques for reliable database systems
		CO5	Evaluate NoSQL database types and explain their suitability for handling unstructured data.
25AIPCC205	**Foundation of Machine Learning**	**CO1**	Understand fundamental concepts, types, and models of Machine Learning.
		CO2	Apply classification techniques and evaluate models using appropriate metrics.
		CO3	Analyze regression models and optimization techniques for predictive analysis.
		CO4	Implement unsupervised learning methods such as clustering and association rules.
		CO5	Understand and apply basic concepts of neural networks for real-world problems.

25AIPCC206	**Object-Oriented Programming and Computer Graphics**	**CO1**	Apply OOP concepts like classes, inheritance, and polymorphism in C++.
		CO2	Design and implement modular and reusable code.
		CO3	Understand basic graphics systems and drawing algorithms.
		CO4	Perform geometric transformations on objects.
		CO5	Develop simple computer graphics applications.
25RAMDM202	**Internet of Things**	**CO1**	Understand the fundamentals and needs of Embedded Systems for the Internet of Things
		CO2	Interface different sensors and actuators with IoT development boards.
		CO3	Analyze IoT protocols for making IoT devices communication
		CO4	Use of cloud and its services.
		CO5	Design and Develop secured IoT applications.
25OEC202A	**Leadership and Team Dynamics**	**CO1**	Explain leadership theories, organizational behavior, and group dynamics concepts.
		CO2	Apply communication and interpersonal skills in team environments.
		CO3	Analyze leadership styles, group processes, and motivational approaches
		CO4	Evaluate team effectiveness, conflict management, ethics, and leadership challenges.
		CO5	Develop leadership strategies for professional and global organizational environments.
25OEC202B	**Green Practices & ESG Frameworks**	**CO1**	Explain the concepts of sustainability, green practices, and ESG frameworks.
		CO2	Analyse environmental impacts and adopt green technologies for sustainable development.
		CO3	Evaluate social responsibility and stakeholder engagement practices in organizations.
		CO4	Understand governance principles, ethical leadership, and regulatory frameworks.
		CO5	Apply ESG reporting standards and sustainability assessment methods in industries.
25OEC202C	**Innovation and Business Strategy**	**CO1**	Explain concepts of innovation, creativity, and business strategy.
		CO2	Apply innovation management and strategic thinking tools for business problem solving.
		CO3	Analyze business models, technology innovation, and entrepreneurial strategies.
		CO4	Evaluate sustainability, intellectual property, and innovation management practices.
		CO5	Develop innovative business solutions and strategic growth approaches.

25OEC202D	**Stress Management and Mental Well Being**	**CO1**	Explain the concepts of stress, mental health, and wellbeing
		CO2	Identify sources of stress and analyze their impact
		CO3	Apply stress management techniques
		CO4	Demonstrate emotional intelligence and coping strategies
		CO5	Design a personal wellbeing and stress management plan.
25OEC202E	**French Language Module-II**	**CO1**	Use basic French expressions confidently.
		CO2	Understand simple dialogues and instructions.
		CO3	Read and write short paragraphs.
		CO4	Participate in guided conversations.
		CO5	Apply French in practical situations.
25OEC202F	**German Language Module-II**	**CO1**	Use beginner-level German expressions confidently.
		CO2	Understand simple dialogues and instructions.
		CO3	Read and write short passages.
		CO4	Participate in practical conversations.
		CO5	Apply German in everyday situations.
25OEC202G	**Japanese Language Module-II**	**CO1**	Communicate using beginner-level Japanese expressions.
		CO2	Understand short dialogues and passages.
		CO3	Read and write basic Japanese sentences.
		CO4	Participate in practical conversations.
		CO5	Apply Japanese in everyday situations.
25AIPCC204L	**Database Management Systems Lab**	**CO1**	Apply the concepts of database design by creating E-R diagrams and converting them into relational models.
		CO2	Develop and execute SQL queries for data manipulation, transaction control, and access management using DML, DCL, and TCL commands.
		CO3	Analyze and implement SQL operations, including joins, views, subqueries, stored procedures, and triggers, to optimize data retrieval and integrity.
		CO4	Design and Implement CRUD operations in MongoDB, demonstrating an understanding of NoSQL database concepts and their practical applications.
		CO1	Apply the fundamental concepts of supervised and unsupervised machine learning algorithms and Feature extraction techniques

25AIPCC205L	**Foundation of Machine Learning Lab**	**CO2**	Apply classification algorithm techniques and evaluate the performance
		CO3	Apply regression algorithm techniques and evaluate the performance
		CO4	Apply unsupervised learning techniques.
25AIPCC206L	**Object Oriented Programming and Computer Graphics Lab**	**CO1**	Apply OOP concepts such as classes, inheritance, and polymorphism using C++
		CO2	Design and implement structured, modular, and reusable programs
		CO3	Implement basic computer graphics algorithms for drawing primitives
		CO4	Apply 2D transformations to graphical objects
		CO5	Develop simple computer graphics applications
25AIVSE202	**Data Science and Visualization Techniques**	**CO1**	Apply statistical methods for data preprocessing and analysis.
		CO2	Design and create effective data visualizations.
		CO3	Apply data visualization techniques in various application domains..
25AEC201A	**Modern Indian Language (Marathi)**	**CO1**	मराठी भिोतील प्रगत भाषिक कौशलयाांचा प्रभिीपणे िापर करून सांिि साधू शकतील.
		CO2	प्रसारमाध्यमाांतील सांज्ञापनाचे षिषिध प्रकार, स्िरूप ि समाजातील तयाांचे स्थान स्पष्टट करू शकतील.
		CO3	व्यक्ततमत्ि षिकासामध्ये भिोचे महत्ि ओळखून प्रभिी सांिि कौशलय षिकससत करू शकतील
		CO4	लोकशाहीतील जिीनव्यिहार आणण प्रसारमाध्यमे याांतील परस्परसांबांधाांचे षिश्लेण करू शकतील.
		CO5	प्रसारमाध्यमाांसाठी षिषिध प्रकारचे लेखन कौशलय आतमसात करून प्रभिी लेखन करू शकतील.
25AEC201B	**Modern Indian Language (Sanskrit)**	**CO1**	Understand the basic structure, phonetics, and grammar of the Sanskrit language.
		CO2	Construct simple Sanskrit sentences using basic grammatical rules.
		CO3	Interpret selected Sanskrit verses related to science, mathematics, and philosophy.
		CO4	Recognize the contributions of ancient Indian scholars to science and engineering.
		CO5	Appreciate the relevance of Sanskrit in modern fields such as computational linguistics, knowledge.
25HSM202A	**Business Fundamentals for Entrepreneurs**	**CO1**	Explain the role of entrepreneurship in economic and technological development.
		CO2	Identify and analyze business opportunities using systematic tools and techniques.
		CO3	Apply marketing and financial fundamentals for planning entrepreneurial ventures.
		CO4	Design sustainable business models and evaluate startup feasibility.

		CO5	Develop and present a comprehensive business plan for a technology-based enterprise.
25HSM202B	**Entrepreneur and Start-ups**	**CO1**	Explain concepts of entrepreneurship, innovation, and their role in economic and societal development.
		CO2	Identify entrepreneurial opportunities using creativity, design thinking, and market analysis tools.
		CO3	Analyze feasibility of a business idea considering technical, financial, legal, and social aspects.
		CO4	Apply knowledge of startup ecosystem, IPR, funding, and government initiatives to venture creation.
		CO5	Develop and present a basic business plan demonstrating teamwork, communication, ethics, and lifelong learning attitude.
25HSM202B	**Fundamentals of Accounting and Finance**	**CO1**	Apply key accounting principles in business contexts.
		CO2	Interpret financial statements and reports.
		CO3	Understand working capital and its components.
		CO4	Evaluate capital budgeting decisions.
		CO5	Gain awareness of financial markets and financing options.
25HSM202D	**Business Intelligence and Analytics**	**CO1**	Understand the concepts of Decision Support Systems, Business Intelligence, and Business Analytics.
		CO2	Understand the architecture of Data Warehouses and OLAP systems used in business intelligence.
		CO3	Apply data preparation, reporting, and visualization techniques to analyze business data.
		CO4	Analyze the impact of predictive analytics, machine learning, and analytics applications
		CO5	Apply Machine Learning in BI.
25VEC202	**Indian Constitution and Governance**	**CO1**	Explain the historical background, features, and structure of the Indian Constitution.
		CO2	Describe Fundamental Rights, Directive Principles, and Fundamental Duties and their significance.
		CO3	Apply constitutional provisions to analyze the functioning of Union and State governments.
		CO4	Analyze the role of constitutional and statutory bodies in Indian governance
		CO5	Evaluate contemporary governance issues with reference to constitutional values and ethics.

Department of Artificial Intelligence and Machine Learning

Third Year of AIML (2024 Pattern)

(With effect from Academic Year 2026-27)

Term-I

Course Outcomes

PCC-301 -AIM	**Operating System**	**CO1**	Explain the architecture, components, and functions of modern operating systems.
		CO2	Analyze process scheduling, synchronization, deadlock handling, and resource allocation techniques.
		CO3	Apply memory management and virtual memory algorithms to solve operating system problems.
		CO4	Evaluate file systems, storage management strategies, and security mechanisms in operating systems.
		CO5	Assess operating system support for AI/ML workloads, cloud computing platforms, and distributed environments.
PCC-302-AIM	**Deep Learning**	**CO1**	Explain the fundamentals of artificial neural networks and deep learning concepts.
		CO2	Explain the fundamentals of artificial neural networks and deep learning concepts.
		CO3	Develop convolutional neural network models for image classification and computer vision tasks.
		CO4	Apply recurrent neural networks and sequence models for time-series and NLP applications.
		CO5	Analyze advanced deep learning architectures including Autoencoders, GANs, and Transformers for real-world AI applications.
PCC-303 -AIM	**Theory of Computation**	**CO1**	Design DFA and NFA models for regular languages and validate string acceptance.
		CO2	Analyze the equivalence and conversion between regular expressions, NFA, DFA, and regular languages.
		CO3	Develop Context-Free Grammars for specified Context-Free Languages and generate valid strings using derivation techniques.
		CO4	Construct the Pushdown Automata for Context-Free Languages and validate string acceptance.
		CO5	Design Turing Machines for language acceptance and simple computational problems.
PCC-304 -AIM	**Operating System Lab 1**	**CO1**	Explain the architecture, services, system calls, and structural design of modern operating systems.
		CO2	Analyze process scheduling, multithreading, synchronization, and deadlock management techniques for efficient resource allocation.
		CO3	Apply memory management and virtual memory algorithms to solve operating system-related problems and evaluate their performance.
		CO4	Evaluate file organization, storage management, disk scheduling, and security mechanisms in operating systems.
		CO5	Assess the use of virtualization, containerization, and operating system support for cloud computing and AI/ML workloads.
		CO1	Explain the principles of artificial neural networks, deep learning architectures, activation functions, loss functions, and optimization techniques.

PCC-305-AIM	**Deep Learning Lab-2**	**CO2**	Design and implement deep learning models using modern frameworks to solve classification, regression, and prediction problems.
		CO3	Apply CNNs, RNNs, LSTMs, and transfer learning techniques for image, text, speech, and sequential data analysis.
		CO4	Evaluate and improve deep learning models using appropriate performance metrics, regularization methods, and hyperparameter tuning strategies.
		CO5	Design and build end-to-end AI applications integrating deep learning solutions for domains like image recognition, speech processing, and text analysis.
PEC-321D-AIM	**Natural Language Processing (Elective I)**	**CO1**	Describe the fundamental concepts of NLP, challenges and issues in NLP.
		CO2	Analyse word level and syntactical parsing techniques.
		CO3	Analyse semantic relationships and sentiment features for natural languages.
		CO4	Integrate the NLP techniques for the information retrieval task
		CO5	Demonstrate the use of NLP tools and techniques for real time applications of natural languages.
PEC-322D -AIM	**Natural Language Processing Lab (Elective I Lab 3)**	**CO1**	Apply text preprocessing techniques for natural language data preparation.
		CO2	Analyze text representations using feature extraction and embedding methods.
		CO3	Implement POS tagging, semantic analysis, and text classification techniques.
		CO4	Implement NLP-based solutions for sentiment analysis and information retrieval tasks.
		CO5	Use NLP tools and libraries to solve real-world language processing problems.
MDM-33-AIM	**AI-IoT Product Development**	**CO1**	Configure IoT hardware and acquire real-time sensor data using Arduino-based systems.
		CO2	Develop IoT applications with cloud integration and real-time dashboard visualization.
		CO3	Apply data preprocessing, visualization, and analysis techniques on IoT datasets using Python tools.
		CO4	Develop and evaluate machine learning models using IoT data for prediction and intelligent decision-making.
		CO5	Design and implement complete AI-IoT systems integrating sensors, cloud platforms, machine learning, and edge intelligence for real-world applications
ELC-342-AIM	**Technical Seminar**	**CO1**	Apply appropriate research tools and databases to collect technical literature in the selected domain.
		CO2	Analyse research papers to identify methodologies, datasets, tools, experimental setup, and outcomes.
		CO3	Compare and analyze various techniques and approaches reported in the literature.
		CO4	Evaluate existing work to identify research gaps and opportunities for future investigation.
		CO5	Develop a technical seminar report and presentation by synthesizing information from multiple research sources and formulate a project problem statement.

Term-II

Course Outcomes

PCC-351 -AIM	**Computer Vision**	**CO1**	Apply image preprocessing and enhancement techniques for visual data analysis.
		CO2	Apply segmentation and feature extraction techniques for image analysis and recognition.
		CO3	Analyze object recognition methods and interpret three-dimensional scene information.
		CO4	Apply motion analysis, object detection, and tracking techniques for video understanding.
		CO5	Evaluate advanced AI-driven computer vision techniques and develop intelligent visual applications.
PCC-352-AIM	**Software Engineering with DevOps**	**CO1**	Identify various software application domains and classify software applications.
		CO2	Analyze software requirements by applying various modeling techniques.
		CO3	Translate the requirement models into design models.
		CO4	Explain the fundamentals of DevOps, and the role of collaboration between development and operations teams.
		CO5	Create, manage, and deploy Docker images and container for developing scalable and portable applications.
PCC-353 AIM	**Computer Vision Lab 1**	**CO1**	Apply image acquisition, preprocessing, enhancement, and transformation techniques for visual data analysis
		CO2	Implement image segmentation, feature extraction, and shape analysis techniques for object identification.
		CO3	Develop computer vision applications for object recognition, face recognition, and three dimensional scene understanding.
		CO4	Apply motion analysis, object detection, tracking, and video analytics techniques for dynamic scene interpretation.
		CO5	Design AI-enabled computer vision solutions using deep learning models for classification, detection, and segmentation tasks.
PCC-354-AIM	**Software Engineering with DevOps Lab 2**	**CO1**	Make use of Version Control system to efficiently track changes, manage code versions, and collaborate on software development.
		CO2	Apply Continuous Integration (CI) and Continuous Deployment (CD) to automate code integration, deployment.
		CO3	Utilize containerization and Container orchestration tools to package, deploy, and manage applications.
		CO4	Apply Configuration Management, Infrastructure as Code (IaC), and Cloud Services for automated provisioning, deployment, and management of IT infrastructure.
PEC-361A-AIM	**Large Language Models (Elective II)**	**CO1**	Explain NLP concepts, text preprocessing techniques, and word embeddings.
		CO2	Apply Transformer architecture and attention mechanisms for NLP tasks
		CO3	Analyze the architecture and working of Large Language Models.
		CO4	Develop applications using fine-tuning, prompt engineering, and RAG techniques.

		CO5	Evaluate the performance, deployment, and ethical aspects of LLM-based and multimodal AI systems
PEC-361B-AIM	**Quantum Computing (Elective II)**	**CO1**	Formulate mathematical models of single-qubit states and visualize quantum phenomena using the Bloch sphere.
		CO2	Analyse multi-qubit systems using density matrices to distinguish states and verify quantum entanglement.)
		CO3	Design reversible quantum logic circuits and compute the statistical expectation values of measurements.
		CO4	Evaluate the mathematical execution and theoretical speedup of foundational quantum algorithms.
		CO5	Develop understanding towards simple quantum cryptographic protocols and error correcting codes.
PEC-361C-AIM	**Blockchain Technology (Elective II)**	**CO1**	Interpret the architecture, components, and operational principles of blockchain systems and distributed ledgers.
		CO2	Analyze cryptographic techniques, consensus algorithms, and security mechanisms employed in blockchain networks.
		CO3	Implement smart contracts using contemporary blockchain development platforms and frameworks.
		CO4	Evaluate decentralized and enterprise blockchain solutions for diverse application domains. (L5)
		CO5	Design blockchain-based solutions to address real-world challenges considering scalability, security, and sustainability requirements.
PEC-361D-AIM	**Data Science & Big Data Analytics**	**CO1**	Analyze needs and challenges for Data Science Big Data Analytics
		CO2	Understand, apply and analyze needs, challenges and techniques for big data visualization.
		CO3	Apply the lifecycle of Big Data analytics to real world problems
		CO4	Design and implement Big Databases using the Hadoop ecosystem
		CO5	Evaluate the ethical, privacy, security, and societal implications associated with data science and big data applications.
PEC-362A-AIM	**Power BI & Tableau (Elective III)**	**CO1**	Explain the concepts of Business Intelligence, data analytics, data visualization principles, and the role of Power BI and Tableau in data-driven decision making.
		CO2	Apply data preparation, transformation, integration, and data modeling techniques using Power BI and Tableau to create structured datasets for analysis.
		CO3	Design interactive dashboards and visual reports using appropriate visualization techniques to communicate business insights effectively.
		CO4	Analyze business data using advanced analytical features, DAX calculations, forecasting methods, and AI-assisted capabilities available in Power BI and Tableau.
		CO5	Develop business intelligence solutions for real-world applications by utilizing cloud-based BI services, security mechanisms, real-time analytics, and emerging AI-powered BI technologies.
PEC-362B-AIM	**High Performance Computing (Elective III)**	**CO1**	Understand the fundamentals of parallel computing, parallel architectures, and programming paradigms.
		CO2	Apply different Parallel programming paradigm and Decomposition Techniques.
		CO3	Illustrate data communication operations on various parallel architecture
		CO4	Analyze the performance of parallel systems.

		CO5	Apply GPU computing and CUDA programming techniques for High-Performance Computing applications.
PEC-362C-AIM	**Mobile Application Development (Elective III)**	**CO1**	Explain mobile computing concepts, architectures, operating systems, and development methodologies.
		CO2	Design mobile user interfaces and navigation systems following established UI/UX principles.
		CO3	Develop mobile applications incorporating storage mechanisms, sensors, and device services.
		CO4	Integrate APIs, cloud services, and AI/ML models into mobile applications.
		CO5	Test, secure, optimize, and deploy mobile applications for practical applications.
PEC-362D-AIM	**Cyber Security & Risk Management (Elective III)**	**CO1**	Explain cybersecurity concepts, threat landscapes, attack methodologies, and security frameworks used to protect information assets.
		CO2	Apply cryptographic algorithms, key management techniques, digital signatures, and PKI mechanisms to secure data and communications.
		CO3	Analyze and implement network security controls including firewalls, IDS/IPS, VPNs, segmentation, wireless security, and DNS security mechanisms.
		CO4	Assess cybersecurity risks and recommend appropriate security architectures, design principles, and risk treatment strategies for organizational environments.
		CO5	Evaluate security challenges and mitigation approaches in cloud, IoT/OT, and AI-driven systems while complying with cybersecurity laws, privacy regulations, and ethical practices.
PEC-363A-AIM	**Power BI & Tableau Lab (Elective III Lab 3)**	**CO1**	Import, clean, transform, and integrate data from multiple sources using Power BI and Tableau.
		CO2	Create data models and establish relationships among datasets to support analytical reporting.
		CO3	Develop interactive dashboards and visualizations using appropriate charts, filters, slicers, and drill-down features.
		CO4	Perform advanced analytics using DAX functions, forecasting techniques, and Python integration to extract actionable business insights.
		CO5	Design and implement a complete Business Intelligence solution for a real-world problem by integrating data preparation, modeling, visualization, and analytics techniques.
PCC-363C-AIM	**High Performance Computing Lab (Elective III Lab 3)**	**CO1**	Implement parallel algorithms using OpenMP.
		CO2	Develop GPU-based applications using CUDA.
		CO3	Apply MPI and parallel computing techniques to HPC applications.
		CO4	Analyze the performance of parallel algorithms and HPC applications.
		CO5	Design parallel computing solutions for real-world computational problems.
PEC-363C- AIM	**Mobile Application Development (Elective III Lab 3)**	**CO1**	Configure and utilize mobile application development environments.
		CO2	Design and implement responsive mobile user interfaces.
		CO3	Develop applications utilizing local storage and device hardware resources.
		CO4	Integrate cloud services, APIs, and AI/ML functionalities into mobile applications.

		CO5	Test, debug, optimize, and deploy mobile applications.
PEC-363D-AIM	**Cyber Security & Risk Management Laboratory (Elective III Lab 3)**	**CO1**	Deploy Kali Linux, configure network firewalls, and harden web applications against hijacking threats.
		CO2	Execute network scanning using Nmap/Zenmap and automate database flaw identification using exploitation tools.
		CO3	Construct custom Snort rules to parse live packet payloads and isolate network threats.
		CO4	Build operational Python client-server scripts utilizing Caesar ciphers, RSA encryption, and digital signature authentication.
		CO5	Implement safe hybrid security pipelines combining Diffie-Hellman key exchanges with symmetric DES encryption.
MDM-371-AIM	**Multimedia Technology**	**CO1**	Explain multimedia components, architectures, and media representation techniques.
		CO2	Perform basic image, audio, and video editing using multimedia tools.
		CO3	Apply multimedia compression and storage techniques for efficient media handling.
		CO4	Develop AI-assisted multimedia applications for classification, enhancement, and content generation.
		CO5	Design and present an interactive multimedia project integrating multiple media elements.
VSE-372-AIM	**Full Stack Development with MERN**	**CO1**	Develop interactive front-end applications using React.js components and hooks.
		CO2	Implement server-side functionalities and REST APIs using Node.js and Express.js.
		CO3	Design and integrate MongoDB databases for data storage and retrieval.
		CO4	Analyse and integrate front-end, back-end, and database components to develop full-stack applications.
		CO5	Develop AI-ML oriented web applications using MERN stack technologies.
ELC-381-AIM	**Internship/OJT**	**CO1**	Apply academic knowledge and technical skills in professional environments.
		CO2	Analyze industrial problems, workflows, and technical requirements.
		CO3	Utilize appropriate tools, technologies, and platforms to accomplish assigned tasks.
		CO4	Evaluate technical solutions considering professional, societal, and ethical responsibilities.
		CO5	Develop professional documentation, reports, and presentations based on internship experience.