Master of Computer Application
Course Outcome (CO)

		SEMESTER – I	
Course Code	**Course Title**	**Course Outcome (CO)**	**Cognitive Level (As Per Blooms Taxonomy)**
MCA-411	Object Oriented Programming Using Java	• CO1: Recall Java syntax rules, including data types, variables, and control structures.	Remember (1)
		• CO2: Create Java application development using polymorphism, inheritance, and inner classes.	Create (6)
		• CO3: Develop GUI interface and event driven applications.	Create (6)
		• CO4: Manipulate databases through java application.	Apply (4)
MCA-412	Lab on Java Programming	• CO1: Write java programs using inner classes and static fields in implementation of Java application	Apply (3)
		• CO2: Develop Java application for GUI development and event handling.	Create (6)
		• CO3: Develop database application using JDBC.	Apply (3)
		• CO4: Students will be able to apply Java programming constructs to develop simple programs that solve basic computational problems.	Apply (3)
MCA-413	Data Structures and Algorithms	• CO1: Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.	Understand (2)
		• CO2: Understand data structures such as arrays, linked lists, stacks and queues, graphs, trees and hash tables.	Understand (2)
		• CO3: Understand about hash functions, collision resolution techniques like separate chaining and open addressing.	Understand (2)
		• CO4: Study binary trees: representations, operations like insert and delete, and traversal methods including in order, preorder, postorder, and level order.	Analyze (4)
MCA-414	Lab on Data Structures and Algorithms	• CO1: Ability to analyze the time and space complexities of Algorithms	Understand(2)
		• CO2: Understand the difference between structured data and data structure	Remember (1)
		• CO3: Choose the appropriate data structure and algorithm design method for a specified application.	Evaluate (6)
		• CO4: Ability to design programs using a variety of data structures such as stacks, queues, binary trees, search trees and etc.	Analyze (4)
MCA-415	Python Programming	• CO1: Understand the basic concept of Python Programming.	Understand(2)
		• CO2: Understand lists, tuples, dictionaries, strings and files efficiently for solving real world	Apply (3)

		problems	
		• CO3: Recall the concepts of object-oriented programming using python	Remember(1)
		• CO4: Understand modules, packages and GUI based programming for web.	Understand(2)
		• CO5: Develop Database connectivity steps.	Create (6)
MCA-416	Lab on Python Programming	• CO1: Recall Python syntax rules, including variables, data types, and basic control structures (loops, conditionals).	Remember (1)
		• CO2: Demonstrate use and working of various data types, control structures, files, exceptional handling etc.	Apply (3)
		• CO3: Create, configure and make use of modules	Create (6)
		• CO4. Develop console based and GUI applications (both procedural/object oriented) to solve different problems using python programming.	Create (6)
MCA-417	Fundamentals of Artificial Intelligence	• CO1: Understand the informed and uninformed problem types.	Understand (2)
		• CO2: Identify problems that are amenable to solution by AI methods.	Apply (3)
		• CO3: Identify appropriate AI methods to solve a given problem.	Apply (3)
		• CO4: Understand system using different informed search / uninformed search or heuristic approaches.	Understand (2)
MCA-418 (A)	Cloud Computing-I	• CO1: Apply knowledge of cloud computing fundamentals to analyze and propose appropriate deployment techniques for specific organizational needs	Apply (3)
		• CO2: Demonstrate comprehension of virtualization concepts, including types (hardware, storage, and network) and their relevance to cloud computing.	Understand (2)
		• CO3: Describe Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) models, including their key features and use cases.	Remember (1)
		• CO4: Apply parallel and distributed programming paradigms in cloud environments to develop scalable applications.	Apply (3)
MCA-418(B)	Lab on Cloud Computing-I	• CO1: Configure various virtualization tools such as Virtual Box, VMware Workstation.	Apply (3)
		• CO2: Learn how to simulate a cloud environment to implement new schedulers.	Create (6)
		• CO3: Demonstrate the benefits of various distributed computing platforms	Apply (3)
		• CO4: Deploy applications in a simulated cloud environment	Apply (3)
MCA-419	Data Science-I	• CO1: Understand the fundamental concepts of data science.	Understand (2)

Course Code	Course Name	Course Outcomes	Bloom's Level
(A)		• CO2: Apply data cleaning and preprocessing techniques.	Apply (3)
		• CO3: Visualize and present the inference using various tools.	Apply (3), Analyze(4)
		• CO4: Evaluate relationships between variables using correlation and covariance	Analyze(4), Evaluate (5)
		• CO5: Create interactive visualizations and dashboards for business analytics using Power BI.	Create (6), Apply (3)
MCA-419(B)	Lab on Data Science -I	• CO1: Demonstrate Proficiency in Setting Up and Using Python Data Science Tools	Apply (3)
		• CO2: Apply Data Preprocessing Techniques for Machine Learning.	Apply (3)
		• CO3: Conduct Statistical Analysis and Interpret Results	Analyze (4), Evaluating (5)
		• CO4: Develop and Evaluate Machine Learning Models.	Evaluate (5), Create (6)
MCA-420(A)	Cyber Security	• CO1: Describe the differences between packet filters and firewalls and how they protect networks.	Understand (2)
		• CO2: Describe the different types of cloud service models and deployment models, and how they impact security	Understand (2)
		• CO3: Apply vulnerability assessment tools like Nessus and OpenVAS to identify vulnerabilities in a given system.	Apply (3)
		• CO4: Apply digital forensics techniques to a simulated cybercrime scenario.	Apply (3)
		• CO5: Analyze the results from web application security tools and differentiate between various types of vulnerabilities identified.	Analyze (4)
MCA-420(B)	Lab on Cyber Security	• CO1: Describe methods for analyzing web app security.	Understand (1)
		• CO2: Identify key tools available in Kali Linux for web application analysis.	Understand (1)
		• CO3: Implement Kali Linux in Virtual Box/VMware and set up network.	Analyze(4)
		• CO4: Define John the Ripper to decode hashed passwords.	Remember (1)
MCA-421(A)	Web Technologies-I	• CO1: Recall the basic HTML tags and their purposes	Remember (1)
		• CO 2: Describe how JavaScript can be used to manipulate the DOM and Handle events.	Understand (2)
		• CO 3: To understand jQuery selectors and methods for DOM manipulation	Understand (2)
		• CO 4: To analyze the responsiveness and visual appeal of web interfaces Created with Bootstrap.	Analyze(4)
MCA-421(B)	Lab on Web Technologies-I	• CO1: Understand the structure of an HTML document, CSS styling and layout using CSS	Understand (2)
		• CO2: Recall the concept of variables, scope, functions, operators, looping, and conditional statements in JavaScript	Remember (1)

		• CO3: Implement interactive web applications using advanced event handling techniques in JavaScript.	Apply (3)
		• CO3: Implement interactive web applications using advanced event handling techniques in JavaScript.	Understand (2)

SEMESTER – II			
Course Code	Course Title	Course Outcome (CO)	Cognitive Level (As Per Blooms Taxonomy)
MCA-431	Database Management System	• CO1: Understand the fundamental concepts and terminology associated with database systems, including architecture, design, and various models.	Understand (2)
		• CO2: Explain the fundamental concepts of Entity-Relationship (ER) modelling and its purpose in database design	Understand (2)
		• CO3: Apply the relational model, specify integrity constraints, and explain how to create a relational database using an ER diagram and normalization techniques.	Apply (3)
		• CO4: Use knowledge to implement and manipulate database schemas, perform SQL queries, and manage transactions and concurrency control.	Apply (3)
		• CO5: Determine partitioning and distribution of data across networked nodes of a DBMS and data optimization in a distributed environment.	Analyze (4)
MCA-432	LAB on Database Management System	• CO1: Understand and Utilize DML (Data Manipulation Language) and DDL commands to create and maintain tables	Understand (2)
		• CO2: Develop a relational database schema for a given scenario, including tables, relationships, and constraints.	Create (6)
		• CO3: Utilize the DML/DDL commands and programming PL/SQL including stored procedures, stored functions, cursors, views and Triggers for modify data	Apply (2)
		• CO4: Execute nested queries and perform various types of JOIN operations to retrieve and combine data from multiple tables	Analyze (4)
		• CO5: Establish database connectivity and perform operations using front-end tools.	Apply (2)
MCA-433	Software Project Management	• CO1: Understand the activities during the project scheduling of any software application.	Understand (2)
		• CO2: Understand about risk management activities and the resource allocation for the projects	Understand (2)
		• CO3: Acquire knowledge and skills needed for the construction of highly reliable software project	Apply (3)
		• CO4: Apply different techniques of project	Apply (3)

		monitoring, control and review.	
		• CO5: Explain various project management scheduling techniques.	Analyze (4)
MCA-434	Machine Learning	• CO1: Understand and implement the supervised learning algorithms.	Understand (2) Apply (3)
		• CO2: Analyze and apply the machine learning concepts for different problems.	Apply (3) Analyze (4)
		• CO3: Apply the clustering algorithms for various problems.	Apply (3)
		• CO4: Evaluate and test the performance of the learning algorithms.	Evaluate (5)
		• CO5: Design and create a learning model for real time applications.	Create (6)
MCA-435(A)	Advanced Cloud Computing-II	• CO1: Explain the evolution, characteristics, service models, and deployment models of cloud computing, analysing its benefits, challenges, and architecture through real-world applications.	Analysis (4)
		• CO2: Describe data centers, cloud infrastructure, virtualization, cloud storage, networking, security, and disaster recovery in the cloud.	Remembering (2)
		• CO3: Compare major cloud service platforms, develop cloud-native applications, and implement micro services, containers, server less computing, cloud databases, and Dev Ops practices.	Analysis (4)
		• CO4: Apply cloud resource management, auto-scaling, load balancing, monitoring, cost optimization, performance tuning, SLA management, and multi-cloud strategies.	Apply (3)
		• CO5: Understand and explore emerging trends like edge computing, IoT, AI, machine learning, block chain, quantum computing, green cloud practices, and future innovations in cloud computing.	Understanding (1) Evaluating (4)
MCA-435(B)	Lab on Advanced Cloud Computing	• CO1: Configure cloud infrastructure.	Apply (3)
		• CO2: Monitor load on cloud, balance load by analyzing.	Analyze (4)
		• CO3: Work with real time cloud solutions.	Apply (3)
MCA-436 (A)	Data Science II	• CO1: Understand fundamental concepts of data science and machine learning.	Understand (2)
		• CO2: Apply machine learning algorithms to solve practical problems using appropriate libraries and frameworks.	Apply (3)
		• CO3: Utilize big data technologies to process and analyze large datasets	Apply (3), Analyze(4)
		• CO4: Analyze advanced machine learning techniques and frameworks.	Analyze(4)
		• CO5: Develop and implement advanced data science techniques, including time series analysis, natural language processing, and reinforcement learning.	Create (6) Apply (3)

MCA-436(B)	Lab on Data Science -II	• CO1: Explore the fundamental concepts of data science & Machine Learning	Understand (2)
		• CO2: Understand data analysis techniques for applications handling large data.	Understand (2) Analyze (4)
		• CO3.Understand various machine learning algorithms used in data science process	Understand (2)
		• CO4.Visualize and present the inference using various tools.	Apply (3)
MCA-437(A)	Information Security and Mitigation	• CO1: Identify key concepts related to information security, including confidentiality, integrity, and availability.	Remember (1)
		• CO2: Describe fundamental principles and practices of network security	Understand (2)
		• CO3: Apply vulnerability scanning tools and penetration testing techniques to assess security in a controlled environment.	Apply (3)
		• CO4: Analyze firewall rules and configurations to identify potential weaknesses.	Analyze (4)
MCA-437(B)	Lab on Information Security and Mitigation	• CO1: Identify the basic structure and components of the DES encryption algorithm.	Remember (1)
		• CO2: Describe the AES encryption and decryption processes, including key sizes and block modes.	Understand (2)
		• CO3: Implement a digital signature scheme in a program and test it for signing and verifying data.	Apply (3)
MCA-438(A)	Web Technologies-II	• CO1: Identify the advantages of Angular JS and its MVC architecture.	Remember (1)
		• CO2: Describe how to create and use Angular JS modules.	Understand (2)
		• CO3: Implement controllers in Angular JS, including methods and external controller files.	Apply (3)
		• CO4: Develop MongoDB queries to perform CRUD operations.	Apply (3)
MCA-438(B)	Lab on Web Technologies-II	• CO 1: Identify the syntax and basic usage of expressions in AngularJS.	Remember (1)
		• CO 2: Develop a form that includes various validation rules to ensure data integrity.	Apply (3)
		• CO 3: To understand the designing library like Bootstrap.	Understand (2)
		• CO 4: Describe the usage of insert and delete commands to manipulate data in MongoDB.	Understand (2)
MCA-439(A)	Internet of Things (IOT)	• CO1: Recall fundamental concepts and understanding basic principles related to IoT security.	Remember (1)
		• CO2: To understand essentials of IoT Security.	Understand (2)
		• CO3: Implement interfacing of various sensors, actuators to the development boards.	Apply (3)
		• CO4: Implementing IoT systems using standard communication protocols and analyzing their effectiveness for interoperability and data exchange.	Apply (3)

		• CO5: Compare various IoT communication technologies and Design various IoT applications.	Analyze (4)
MCA-439(B)	Lab on Internet of Things (IOT)	• CO1: Recall the steps involved in installing operating systems on the Raspberry Pi	Remember (1)
		• CO2: Describe how each type of sensor works and its applications.	Understand (2)
		• CO3: Apply Wire IR sensors to a Raspberry Pi or Arduino board and ensure proper connections and functionality.	Apply (3)
MCA-440(A)	Big Data Analytics	• CO1: Recognize the characteristics, applications of big data that make it useful to real world problems.	Remember (1)
		• CO2: Discuss the challenges and their solutions in Big Data	Understand (2)
		• CO3: Understand and work on Hadoop Framework and eco systems.	Understand (2)
		• CO4: Explain and analyze the Big Data using Map-reduce programming in Hadoop	Understand (2)
MCA-440(B)	Lab on Big Data Analytics	• CO1: Apply HDFS commands to manage file systems in a distributed environment.	Apply (3)
		• CO2: Develop Java applications for interacting with HDFS to perform file operations.	Apply (3)
		• CO3: Utilize Hadoop's built-in commands for efficient file and directory management.	Apply (3)
		• CO4: Design and implement a pipeline of multiple MapReduce jobs for complex data workflows.	Apply (3)
		• CO5: Formulate and execute HiveQL queries to retrieve and manipulate data stored in Hive.	Apply (3)
MCA-441(A)	Natural Language Processing	• CO 1: Understand issues and challenges in Natural Language Processing and NLP applications and their relevance in the classical and modern context.	Understand (2)
		• CO 2: Apply text processing techniques and handle language scripts	Apply (3)
		• CO 3: Understand Semantic Analysis theories and approaches, including Meaning representation, Lexical Semantics, word similarity, and relationships.	Understand (2)
		• CO 4: Study different word classes and their roles in Part-of-Speech (POS) tagging.	Understand (2)
MCA-441(B)	Lab on Natural Language Processing	• CO1: Understand installation and use of NLTK in python.	Understand (2)
		• CO2: Implement python program to process text files, morphology of Marathi words	Apply (3)
		• CO3: Understanding text files processing operation and Regular Expressions in NLP	Understand (2)
		• CO4: Understanding Morphology, PoS Tagging	Understand (2)
MCA-442(A)	Digital Image Processing	• CO1: Students will recall the fundamental elements of digital image perception and models.	Remember (1)

Course Code	Course Title	Course Outcome (CO)	Cognitive Level (As Per Blooms Taxonomy)
		• CO2: Students will analyze various methods of image enhancement, restoration, and analysis and understand their applications	Analyze (4)
		• CO3: Students will understand how point operations and histogram modeling contribute to image enhancement.	Understand (2)
		• CO4: Students will recall models and techniques used in image restoration	Remember (1)
MCA-442(B)	LAB on Digital Image Processing	• CO1: Identify different image enhancement techniques and their purposes.	Remember (1)
		• CO2: Apply histogram equalization to an image and plot its histogram	Apply (3)
		• CO3: Develop gray level slicing (intensity level slicing) on an image and analyze its effects.	Create (6)
		• CO4: Develop various smoothing spatial filters (e.g., mean, median, Gaussian filters) on images.	Create (6)
RM-417	Research Methodology	• CO1: Understand the basic concepts of research and its methodologies, identify appropriate research topics, select and define appropriate research problem and parameters	Remember(1)
		• CO2: Prepare a research proposal.	Understand (2)
		• CO3: Organize and conduct research in a more appropriate manner, writing research report and thesis.	Apply(3)
		• CO4: Carry out sampling and data analysis	Apply(3)

SEMESTER – III

Course Code	Course Title	Course Outcome (CO)	Cognitive Level (As Per Blooms Taxonomy)
MCA-451	Deep Learning	• CO1: Understand and describe key concepts, evolution, importance, and applications of deep learning.	Understand (2)
		• CO2: Apply basic neural network architectures and optimization techniques.	Apply (3)
		• CO3: Design and implement CNNs for computer vision tasks and transfer learning.	Apply (3)
		• CO4: Apply RNNs, LSTMs, and GRUs for sequential data problems.	Apply (3)
		• CO5: Analyze and evaluate advanced deep learning techniques like GANs and RL.	Analyze(4), Evaluate (5)
MCA-452	Block Chain Technology	• CO1: Explain the fundamental concepts, origin, and components of blockchain and distributed ledger technology (DLT)..	Remember (1), Understand (2)
		• CO2: Illustrate how blockchain operates including structure, lifecycle, and the role of various blockchain actors.	Understand (2), Apply (3)
		• CO3: Analyze the Bitcoin network, its transaction mechanism, mining process, and its role as a crypto currency.	Analyze(4), Remember (1)
		• CO4: Demonstrate the use of Ethereum platform and tools like Solidity, EVM, Web3, and smart contracts to create decentralized	Apply (3), Create (6)

		applications (DApps).	
		• CO5: Evaluate the Hyperledger Fabric framework and describe its architecture, membership, chain code, and practical use cases in enterprise-level applications.	Analyze(4), Evaluate (5)
MCA-453(A)	Mobile Application Development	• CO1: Understand the fundamental concepts of mobile application development and gain insight into handheld devices, mobile operating systems, and Android platform architecture.	Remember (1)
		• CO2: Set up the Android development environment and demonstrate the ability to create simple Android applications, utilizing Android components like Activities, Services, Broadcast Receivers, and Content Providers.	Understand (2)
		• CO3: Design and develop interactive Android User Interfaces using various UI components, layouts, event handling techniques, and menus to ensure an intuitive user experience.	Apply (3)
		• CO4: Implement advanced Android features such as drag-and-drop, notifications, location-based services, and integration of email, SMS, and phone functionalities within an Android application.	Analyze(4)
		• CO5: Design and manage databases in Android applications using SQLite to store, retrieve, and manage data, and integrate databases effectively within the application's flow.	Create(6)
MCA-453(B)	Lab on Mobile Application Development	• CO1: Install and configure the Android development environment using Android Studio, SDK tools, and cross-platform IDEs, and set up a C compiler in a virtual environment using VirtualBox.	Apply (3)
		• CO2: Design and develop Android user interfaces using layouts, views, widgets (e.g., DatePicker, Spinner, RadioButtons), and demonstrate event handling with various UI components.	Create (6)
		• CO3: Implement core Android components such as Activities, Intents (Implicit and Explicit), Dialogs, and Menus to build interactive mobile applications and manage navigation and communication between components.	Analyze(4)
		• CO4: Apply data persistence in Android applications by using SQLite databases and content providers to perform insert, update, delete, and retrieve operations effectively.	Apply (3)
MCA-454(A)	Business Intelligence	• CO1: Explain BI concepts, architecture, and applications	Understand (2)
		• CO2: Identify data sources and apply preprocessing techniques.	Understand (2)
		• CO3: Demonstrate the use of modern BI tools to create dashboards and reports for decision-	Apply (L3)

		making.	
		• CO4: Evaluate BI applications in domains like finance, healthcare, and retail.	Evaluate (5)
MCA-454(B)	Lab on Business Intelligence	• CO1: Install and configure BI tools like Power BI and import data from various sources.	Understand (2)
		• CO2: Perform data cleaning and transformation using Power BI and Excel.	Apply(3)
		• CO3 Create basic data visualizations and interpret dashboards for business insights.	Apply(3)
		• CO4. Demonstrate ability to build interactive dashboards using slicers, cards, and charts.	Apply(3)
MCA-455(A)	Generative AI	• CO 1: Understand the evolution of AI and the significance of Deep Learning.	Understand (2)
		• CO 2: Apply various Neural Network architectures for tasks like image recognition and sequence modeling.	Apply (3)
		• CO 3: Analyze data preprocessing and training techniques for neural networks.	Analyzing (4)
		• CO 4: Design practical solutions using advanced neural networks for diverse applications.	Creating (6)
MCA-455(B)	Lab on Generative AI	• CO1. Apply Python and TensorFlow basics, including data handling, visualization and preprocessing techniques.	Applying (3)
		• CO2. Implement and compare Generative AI models such as GANs, VAEs, LSTM networks, and Transformer models for text generation and images.	Applying (3)
		• CO3. Evaluate model performance and experiment with hyper parameters and optimization techniques to enhance Generative AI outcomes.	Evaluating (5)
		• CO4. Develop innovative applications in text generation showcasing practical skills.	Creating (6)
MCA-456(A)	UI and UX Design	• CO1: Design user interfaces using HTML5 principles, ensuring accessibility and semantic structure.	Create (6)
		• CO2: Create visually engaging and interactive UI components using advanced CSS3 techniques.	Create (6)
		• CO3: Implement TypeScript logic to manage user interactions in UI design.	Apply (3)
		• CO4: Build reusable UI Component using TypeScript Function, Classes and Interfaces	Create (6)
MCA-456(B)	Lab on UI and UX Design	• CO 1: Demonstrate understanding of HTML structure with semantic tags.	Understand (2)
		• CO 2: Apply CSS3 and TypeScript to validate forms and toggle UI states	Apply (3)
		• CO 3 Build Reusable UI components such as modal Using TypeScript Classes	Create (6)
		• CO 4: Create and manipulate a list of tasks using loops and conditionals.	Apply (3)

MCA-457(A)	Dev Ops	• CO1: Understand DevOps Principles, Tools and Cultural Transformation in software development.	Understand (2)
		• CO 2: Apply Version Control using Git to manage source code and collaboration	Apply (3)
		• CO 3: Implement Configuration Management using Chef	Create (6)
		• CO 4: Understand and Utilize Docker for application Containerization	Understand (2)
MCA 457 (B)	Lab on Dev Ops	• CO1: Describe the fundamental concepts and importance of version control systems in software development.	Understand (2)
		• CO2: Perform Git operations such as repository creation, commit, branching, and merging.	Apply (3)
		• CO3: Utilize GitHub to manage collaborative projects through cloning, pushing, and pulling code.	Apply (3)
		• CO4: Create and configure Docker accounts and pull OS images for containerized environments.	Apply (3), Analyze(4)
MCA-458(A)	E-Commerce Technologies and Management	• CO1: Explain the concepts and applications of E-Commerce	Understand (2)
		• CO2: Understand the structure and functioning of web portals and crowdsourcing platforms	Understand (2)
		• CO3: Apply front-end and back-end technologies for Developing E-commerce system.	Apply (3)
		• CO4: Explain the principles of e-commerce security, including common network threats, fraud prevention techniques	Understand (2)
MCA-458(B)	Lab On E-Commerce Technologies and Management	• CO1: Design and develop basic static web pages for an e-commerce website using HTML and CSS.	Apply (3)
		• CO2: Understand the process of domain name registration and identify hosting services	Understand (2)
		• CO3: Deploy websites using free hosting platforms and manage via control Panel	Apply (3)
		• CO4: Install and configure WordPress locally, add products, and simulate a complete checkout process.	Apply (3)
MCA-459(A)	Social Media Analytics	• CO1: Understand the scope, sources, and types of data used in social media analytics.	Understand (2)
		• CO2: Analyze social media campaigns and interpret platform-specific metrics.	Analyze(4)
		• CO3: Compare and interpret analytics data from various social media platforms.	Compare (4)
		• CO4: Process, visualize and draw conclusions from social media datasets	Evaluate (5)
MCA-459(B)	Lab On Social Media	• CO1: Set up and use social media analytics tools across various platforms	Apply (3)

Course Code	Course Title	Course Outcome (CO)	Cognitive Level (As Per Blooms Taxonomy)
	Analytics	• CO2: Collect and interpret real-world social media data for campaign analysis.	Analyze (4)
		• CO3: Visualize traffic and engagement insights using Google Data Studio	Create (6)
		• CO4: Evaluate ad performance and develop data-driven recommendations	Evaluate (5)
		• CO5: Design and monitor effective hashtag-based social media campaigns	Apply (3)
MCA-460(A)	Virtual and Augmented Reality	• CO1: Define the concepts, history, and evolution of VR and AR.	Remember (1)
		• CO2: Describe the working principles of VR/AR hardware and tracking technologies.	Understand (2)
		• CO3: Demonstrate interaction techniques and rendering pipelines in immersive technologies.	Apply (3)
		• CO4: Analyze AR/VR applications across different industry sectors.	Analyze (4)
MCA-460(B)	Lab on Virtual and Augmented Reality	• CO1: Configure and deploy development environments for creating AR/VR applications.	Apply (3)
		• CO2: Develop interactive AR/VR applications using appropriate SDKs and tools.	Create (6)
		• CO3: Implement tracking and user interaction techniques in immersive applications.	Apply (3)
		• CO4: Evaluate and optimize the performance of AR/VR applications.	Evaluate (5)
RP-461	Research Project	• CO1: Identify and define a real-world research problem.	Understand (2)
		• CO2: Conduct literature survey and identify research gaps.	Analyze (4)
		• CO3: Formulate hypothesis or objectives and design methodology.	Apply (3)
		• CO4: Develop working models/simulations/prototypes based on selected tools.	Create (6)

SEMESTER – IV

Course Code	Course Title	Course Outcome (CO)	Cognitive Level (As Per Blooms Taxonomy)
MOOC-471 & MOOC-472	Massive Open Online Course	• CO1: Identify and select appropriate MOOC courses aligned with academic and career goals.	Remembering (1)
		• CO2: Demonstrate understanding of new and emerging technologies learned through MOOCs.	Understanding (2)
		• CO3: Apply the acquired knowledge and skills from MOOC to practical scenarios or mini projects.	Applying (3)
		• CO4: Analyze concepts learned and present learning through assignments, discussions, or presentations.	Analyzing (4)
OJT-473	On-The-Job Training Internship (OJT)	• CO1. Recall key concepts, terminology, and tools related to the field	Remembering (1)
		• CO2. Understand core processes and methodologies applicable in the professional	Understanding (2)

		environment	
		• CO3. Apply learned knowledge to perform tasks and solve real-world problems in the field	Applying (3)
		• CO4. Analyze workplace situations, identify issues, and propose solutions for improvement	Analyzing(4)
		• CO5. Evaluate strategies and propose new solutions based on experience and learned knowledge	Evaluating (5)
		• CO6. Design and develop innovative solutions, strategies, or processes based on the knowledge and experience gained throughout the course	Creating (6)