PROGRAMME OUTCOMES AND COURSE OUTCOMES

2022 – 2023

NAME OF THE PROGRAMME: MCA **PROGRAMME CODE: MCA**

Programme Outcomes:

PO 1	Apply the knowledge of computing maths and science for the solution of problems and requirements
PO 2	Identify, critically analyze, formulate and develop computer applications using fundamental principles of relevant domain disciplines
PO 3	Design and evaluate solutions for computer based problems to meet the desired needs within realistic constraints such as safety, security and applicability
PO 4	Use research based knowledge to conduct experiments and interpret data to attain well-defined conclusions.
PO 5	Create, select and apply modern computing tools by understanding the limitations, with dexterity.
PO6	Demonstrate the competency in programming skills as per industry expectations.
PO7	Understand the impact of system solutions in societal, environmental and cultural issues within local and global contexts for sustainable development
PO8	Commit to professional ethics and cyber regulations, responsibilities & norms.

PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary environment to manage projects.
PO10	Communicate effectively with the society about computing technologies.
PO11	Demonstrate knowledge and understanding of the management principles and apply these to manage projects.
PO12	Appreciate the importance of goal setting and to recognize the need for life-long learning in the broadest context of technological change.

Course Outcomes:

Course Code	Course Title	Course Outcomes
20MCA101	Mathematical Foundation Of Computer Science	CO 1: Perform Logical operations and predicate calculus needed for computing skill. CO2: Analyze and Compare the various techniques for solving numerical equations. CO3: Apply the techniques of statistics and numerical methods to unravel problems by computers. CO4: Explain the set theory logic. CO 5: Utilize the Knowledge of matrices for designing and solving problems

22MCA102	Relational Database Management Systems	CO1:Understand the basic concepts of Relational Data Model, Entity Relationship Model and process of Normalization. CO 2: Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML) CO 3: Understand and construct database using Structured Query Language (SQL) in Oracle9i environment. CO 4 Learn basics of PL/SQL and develop Programs using Cursors, Exceptions, Procedures and Functions CO 5: Understand and use built-in functions and enhance the knowledge of handling multiple tables

20MCA103	Operating Systems	CO 1: Identify the components and processes. CO 2: Analyze on scheduling algorithms and deadlocks. CO 3: Demonstrate the mapping between the physical memory and virtual memory. CO 4: Identify the secondary memory management techniques. CO 5: Analyze on the distributed systems and security issues.

20MCA104	Progtramming In Python	CO 1: Predict the basics of Python programming. CO 2: Solve problems requiring the writing of well-documented programs in the Python language, including use of the logical constructs of that language. CO 3: Use and manipulate Lists and python exception handling model to develop robust programs. CO 4: Formulate solutions for String, tuples and File operations. CO 5: Apply object-oriented programming concepts to develop dynamic interactive Python applications
20MCA105	Lab I – Python Programming	CO 1: Implement Math functions, Strings, List and Tuple in Python programs. CO 2: Express different Decision Making statements and Functions. CO 3: Interpret Object oriented programming in Python & File handling operations

20MCA106	Lab Ii – Rdbms	CO 1: Enhance Programming skills and techniques. CO 2: Formulate complex queries using SQL CO 3: Use the PL/SQL code constructs of IF-THEN-ELSE and LOOP types as well as syntax and command functions.
29MCA107	Skill Based Lab I – Linux	CO 1: Use Linux utilities and develop shell scripts to perform tasks. CO 2: Effectively use Linux environment to accomplish software development tasks. CO 3: Monitor system performance and network activities.
20MCA108	Soft Skills I – Professional Communication	CO 1: Display competence in oral and written communication. CO 2: Use current technology related to the communication.

20MCA201	Data Structures And Algorithms	CO 1: Select appropriate data structures as applied to specified problem definition. CO 2: Implement operations like searching, insertion, deletion and traversing in trees. CO 3: Compare the data structures of advanced search trees. CO 4: Implement appropriate heap operations, sorting, searching techniques for a given problem. CO 5: Determine and analyze the complexity of graph Algorithms.

20MCA202	Web Technologies	CO 1: Use knowledge of HTML and CSS to create personal and/or business websites CO 2:Create effective scripts using JavaScript and jQuery to enhance the end user experience. CO 3:Write PHP scripts to handle HTML forms. CO 4:Test, debug, and deploy web pages containing PHP and MySQL. CO 5:Implement SQL language, JavaScript, Ajax, Jquery, PHP and CSS in the project.
20MCA203	Programming In Java	CO 1: Apply the basic Java constructs to develop solutions to real time problems. CO 2: Analyze the hierarchy of java classes to develop object oriented programs. CO 3: Design software in Java using Packages and Threads. CO 4: Implement Concepts of AWT for creating GUI. CO 5: Design a Software using JDBC.

20MCA204	Lab Iii – Web Technologies	CO 1: Design WebPages using server side scripting. CO 2: Use PHP built-in functions and custom functions for processing. CO 3: Create various interactive and dynamic websites
20MCA205	Lab Iv – Java Programming	CO 1: Apply the basic Java constructs to develop solutions to real time problems. CO 2: Analyze the hierarchy of java classes to develop object oriented programs. CO 3: Design software in Java using Packages and Threads. CO 4: Implement Concepts of AWT for creating GUI. CO 5: Design a Software using JDBC.
20MCA206	Skill Based Lab Ii – R Programming	CO 1: Demonstrate the practical application of R programming tool. CO 2: Emphasize the implementation of statistical operations in R
0MCA207	Soft Skills Ii– Numericalaptitude	CO1: Apply quantitative techniques to solve variety of problems. CO 2: Enhance the reasoning skills for employability.

22MCA302	Software Engineering Principles	CO 1: Understand basic software engineering methods and practices CO 2: Analyse on software requirements and the SRS documents. CO 3: Identify the data, class and flow oriented modelling concepts. CO 4: Analyse on the design oriented concepts. CO 5: Identify the managerial aspects of Software development..
20MCA303	Mobile Application Development	CO 1: Understand the capabilities and limitations of mobile platforms that affect application development and deployment. CO 2: Compare and analyze various technology and business trends impacting mobile application development. CO 3: Demonstrate the characterisation and architecture of mobile applications CO 4: Assess the way how to send messages through android phones. CO 5: Design and develop the techniques for deploying and testing mobile applications, and for enhancing their performance and scalability.

20MCA304	Enterprise Application Development	CO 1: Develop dynamic web applications using MVC. CO 2: Use dependency injection & inversion of control in developing Spring project. CO 3: Create the Struts classes and use MVC design pattern for creating large web applications CO 4: Map Java classes and object associations to relational database tables with Hibernate mapping files Map Java classes and object associations to relational database tables with Hibernate mapping files CO 5: Use Django for rapid development, pragmatic, maintainable, clean design, and secures websites

20MCA305	Lab V - Mobile Application Development	CO 1: Install and configure Android application development tools. CO 2: Design and develop user Interfaces for the Android platform. CO 3: Apply Java programming concepts to Android application development CO 4: Familiar with technology and business trends impacting mobile applications CO 5: Include database and maps in apps to facilitate societal centric applications.
20MCA306	Lab Vi – Enterprise Application Development	CO 1: Perform Database operations for web applications using MVC. CO 2: Develop database application using Spring JDBC/Struts with CURD functionality. CO 3: Enable multilingual websites by using its built-in internationalization system

20MCA307	Skill Based Lab III – Computer Aided Software Engineering (Case) Tools	CO 1: Planning project using open source planning tools. CO 2: Designing project using designing tools CO 3: Testing projects using testing tools
20MCA308	Soft Skills III – Technical Aptitude	CO1: Recall and make thorough the basic concepts of computer science. CO2: Enhance the technical aptitude skills in the interview perspective.

22MCA401	UIX Design Programming	C01: Analyze React Components, the building blocks and its interaction with other web applications C02 Design websites using various Angular features including directives, components and services C03: Compute and build applications using Node.JS along with the combination of Bootstrap CO4: Apply the concepts of MongoDB& MySQL, the back-end databases. CO5: Utilize the conceptual and practical aspects of CSS Pre-processors and JSON
20MCAAD01	Data Mining Techniques	CO 1: Identify the functionalities of Data Mining and various techniques to extractknowledge. CO 2: Analyze the methods to discover Association Rules CO 3: Design & deploy the appropriate Clustering techniques. CO 4: Outline web mining, temporal and spatial data mining CO 5: Examine and Exploreweka techniques

20MCADA02	Data Analytics And Visualization Using Spreadsheets	CO 1: Ability to analyze data is a powerful skill that helps you make better decisions CO 2: Identify the basic principles of a Pivot Table CO 3: Recognize how to use Pivot Table and Pivot chart CO 4: Use Excel's powerful functions to efficiently transform mountains of raw data into clear insights CO 5: Use your new-found Excel skills like Descriptive Statistics and Inferential Statistics to analyze what makes a successful project.

20MCADA03	Big Data Analytics	CO 1: Understand the fundamentals of various big data analysis techniques CO 2: Analyze the big data analytic techniques for useful business applications CO3: Examine the HADOOP and Map Reduce technologies associated with big data analytics CO 4: Scrutinize the various storage architecture using HDFS and Map reducing techniques CO5: Understand, Explore and deploy Hbase

20MCADA04	Data Analytics Tools & Techniques	CO 1: Examine the programming constructs of Pig and database management using HiveQL CO 2: Write scripts using Pig latin and perform various HiveQL queries by applying RDBMS concepts CO 3: Apply the concepts of Pig and Hive in simple tasks CO 4: Formulate and analyse different databases for different situations CO 5: Create real time applications
20MCADA05	Business Analytics Using R	CO 1: Examine the concepts around Business analytics CO 2: Evaluate the process of analysing a business descriptively using the tool CO 3: Explore data and business analytic process CO 4: Apply various supervised and un supervised Machine learning techniques CO 5: Learn to apply different algorithms of regression for business problems

20MCADA06	Big Data Security	CO 1: Identify the need for security and best practices in a big data environment CO 2: Analyze the steps to secure big data CO 3: Build security in hadoop eco system CO 4: Assess the sensitivity of data in Hadoop CO 5: Outline data security and event logging
20MCADS01	Data Communication & Networking	CO 1: Identify the functionalities of Networking layers of both OSI and TCP/IP reference models. CO 2: Analyze the design issues of Datalink layer and techniques to resolve it. CO 3: Compare the principles of Switching and Routing algorithm. CO 4: Predict the TCP and UDP related procedures. CO 5: Outline the Application layer protocols.

20MCADS02	Wireless Communication & Security	CO 1: Identify, Predict and Evaluate MAC, SDMA, TDMA, FDMA, CDMA CO 2: Demonstrate the architectures, challenges and solutions of Wireless communication CO 3: Assess the role of Wireless Networks in shaping the future internet. CO 4: Design Mobile IP to support seamless and continuous Internet connectivity CO 5: Design SIP to create, modify, and terminate a multimedia session over the Internet Protocol

20MCADS03	Cryptography & Network Security	CO 1 Evaluate the fundamentals of networks security, security architecture, threats and vulnerabilities CO 2 Compare Stream ciphers and block ciphers. CO 3 Apply the different cryptographic operations of public key cryptography. CO 4 Pertain the various Authentication schemes to simulate different applications. CO 5 Applying CrypTool 2 to encrypt and decrypt texts using different ciphers.

20MCADS04	Cyber Forensics	CO 1 Predict the forensics fundamentals and the various technologies used to avoid computer crimes CO 2 Illustrate different methods to collect and preserve digital evidence and Digital Crime Scene. CO 3 Identify and Analyze Forensic Technical Surveillance Devices. CO 4 Evaluate the Various tools and tactics followed in military. CO 5 Demonstrate the Usage of surveillance tools for tracking cyber criminals
20MCADS05	Cloud Security	CO 1 Examine the security threats in cloud platforms CO 2 Evaluate Data Asset and Identity Access Management CO 3 Manage the vulnerable cloud environment CO 4 Understand the security issues that arises over a Network CO 5 Explore the security incidents by detecting, responding and recovering

20MCADS06	High Speed Networks	CO 1 Work Identify the building blocks and operation of high speed networking and ATM. CO 2 Analyze the cause of congestion, traffic slow down and related factors for Quality of Service Identify. CO 3 Apply the concepts learnt in this course to optimize performance of high-speed networks using Flow Control. CO 4 Compare the different architectures used for HSN. CO 5 Describe the protocols that are used to design high speed networks.

20MCAAM01	Artificial Intelligence & Expert Systems	CO 1: Identify problems that are amenable to solution by AI methods. CO 2: Formulate search problems and implement search algorithms using admissible heuristics. CO 3: Design and carry out an empirical evaluation of different algorithms on a predicate logic and state the conclusions that the evaluation supports. CO 4: Analyze games playing as adversarial search problems and implement optimal and efficient solutions. CO 5: Apply the concepts of Expert Systems in machine learning, Examine and Explore scikit learn techniques

20MCAAM02	Soft Computing	CO 1: Explore the functional components of artificial neural networks.. CO 2: Examine the principles of back propagation networks. CO 3: Expose the students to the concepts of predicting the functionalities of ART. CO 4: Analyze the logic principle of classical sets and fuzzy set operations in fuzzy set theory. CO 5: Identify the concept of fuzzification and defuzzification involved in various systems.
20MCAAM03	Machine Learning	CO 1 Identify the concepts of machine learning CO 2 Demonstrate Decision Tree learning and Bayesian Learning for classification. CO 3 Analyze the logic behind Genetic Algorithms. CO 4 Compare various set of rules available for Learning. CO 5 Propose solution for real world problems based on Inductive and Analytical Learning.

20MCAAM04	Neural Networks	CO 1 Identify problems that are amenable to solution by Neural networks methods. CO 2 Formulate searching rules and implement Single Layer Perceptron and Multilayer Perceptron Networks. CO 3 Design and carry out an empirical evaluation of different algorithms on Pattern Association CO 4 Analyze Feedback and Feed forward Network and implement optimal and efficient solutions. CO 5 Apply the application of Neural Networks in Arts, Bioinformatics and use of Neural Networks in Knowledge Extraction.

20MCAAM05	Human Computer Interaction	CO 1 Design effective dialog for HCI CO 2 Design effective HCI for individuals and persons with disabilities CO 3 Assess the importance of user feedback CO 4 Explain the HCI implications for designing websites CO 5 Develop meaningful user interface
20MCAAM06	Deep Learning	CO 1 Identify problems that are amenable to solution by deep networks CO 2 Formulate convolutional networks and sequence modelling for problem solving CO 3 Design and carry out an empirical evaluation of autoencoders and representation learning CO 4 Analyze structured probabilistic and Monte Carlo Methods CO 5 Apply the applications of deep learning.

20MCAGE01	Office Automation Tools	CO 1: Identify current and emerging word processing technologies to produce organizational documents CO 2: Develop, open and explore the Microsoft Office Excel environment CO 3: Design and edit charts and graphs with the use of functions and formulas. CO 4: Implement and query a database using different methods CO 5: Generate slide presentations that include text, graphics, animation, and transitions.
20MCAGE02	Financial Management And Accounting	CO 1: Preparation and analysis of balance sheet. CO 2: Predict the Classification of Costing. CO 3: Decide the budget preparation and control of a company. CO 4: Analyze the flow of funds. CO 5: Use Tally to implement the needs of financial accounting

20MCAGE03	Organizational Behaviour	CO 1: Develop an Organisational Behaviour model for any type of Organization CO 2: Understand the Ethics in Decision Making CO 3: Develop and improve the quality of Leadership. CO 4: Evaluate the Common biases and eradication in Decision Making Process. CO 5: Understand how to manage the Stress during a job

20MCAGE04	E-Commerce	CO 1: Gain a comprehensive understanding of the E-Commerce landscape, current and emerging technology and infrastructure underpinnings of the business. CO 2: Analyze the impact of E-commerce on business models and strategy. CO 3: Develop an understanding on how internet can help business grow/ Describe the infrastructure for E-commerce CO 4: Assess electronic payment systems CO 5: Gain an understanding on the importance of security, privacy, and ethical issues as they relate to E-Commerce.

20MCAGE05	Ethics In Computing	CO 1: Predict the relationship between the law, ethics and computer technology. CO 2: Outline the philosophical and ethical debates with the ideas and the nature of intellectual creativity. CO 3: Design the impact of computer technology on free speech. CO 4: Formulate the ethical and legal issues of the impact that computing technologies had on workplace. CO 5: Develop a personal standpoint in relation to DataBase society and the usage of biometric data.

20MCAGE06	Resource Management Techniques	CO 1: Identify the applications of Operations Research and methods to solve business problems. CO 2: Apply linear programming to solve operational problem with constraints. CO 3: Apply transportation and assignment models to find optimal solution in warehousing and Travelling, CO 4: Prepare project scheduling using PERT and CPM. CO 5: Use optimization concepts in real world problems

20MCAGE07	Entrepreneurship Development	CO1: Highlight the salient characteristics of successful entrepreneur CO2: Enumerate the competencies relevant for Entrepreneurial development. CO3: Delineate the growth of women Entrepreneurship in India. CO4: Identify the major problems faced in conducting EDPs. CO5: Discuss the methods of project appraisal used for small scale enterprises
20MCAGE08	Wireless Sensor Networks	CO 1: Formulate the basic standardization of wireless networks. CO 2: Analyze the implementation of technologies related to WSN. CO 3: Identify and understand the security issues in ad hoc and sensor networks. CO 4: Compare the protocols and to promote the research work in this area. CO 5: Apply and solve problems in the applications of Wireless Networking Area.

20MCAGE09	Research Methodology	CO 1: Predict the different stages of research process. CO 2: Apply methods to collect best data. CO 3: Assess the suitable research design & work. CO 4: Compare categorical and continuous measures. CO 5: Analyze the process of various reports writing.
20MCAGE10	Digital Image Processing	CO 1: To review the fundamental concepts of a digital image processing system. CO 2: To examine various types of images, their intensity transformations and spatial filtering. CO 3: To analyze the different types of noises and the filters used to restore and reconstructthe images. CO 4: To create color images and pseudo images with smoothening and sharpening techniques. CO 5: To compare the various lossy and lossless compression mechanisms.

20MCAGE11	Cloud Computing	CO 1: Compare the strengths and limitations of cloud computing. CO 2: Identify the architecture, infrastructure and delivery models of cloud computing. CO 3: Apply suitable virtualization concept. CO 4: Choose the appropriate Cloud player, Programming Models and approach. CO 5: Address the core issues of cloud computing such as security, privacy and interoperability

20MCAGE12	Agile Software Engineering	CO 1Explain the fundamental principles and practices of the agile development methods. CO 2Analyze the planning and execution of the agile manifesto CO 3Monitor the management to achieve complete product development. CO 4Practice the integration of development and operations in software projects. CO 5Present the software project by following the principles that best fit the technical and market demands.