FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018
COURSE OUTCOMES

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

COURSECODE	COURSETITLE	COURSEOUTCOMES
20MCA101	**MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE**	Perform Logical operations and predicate calculus needed for computing skill.
		Analyze and Compare the various techniques for solving numerical equations
		Apply the techniques of statistics and numerical methods to unravel problems by computers.
		Explain the set theory logic
		Utilize the Knowledge of matrices for designing and solving problems
20MCA102	**SOFTWARE ENGINEERING**	Compare the different domains and process models.
		Generate project schedule for different activities of software development.
		Identify the data, class and flow oriented modelling concepts.

		Analyse on the design oriented concepts
		Identify the managerial aspects of Software development.
20MCA103	**OPERATING SYSTEMS**	Identify the components and processes.
		Analyse on scheduling algorithms and deadlocks.
		Demonstrate the mapping between the physical memory and virtual memory
		Identify the secondary memory management techniques
		Analyse on the I/O systems
20MCA104	**PROGRAMMING IN PYTHON**	Predict the basics of Python programming.
		Solve problems requiring the writing of well-documented programs in the Python language, including use of the logical constructs of that language.
		Use and manipulate Lists and python exception handling model to develop robust programs.
		Formulate solutions for String, tuples and File operations.

		Apply object-oriented programming concepts to develop dynamic interactive Python applications.
20MCA105	**LAB I – PYTHON PROGRAMMING**	Implement Math functions, Strings, List and Tuple in Python programs.
		Express different Decision Making statements and Functions.
		Interpret Object oriented programming in Python & File handling operations.
20MCA106	**LAB II – RDBMS**	Enhance Programming skills and techniques.
		Formulate complex queries using SQL
		Use the PL/SQL code constructs of IF-THEN-ELSE and LOOP types as well as syntax and command Functions.
20MCA107	**SKILL BASED-LAB I-LINUX**	Use Linux utilities and develop shell scripts to perform tasks.
		Effectively use Linux environment to accomplish software development tasks
		Monitor system performance and network activities

20MCA108	**SOFT SKILLS I – PROFESSIONAL COMMUNICATIO**	Display competence in oral and written communication.
		Use current technology related to the communication.
20MCA201	**DATA STRUCTURES AND ALGORITHMS**	Select appropriate data structures as applied to specified problem definition.
		Implement operations like searching, insertion, deletion and traversing in trees.
		Compare the data structures of advanced search trees.
		Implement appropriate heap operations, sorting, searching techniques for a given problem.
		Determine and analyze the complexity of graph Algorithms.
20MCA202	**WEB TECHNOLOGIES**	Use knowledge of HTML and CSS to create personal and/or business websites
		Create effective scripts using JavaScript and jQuery to enhance the end user experience.
		Write PHP scripts to handle HTML forms.

		Test, debug, and deploy web pages containing PHP and MySQL.
		Implement SQL language, JavaScript, Ajax, Jquery, PHP and CSS in the project.
20MCA203	**PROGRAMMING IN JAVA**	Apply the basic Java constructs to develop solutions to real time problems.
		Analyze the hierarchy of java classes to develop object oriented programs.
		Design software in Java using Packages and Threads.
		Implement Concepts of AWT for Creating GUI.
		Design a Software using JDBC and to explain the role of RMI interfaces.
20MCA204	**Lab III – WEB TECHNOLOGIES**	Design WebPages using server side scripting.
		Use PHP built-in functions and custom functions for processing.
		Create various interactive and dynamic websites
20MCA205	**LAB IV – JAVA PROGRAMMING**	Understand Java programming development environment, Compiling, Debugging, Linking and Executing the programs.

		Analyze the complexity of problems, modularized the problems into small modules and then convert them in to programs.
		Understand and apply the in built functions and customized functions for solving the problems.
20MCA206	**SKILL BASED LAB II - R PROGRAMMING**	Demonstrate the practical application of R programming tool.
		Emphasize the implementation of statistical operations in R
20MCA207	**SOFT SKILL II – APTITUDE TRAINING**	Apply quantitative techniques to solve variety of problems.
		Enhance the technical skills for employability.
20MCADA01	**DATA MINING TECHNIQUES**	Identify the functionalities of Data Mining and various techniques to extract knowledge.
		Analyze the methods to discover Association Rules
		Design & deploy the appropriate Clustering techniques.
		Outline web mining, temporal and spatial data mining
		Examine and Explore weka techniques
20MCADA02	**DATA ANALYTICS AND VISUALIZATION USING SPREADSHEETS**	Ability to analyze data is a powerful skill that helps you make better decisions
		Identify the basic principles of a Pivot Table

		Recognize how to use Pivot Table and Pivot chart
		Use Excel's powerful functions to efficiently transform mountains of raw data into clear insights
		Use your new-found Excel skills like Descriptive Statistics and Inferential Statistics to analyze what makes a successful project.
20MCADS01	**DATA COMMUNICATION & NETWORKING**	Identify the functionalities of Networking layers of both OSI and TCP/IP reference models.
		Analyze the design issues of Datalink layer and techniques to resolve it.
		Compare the principles of Internet protocols and Routing algorithm. Predict the TCP and UDP related procedures
		Outline the Application layer protocols.
		Examine and Explore Network Simulation techniques
20MCADS02	**WIRELESS COMMUNICATION & SECURITY**	Identify, Predict and Evaluate MAC, SDMA, TDMA, FDMA, CDMA
		Demonstrate the architectures, challenges and solutions of Wireless communication
		Assess the role of Wireless Networks in shaping the future internet.

		Design Mobile IP to support seamless and continuous Internet connectivity
		Design SIP to create, modify, and terminate a multimedia session over the Internet Protocol.
20MCAAM01	**ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS**	Identify problems that are amenable to solution by AI methods.
		Formulate search problems and implement search algorithms using admissible heuristics.
		Design and carry out an empirical evaluation of different algorithms on a predicate logic and state the conclusions that the evaluation supports.
		Analyze games playing as adversarial search problems and implement optimal and efficient solutions.
		Apply the concepts of Expert Systems in machine learning, Examine and Explore scikit learn techniques
20MCAAM02	**SOFT COMPUTING**	Explore the functional components of artificial neural networks.
		Examine the principles of back propagation networks.
		Expose the students to the concepts of predicting the functionalities of ART.

		Analyze the logic principle of classical sets and fuzzy set operations in fuzzy set theory.
		Identify the concept of fuzzification and defuzzification involved in various systems.
20MCAGE01	**OFFICE AUTOMATION TOOLS**	Identify current and emerging word processing technologies to produce organizational documents
		Develop, open and explore the Microsoft Office Excel environment
		Design and edit charts and graphs with the use of functions and formulas.
		Implement and query a database using different methods
		Generate slide presentations that include text, graphics, animation, and transitions.
20MCAGE02	**FINANCIAL MANAGEMENT AND ACCOUNTING**	Preparation and analysis of balance sheet.
		Predict the Classification of Costing.
		Decide the budget preparation and control of a company.
		Analyze the flow of funds.

		Use Tally to implement the needs of financial accounting.
20MCAGE03	**ORGANIZATIONAL BEHAVIOUR**	Develop an Organisational Behaviour model for any type of Organization
		Understand the Ethics in Decision Making
		Develop and improve the quality of Leadership
		Evaluate the Common biases and eradication in Decision Making Process
		Understand how to manage the Stress during a job
20MCAGE04	**E-COMMERCE**	Gain a comprehensive understanding of the E-Commerce landscape, current and emerging technology and infrastructure underpinnings of the business.
		Analyze the impact of E-commerce on business models and strategy.
		Develop an understanding on how internet can help business grow/ Describe the infrastructure for E-commerce
		Assess electronic payment systems
		Gain an understanding on the importance of security, privacy, and ethical issues as they relate to E-Commerce.
20MCAGE05	**ETHICS IN COMPUTING**	Predict the relationship between the law, ethics and computer

		technology
		Outline the philosophical and ethical debates with the ideas and the nature of intellectual creativity.
		Design the impact of computer technology on free speech.
		Formulate the ethical and legal issues of the impact that computing technologies had on workplace.
		Develop a personal standpoint in relation to DataBase society and the usage of biometric data
20MCAGE06	**RESOURCE MANAGEMENT TECHNIQUES**	Identify the applications of Operations Research and methods to solve business problems
		Apply linear programming to solve operational problem with constraints
		Apply transportation and assignment models to find optimal solution in warehousing and Travelling,
		Prepare project scheduling using PERT and CPM
		Use optimization concepts in real world problems
20MCAGE07	**ENTREPRENEURSHIP DEVELOPMENT**	Highlight the salient characteristics of successful entrepreneur
		Enumerate the competencies relevant for Entrepreneurial development.

		Delineate the growth of women Entrepreneurship in India.
		Identify the major problems faced in conducting EDPs.
		Discuss the methods of project appraisal used for small scale enterprises.
20MCAGE08	**WIRELESS SENSOR NETWORKS**	Explore the impact of WSN and its hardware components.
		Analyze the different protocols in MAC and Link layer
		Apply the concepts of localization, time synchronization and positioning in WSN
		Perform data routing and data aggregation
		Design simple applications using sensor nodes incorporating security features.
20MCAGE09	**RESEARCH METHODOLOGY**	Predict the different stages of research process.
		Apply methods to collect best data.
		Assess the suitable research design & work.
		Compare categorical and continuous measures.
		Analyze the process of various reports writing.

20MCAGE10	**DIGITAL IMAGE PROCESSING**	To review the fundamental concepts of a digital image processing system.
		To examine various types of images, their intensity transformations and spatial filtering.
		To analyze the different types of noises and the filters used to restore and reconstructthe images.
		To create color images and pseudo images with smoothening and sharpening techniques.
		To compare the various lossy and lossless compression mechanisms.
20MCAGE11	**CLOUD COMPUTING**	Examine the characteristics of Cloud Computing and the architecture
		Define Infrastructure and Identify service models.
		Relate abstraction and virtualization and cloud computing frameworks.
		Manage and administrate cloud.
		Explore cloud based storage and collaboration technologies.
20MCAGE12	**AGILE SOFTWARE**	Explain the fundamental principles and practices of the agile

	ENGINEERING	development methods.
		Analyze the planning and execution of the agile manifesto
		Monitor the management to achieve complete product development.
		Practice the integration of development and operations in software projects.
		Present the software project by following the principles that best fit the technical and market demands.
20MCAAL01	**INTERNET OF THINGS**	Identify the Fundamentals of Internet of Things.
		Design a portable IoT using relevant protocols.
		Analyze applications of IoT in real time scenario.
		Develop web services to access/control IoT devices.
		Deploy an IoT application and connect to the cloud.
19MCA301	**GRAPH THEORY**	Write precise & accurate mathematical definitions of graph theory
		Apply the principles and concepts of graph theory in practical situations

		Solve the problems using the concepts of Graphs and trees.
		Validate and critically assess a mathematical proof.
		Explore the modern applications of graph theory.
19MCA302	**DATA COMMUNICATION AND NETWORKING**	Identify the functionalities of Networking layers of both OSI and TCP/IP reference models.
		Analyze the design issues of Data link layer and techniques to resolve it.
		Compare the principles of Switching and Routing algorithm.
		Predict the TCP and UDP related procedures.
		Outline the Application layer protocols.
19MCA303	**PROGRAMMING IN JAVA**	Apply the basic Java constructs to develop solutions to real time problems.
		Analyze the hierarchy of java classes to develop object oriented programs.
		Design software in Java using Packages and Threads.
		Implement Concepts of AWT for Creating GUI.
		Design a Software using JDBC and to explain the role of RMI

		interfaces.
19MCA304	**LAB V – PHP & MYSQL**	Design WebPages using server side scripting.
		Use PHP built-in functions and custom functions for processing.
		Create various interactive and dynamic websites
19MCA305	**LAB VI – JAVA PROGRAMMING**	Design WebPages using server side scripting.
		Use PHP built-in functions and custom functions for processing.
		Create various interactive and dynamic websites
19MCA307	**SOFT SKILLS III - QUANTITATIVE APTITUDE**	Apply quantitative techniques to solve variety of problems.
		Perform statistical analysis to interpret information.
19MCA401	**COMPILER DESIGN**	To analyse the basic concepts and applications of Compiler Design
		To compare various lexical analyzers and grammars
		To formulate the conversion process between finite automata, regular grammars with the transition and transformation methods

		To demonstrate the knowledge of formal connection and relationship to expressions and languages
		To identify if a language is regular, context-free, unambiguous after reducing it to normal forms
19MCA402	**MOBILE COMMUNICATION & APPLICATION DEVELOPMENT**	Identify, Predict and Evaluate Wireless Communication Protocols
		Compare and analyze various multiplexing techniques in mobile environment
		Demonstrate the architectures, challenges and solutions of Wireless communication
		Assess the role of Wireless Networks in shaping the future internet.
		Design and develop apps for mobiles using Android
19MCA403	**PROGRAMMING IN PYTHON**	Predict the basics of Python programming.
		Solve problems requiring the writing of well-documented programs in the Python language, including use of the logical constructs of that language.
		Use and manipulate Lists and python exception handling model to develop robust programs.
		Formulate solutions for String, tuples and File operations.

		Apply object-oriented programming concepts to develop dynamic interactive Python applications.
19MCA404	**LAB VII - MOBILE APPLICATION DEVELOPMENT**	Install and configure Android application development tools.
		Design and develop user Interfaces for the Android platform.
		Apply Java programming concepts to Android application development.
		Familiar with technology and business trends impacting mobile applications.
		Include database and maps in apps to facilitate societal centric applications
19MCA405	**LAB VIII – PYTHON PROGRAMMING**	Implement Math functions, Strings, List and Tuple in Python programs.
		Express different Decision Making statements and Functions.
		Interpret Object oriented programming in Python & File handling operations.
19MCA406	**SKILL BASED LAB IV - SOFTWARE TESTING TOOLS**	Finding defects in the programs while developing the software.
		Able to write test cases and test scenarios.
		Develop the scripts for finding the defects and preventing them.

		Understand the automated testing tools available
19MCA407	**SOFT SKILLS IV - TECHNICAL APTITUDE**	Enhance the technical skills for employability.
		Improve the proficiency of participation in competitive examinations.
19MCA501	**SOFTWARE PROJECT MANAGEMENT**	Deliver successful software projects that support organization's strategic goals
		Match organizational needs to the most effective software development model
		Plan and manage projects at each stage of the software development life cycle
		Create project plans that address real-world management challenges
		Develop the skills for tracking and controlling software deliverables
19MCA502	**MACHINE LEARNING**	Identify the concepts of machine learning
		Demonstrate Decision Tree learning and Bayesian Learning for classification.
		Analyze the logic behind Genetic Algorithms.
		Compare various set of rules available for Learning.

		Propose solution for real world problems based on Inductive and Analytical Learning.
19MCA503	**ENTERPRISE APPLICATION DEVELOPMENT**	Develop dynamic web applications using MVC
		Use dependency injection & inversion of control in developing Spring project
		Create the Struts classes and use MVC design pattern for creating large web applications
		Map Java classes and object associations to relational database tables with Hibernate mapping files
		Use Django for rapid development, pragmatic, maintainable, clean design, and secures websites.
19MCA504	**LAB IX- MACHINE LEARNING WITH PYTHON**	Demonstrate the concept of classification & clustering in Python
		Analyse and Evaluate the models built.
		Create classification and clustering models
19MCA505	**LAB X –ENTERPRISE APPLICATION DEVELOPMENT**	Perform Database operations for web applications using MVC
		Develop database application using Spring JDBC/Struts with CURD functionality.
		Enable multilingual websites by using its built-in internationalization system

19MCA506	**SKILL BASED LAB V - R PROGRAMMING**	Demonstrate the practical application of R programming tool.
		Emphasize the implementation of statistical operations in R
19MCA507	**SOFT SKILLS V - INTERPERSONAL SKILLS FOR CORPORATE READINESS**	Develop skills for producing high quality etiquettes at the time of interviews
		Exhibit competencies expected by employers
		Demonstrate emotional intelligence and inter cultural competencies and to be ready to work in teams
19MCA602	**INTERNET OF THINGS**	Identify the Fundamentals of Internet of Things.
		Design a portable IoT using relevant protocols.
		Analyze applications of IoT in real time scenario.
		Develop web services to access/control IoT devices.
		Deploy an IoT application and connect to the cloud.
19MCADS01	**BIG DATA ANALYTICS**	Understand the fundamentals of various big data analysis techniques
		Analyze the big data analytic techniques for useful business applications.

		Design efficient algorithms for mining the data from large volumes.
		Examine the HADOOP and Map Reduce technologies associated with big data analytics
		Explore the applications of Big Data
19MCADS02	**BIG DATA SECURITY**	Identify the need for security and best practices in a big data environment
		Analyze the steps to secure big data
		Build security in hadoop eco system
		Assess the sensitivity of data in Hadoop
		Outline data security and event logging
19MCADS03	**DATA ANALYTICS USING PIG AND HIVE**	Outline the programming constructs of Pig and database management using HiveQL
		Write scripts using Pig latin and perform various HiveQLqueries by applying RDBMS concepts
		Apply the concepts of Pig and Hive in simple tasks
		Formulate and analyse different databases for different situations

		Create real time applications
19MCANW01	**CRYPTOGRAPHY AND NETWORK SECURITY**	Evaluate the fundamentals of networks security, security architecture, threats and vulnerabilities
		Compare Stream ciphers and block ciphers.
		Apply the different cryptographic operations of public key cryptography.
		Pertain the various Authentication schemes to simulate different applications.
		Analyze various Security practices and System security standards.
19MCANW02	**WIRELESS SENSOR NETWORKS**	Explore the impact of WSN and its hardware components.
		Analyze the different protocols in MAC and Link layer
		Apply the concepts of localization, time synchronization and positioning in WSN
		Perform data routing and data aggregation
		Design simple applications using sensor nodes incorporating security features.
19MCANW03	**HIGH SPEED NETWORKS**	Identify the building blocks and operation of high speed networking and ATM**.**

		Analyze the cause of congestion, traffic slow down and related factors for Quality of Service Identify.
		Apply the concepts learnt in this course to optimize performance of high-speed networks using Flow Control.
		Compare the different architectures used for HSN.
		Describe the protocols that are used to design high speed networks.
19MCAAD01	**WEB PROGRAMMING TECHNIQUES**	Understand the basics of HTML tags
		Analyze the advanced features of HTML5.
		Implement the use of internal and external Cascading Style sheets (CSS) to format elements on single or group of pages
		Compose programs for the web and other contexts using the JavaScript programming language
		Apply various ECMAScript 6 methods in building interactive websites.
19MCAAD02	**INTERNET PROGRAMMING FRAMEWORKS**	Analyze React Components, the building blocks and its interaction with other web applications
		Design websites using various Angular features including directives, components and services
		Compute and build applications using Node.JS along with the combination of Bootstrap.

		Apply the concepts of MongoDB & MySQL, the back-end databases
		Utilize the conceptual and practical aspects of CSS Pre-processors and JSON.
19MCAAD03	**SOFTWARE DEVELOPMENT FRAMEWORKS**	Explain the fundamental principles and practices of the agile development methods.
		Analyze the planning and execution of the agile manifesto
		Monitor the management to achieve complete product development.
		Practice the integration of development and operations in software projects.
		Present the software project by following the principles that best fit the technical and market demands.
19MCAGE01	**RESOURCE MANAGEMENT TECHNIQUES**	Identify the applications of Operations Research and methods to solve business problems
		Apply linear programming to solve operational problem with constraints
		Apply transportation and assignment models to find optimal solution in warehousing and Travelling,
		Prepare project scheduling using PERT and CPM

		Use optimization concepts in real world problems
19MCAGE02	**FINANCIAL MANAGEMENT AND ACCOUNTING**	Preparation and analysis of balance sheet.
		Predict the Classification of Costing.
		Decide the budget preparation and control of a company.
		Analyze the flow of funds.
		Use Tally to implement the needs of financial accounting.
19MCAGE03	**MANAGEMENT INFORMATION SYSTEMS**	Analyze and synthesize business information needs to facilitate evaluation of strategic alternatives.
		Apply MIS knowledge and skills learned to facilitate development, deployment and management of information systems.
		Predict the use of information technology for business processes.
		Assess the use of technology of Information Systems for effective management.
		Identify the security features and global issues in organization and society.
19MCAGE04	**E-COMMERCE**	Gain a comprehensive understanding of the E-Commerce landscape, current and emerging technology and

		infrastructure underpinnings of the business.
		Analyze the impact of E-commerce on business models and strategy.
		Develop an understanding on how internet can help business grow/ Describe the infrastructure for E-commerce
		Assess electronic payment systems
		Gain an understanding on the importance of security, privacy, and ethical issues as they relate to E-Commerce.
19MCAGE05	**CYBER FORENSICS**	Predict the forensics fundamentals and the various technologies used to avoid computer crimes
		Illustrate different methods to collect and preserve digital evidence and Digital Crime Scene.
		Identify and Analyze Forensic Technical Surveillance Devices.
		Evaluate the Various tools and tactics followed in military.
		Demonstrate the Usage of surveillance tools for tracking cyber criminals
19MCAGE06	**ETHICS IN COMPUTING**	Predict the relationship between the law, ethics and computer technology

		Outline the philosophical and ethical debates with the ideas and the nature of intellectual creativity.
		Design the impact of computer technology on free speech.
		Formulate the ethical and legal issues of the impact that computing technologies had on workplace.
		Develop a personal standpoint in relation to DataBase society and the usage of biometric data
19MCAGE07	**ENTREPRENEURSHIP DEVELOPMENT**	Highlight the salient characteristics of successful entrepreneur
		Enumerate the competencies relevant for Entrepreneurial development.
		Delineate the growth of women Entrepreneurship in India.
		Identify the major problems faced in conducting EDPs.
		Discuss the methods of project appraisal used for small scale enterprises.
19MCAGE21	**RESEARCH METHODOLOGY**	Predict the different stages of research process.
		Apply methods to collect best data.
		Assess the suitable research design & work.

		Compare categorical and continuous measures.
		Analyze the process of various reports writing.
19MCAGE22	**DATA MINING AND DATA WAREHOUSING**	Practice the pre-processing operations of data.
		Compare & contrast OLTP, OLAP and Data mining as techniques for extracting knowledge from a Data Warehouse.
		Perform Association Rule Mining for Market Basket Analysis.
		Design & deploy the appropriate Classification and Clustering techniques.
		Explore the recent trends in data mining.
19MCAGE23	**DIGITAL IMAGE PROCESSING**	To review the fundamental concepts of a digital image processing system.
		To examine various types of images, their intensity transformations and spatial filtering.
		To analyze the different types of noises and the filters used to restore and reconstructthe images.
		To create color images and pseudo images with smoothening and sharpening techniques.
		To compare the various lossy and lossless compression

		mechanisms.
19MCAGE24	**ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS**	Identify problems that are amenable to solution by AI methods.
		Formulate search problems and implement search algorithms using admissible heuristics.
		Design and carry out an empirical evaluation of different algorithms on a predicate logic and state the conclusions that the evaluation supports.
		Analyze games playing as adversarial search problems and implement optimal and efficient solutions.
		Apply the concepts of Expert Systems in machine learning.
19MCAGE25	**SOFT COMPUTING**	Explore the functional components of artificial neural networks..
		Examine the principles of back propagation networks.
		Expose the students to the concepts of predicting the functionalities of ART.
		Analyze the logic principle of classical sets and fuzzy set operations in fuzzy set theory.
		Identify the concept of fuzzification and defuzzification involved in various systems.

19MCAGE26	**CLOUD COMPUTING**	Examine the characteristics of Cloud Computing and the architecture
		Define Infrastructure and Identify service models.
		Relate abstraction and virtualization and cloud computing frameworks.
		Manage and administrate cloud.
		Explore cloud based storage and collaboration technologies.
19MCAGE27	**ADVANCED DBMS TECHNIQUES**	Design the basic concepts of the advanced database design and dependencies.
		Compare the different data models
		Compile the implementation concepts of storage structures
		Analyze on the advanced transaction management techniques
		Discuss on the advanced databases
19MCAAL01	**HUMAN COMPUTER INTERACTION**	Design effective dialog for HCI
		Design effective HCI for individuals and persons with disabilities
		Assess the importance of user feedback

		Explain the HCI implications for designing websites
		Develop meaningful user interface