



FATIMA COLLEGE

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Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' (CGPA 3.61) by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

PROGRAMME OUTCOMES AND COURSE OUTCOMES

2021 – 2022

NAME OF THE PROGRAMME: MCA

PROGRAMME CODE: MCA

Programme Outcomes (POs)

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.



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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.



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Course Outcomes (POs)

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
20MCA102	Software Engineering	CO 1: Compare the different domains and process



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		<p>models.</p> <p>CO 2: Identify the data, class and flow oriented modeling concepts.</p> <p>CO 3: Analyze on the design oriented concepts.</p> <p>CO 4: Identify the managerial aspects of software development.</p> <p>CO 5: Generate project schedule for different activities of software development</p>
20MCA103	Operating Systems	<p>CO 1: Identify the components and processes.</p> <p>CO 2: Analyze on scheduling algorithms and deadlocks.</p> <p>CO 3: Demonstrate the mapping between the physical memory and virtual memory.</p>



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		<p>CO 4: Identify the secondary memory management techniques.</p> <p>CO 5: Analyze on the distributed systems and security issues.</p>
20MCA104	Programming In Python	<p>CO 1: Predict the basics of Python programming.</p> <p>CO 2: Solve problems requiring the writing of well-documented programs in the Python language, including use of the logical constructs of that language.</p> <p>CO 3: Use and manipulate Lists and python exception handling model to develop robust programs.</p> <p>CO 4: Formulate solutions for String, tuples and File</p>



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		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-



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		ELSE and LOOP types as well as syntax and command functions.
29MCA107	Skill Based Lab I – Linux	<p>CO 1: Use Linux utilities and develop shell scripts to perform tasks.</p> <p>CO 2: Effectively use Linux environment to accomplish software development tasks.</p> <p>CO 3: Monitor system performance and network activities.</p>
20MCA108	Soft Skills I – Professional Communication	<p>CO 1: Display competence in oral and written communication.</p> <p>CO 2: Use current technology related to the communication.</p>
20MCA201	Data Structures and	CO 1: Select appropriate data structures as applied to



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	Algorithms	<p>specified problem definition.</p> <p>CO 2: Implement operations like searching, insertion, deletion and traversing in trees.</p> <p>CO 3: Compare the data structures of advanced search trees.</p> <p>CO 4: Implement appropriate heap operations, sorting, searching techniques for a given problem.</p> <p>CO 5: Determine and analyze the complexity of graph Algorithms.</p>
20MCA202	Web Technologies	CO 1: Use knowledge of HTML and CSS to create personal and/or business websites



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		<p>CO 2:Create effective scripts using JavaScript and jQuery to enhance the end user experience.</p> <p>CO 3:Write PHP scripts to handle HTML forms.</p> <p>CO4:Test, debug, and deploy web pages containing PHP and MySQL.</p> <p>CO 5:Implement SQL language, JavaScript, Ajax, JQuery, PHP and CSS in the project.</p>
20MCA203	Programming in Java	<p>CO 1: Apply the basic Java constructs to develop solutions to real time problems.</p> <p>CO 2: Analyze the hierarchy of java classes to develop object oriented programs.</p> <p>CO 3: Design software in Java using Packages and</p>



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		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



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		<p>oriented programs.</p> <p>CO 3:Design software in Java using Packages and Threads.</p> <p>CO 4:Implement Concepts of AWT for creating GUI.</p> <p>CO 5:Design a Software using JDBC.</p>
20MCA206	Skill Based Lab II – R Programming	<p>CO 1:Demonstrate the practical application of R programming tool.</p> <p>CO 2:Emphasize the implementation of statistical operations in R</p>
20MCA207	Soft Skills II – Aptitude Training	<p>CO 1: Apply quantitative techniques to solve variety of problems.</p> <p>CO 2: Enhance the technical skills for employability.</p>



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20MCA301	Internship & Mini Project	
20MCA302	Software Quality & Testing	<p>CO 1: Identify the Fundamentals of concepts of Software testing and Software Quality Management</p> <p>CO 2: Implement process that ensures the Software is developed with quality standards.</p> <p>CO 3: Use the latest tools that help in Software testing and quality assurance.</p> <p>CO 4: Develop quality management methods to effectively organize staff.</p> <p>CO 5: Deploy a successful development of the Software product.</p>



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20MCA303	Mobile Application Development	<p>CO 1: Understand the capabilities and limitations of mobile platforms that affect application development and deployment.</p> <p>CO 2: Compare and analyze various technology and business trends impacting mobile application development.</p> <p>CO 3: Demonstrate the characterisation and architecture of mobile applications</p> <p>CO 4: Assess the way how to send messages through android phones.</p> <p>CO 5: Design and develop the techniques for deploying and testing mobile applications, and for enhancing their performance and scalability.</p>
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20MCA304	Enterprise Application Development	<p>CO 1:Develop dynamic web applications using MVC.</p> <p>CO 2:Use dependency injection & inversion of control in developing Spring project.</p> <p>CO 3:Create the Struts classes and use MVC design pattern for creating large web applications</p> <p>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</p> <p>CO 5: Use Django for rapid development, pragmatic, maintainable, clean design, and secures websites</p>
20MCA305	Lab V - Mobile Application	<p>CO 1:Install and configure Android application development tools.</p>



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	Development	<p>CO 2:Design and develop user Interfaces for the Android platform.</p> <p>CO 3:Apply Java programming concepts to Android application development</p> <p>CO4: Familiar with technology and business trends impacting mobile applications</p> <p>CO5: Include database and maps in apps to facilitate societal centric applications.</p>
20MCA306	Lab VI –Enterprise Application Development	<p>CO 1:Perform Database operations for web applications using MVC.</p> <p>CO 2:Develop database application using Spring JDBC/Struts with CURD functionality.</p> <p>CO 3:Enable multilingual websites by using its built-in</p>



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		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 Skill III – Interpersonal Skills for Corporate Readiness	CO1: Develop skills for producing high quality etiquettes at the time of interviews CO2: To Exhibit competencies expected by employers CO3: Demonstrate emotional intelligence and inter cultural competencies and to be ready to work in teams, unambiguous after reducing it to normal forms
20MCA401	Lab VII - Uix Design	C01: Design websites using various React and Angular



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	Programming	features C02: Build applications using Node.JS along with MongoDB & MySQL C03: Utilize the conceptual and practical aspects of CSS Pre-processors.
19MCA501	Software Project Management	CO 1: Deliver successful software projects that support organization's strategic goals CO 2: Match organizational needs to the most effective software development model CO 3: Plan and manage projects at each stage of the software development life cycle CO 4: Create project plans that address real-world



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		<p>management challenges</p> <p>CO 5: Develop the skills for tracking and controlling software deliverables</p> <p>CO 6: Predict the behavior of people working in teams and to explore the ways of Managing people in Software Environments.</p>
19MCA502	Machine Learning	<p>CO1: Identify the concepts of machine learning.</p> <p>CO2: Demonstrate the supervised and unsupervised learning algorithms for classification, prediction and clustering.</p> <p>CO3: Analyze the logic behind the execution of various classifiers.</p> <p>CO4: Compare the performance of different algorithms</p>



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		<p>available for mining data.</p> <p>CO5: Propose solution for real world problems</p>
19MCA503	Enterprise Application Development	<p>CO1: Develop dynamic web applications using MVC</p> <p>CO2: Use dependency injection & inversion of control in developing Spring project</p> <p>CO3: Create the Struts classes and use MVC design pattern for creating large web applications</p> <p>CO4: Map Java classes and object associations to relational database tables with Hibernate mapping files</p> <p>CO5: Use Django for rapid development, pragmatic, maintainable, clean design, and secures websites.</p>
19MCA504	Lab -IX- Machine Learning with Python	<p>CO1: Demonstrate the concept of classification & clustering in Python</p> <p>CO2: Analyse and Evaluate the models built.</p>



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		CO3: Create classification and clustering models using sci-kit learn.
19MCA505	Lab X – 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
19MCA506	R Programming	CO 1: Demonstrate the practical application of R programming tool. CO 2: Emphasize the implementation of statistical operations in R
19MCA507	Interpersonal Skills for	CO 1: Outline the roles played in workgroups and



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	Corporate Readiness	teams CO 2: Describe how good communication influences working relationship.
19MCA602	Internet Of Things	CO 1: Identify the Fundamentals of Internet of Things. CO 2: Design a portable IoT using relevant protocols. CO 3: Analyze applications of IoT in real time scenario. CO 4: Develop web services to access/control IoT devices. CO 5: Deploy an IoT application and connect to the cloud
19MCADS01	Big Data Analytics	CO 1: Work with big data platform and understand the



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		<p>fundamentals of various big data analysis techniques</p> <p>CO 2: Analyze the big data analytic techniques for useful business applications.</p> <p>CO 3: Design efficient algorithms for mining the data from large volumes.</p> <p>CO 4: Examine the HADOOP and Map Reduce technologies associated with big data analytics</p> <p>CO 5: Explore the applications of Big Data</p>
19MCADS02	Big Data Security	<p>CO 1: Identify the need for security and best practices in a big data environment</p> <p>CO 2: Analyze the steps to secure big data</p>



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		<p>CO 3: Build security in hadoop eco system</p> <p>CO 4: Assess the sensitivity of data in Hadoop</p> <p>CO 5: Outline data security and event logging</p>
19MCADS03	Data Analytics using pig and hive	<p>CO 1: Outline the programming constructs of Pig and database management using HiveQL</p> <p>CO 2: Write scripts using Pig latin and perform various HiveQLqueries by applying RDBMS concepts</p> <p>CO 3: Apply the concepts of Pig and Hive in simple tasks</p> <p>CO 4: Formulate and analyse different databases for different situations</p>



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		CO 5: Create real time applications
19MCANW01	Cryptography and Network Security	<p>CO 1: Evaluate the fundamentals of networks security, security architecture, threats and vulnerabilities.</p> <p>CO 2: Compare Stream ciphers and block ciphers.</p> <p>CO 3: Apply the different cryptographic operations of public key cryptography.</p> <p>CO 4: Pertain the various Authentication schemes to simulate different applications.</p> <p>CO 5: Analyze various Security practices and System security standards</p>
19MCANW02	Wireless Sensor Networks	CO 1: Formulate the basic standardization of wireless networks.



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		<p>CO 2: Analyze the implementation of technologies related to WSN.</p> <p>CO 3: Identify and understand the security issues in ad hoc and sensor networks.</p> <p>CO 4: Compare the protocols and to promote the research work in this area.</p> <p>CO 5: Apply and solve problems in the applications of Wireless Networking Area.</p>
19MCANW03	High Speed Networks	<p>CO 1: Identify the building blocks and operation of high speed networking and ATM.</p> <p>CO 2: Analyze the cause of congestion, traffic slow down</p>



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		<p>and related factors for Quality of Service Identify.</p> <p>CO 3: Apply the concepts learnt in this course to optimize performance of high-speed networks using Flow Control.</p> <p>CO 4: Compare the different architectures used for HSN.</p> <p>CO 5: Describe the protocols that are used to design high speed networks.</p>
19MCAAD01	Web Programming Techniques	<p>CO 1: Understand the basics of HTML tags.</p> <p>CO 2: Analyze the advanced features of HTML5.</p> <p>CO 3: Implement the use of internal and external</p>



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		<p>Cascading Style Sheets (CSS) to format elements on single or group of pages.</p> <p>CO 4: Compose programs for the web and other contexts using the JavaScript programming language.</p> <p>CO 5: Apply various ECMAScript 6 methods in building interactive websites.</p>
19MCAAD02	Internet Programming Frameworks	<p>CO 1: Analyze React Components, the building blocks and its interaction with other web applications.</p> <p>CO 2: Design websites using various Angular features including directives, components and services.</p> <p>CO 3: Compute and build applications using Node.JS</p>



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		<p>along with the combination of Bootstrap.</p> <p>CO 4: Apply the concepts of MongoDB & MySQL, the back-end databases.</p> <p>CO 5: Utilize the conceptual and practical aspects of CSS Pre-processors and JSON</p>
19MCAAD03	Software Development Frameworks	<p>CO1: Explain the fundamental principles and practices of the agile development methods.</p> <p>CO2: Analyze the planning and execution of the agile manifesto</p> <p>CO3: Monitor the management to achieve complete product development.</p> <p>CO4: Practice the integration of development and operations</p>



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		<p>in software projects.</p> <p>CO5: Present the software project by following the principles that best fit the technical and market demands</p>
19MCAGE01	Resource Management Techniques	<p>CO 1: Identify the applications of Operations Research and methods to solve business problems.</p> <p>CO 2: Apply linear programming to solve operational problem with constraints.</p> <p>CO 3: Apply transportation and assignment models to find optimal solution in warehousing and Travelling,</p> <p>CO 4: Prepare project scheduling using PERT and CPM.</p> <p>CO 5: Use optimization concepts in real world problems</p>



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19MCAGE02	Financial Management and Accounting	<p>CO 1: Preparation and analysis of balance sheet.</p> <p>CO 2: Predict the Classification of Costing.</p> <p>CO 3: Decide the budget preparation and control of a company.</p> <p>CO 4: Analyze the flow of funds.</p> <p>CO 5: Use Tally to implement the needs of financial accounting</p>
19MCAGE03	Management Information Systems	<p>CO 1: Analyze and synthesize business information needs to facilitate evaluation of strategic alternatives.</p> <p>CO 2: Apply MIS knowledge and skills learned to facilitate development, deployment and management of information systems.</p>



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		<p>CO 3:Predict the use of information technology for business processes.</p> <p>CO 4:Assess the use of technology of Information Systems for effective management.</p> <p>CO 5:Identify the security features and global issues in organization and society</p>
19MCAGE04	E-Commerce	<p>CO 1:Gain a comprehensive understanding of the E-Commerce landscape, current and emerging technology and infrastructure underpinnings of the business.</p> <p>CO 2:Analyze the impact of E-commerce on business models and strategy.</p> <p>CO 3:Develop an understanding on how internet can help</p>



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		<p>business grow/ Describe the infrastructure for E-commerce</p> <p>CO 4:Assess electronic payment systems</p> <p>CO 5:Gain an understanding on the importance of security, privacy, and ethical issues as they relate to E-Commerce.</p>
19MCAGE05	Cyber Forensics	<p>CO 1:Predict the forensics fundamentals and the various technologies used to avoid computer crimes.</p> <p>CO 2:Illustrate different methods to collect and preserve digital evidence and Digital Crime Scene.</p> <p>CO 3:Identify and Analyze Forensic Technical Surveillance Devices.</p>



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		<p>CO 4:Evaluate the Various tools and tactics followed in military.</p> <p>CO 5:Demonstrate the Usage of surveillance tools for tracking cyber criminals</p>
19MCAGE06	Ethics in Computing	<p>CO 1:Predict the relationship between the law, ethics and computer technology.</p> <p>CO 2:Outline the philosophical and ethical debates with the ideas and the nature of intellectual creativity.</p> <p>CO 3:Design the impact of computer technology on free speech.</p> <p>CO 4:Formulate the ethical and legal issues of the impact that computing technologies had on workplace.</p> <p>CO 5:Develop a personal standpoint in relation to DataBase</p>



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		society and the usage of biometric data.
19MCAGE07	Entrepreneurship Development	<p>CO1: Highlight the salient characteristics of successful entrepreneur</p> <p>CO2: Enumerate the competencies relevant for Entrepreneurial development.</p> <p>CO3: Delineate the growth of women Entrepreneurship in India.</p> <p>CO4: Identify the major problems faced in conducting EDPs.</p> <p>CO5: Discuss the methods of project appraisal used for small scale enterprises</p>
19MCAGE21	Research Methodology	CO 1: Predict the different stages of research process.



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		<p>CO 2:Apply methods to collect best data.</p> <p>CO 3:Assess the suitable research design & work.</p> <p>CO 4:Compare categorical and continuous measures.</p> <p>CO 5: Analyze the process of various reports writing.</p>
19MCAGE22	Data Mining and Data Warehousing	<p>CO 1:Practice the pre-processing operations of data.</p> <p>CO 2:Compare & contrast OLTP, OLAP and Data mining as techniques for extracting knowledge from a Data Warehouse.</p> <p>CO 3:Perform Association Rule Mining for Market Basket Analysis.</p> <p>CO 4:Design & deploy the appropriate Classification and Clustering techniques.</p>



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		CO 5: Explore the recent trends in data mining.
19MCAGE23	Digital Image Processing	<p>CO 1: To review the fundamental concepts of a digital image processing system.</p> <p>CO 2: To examine various types of images, their intensity transformations and spatial filtering.</p> <p>CO 3: To analyze the different types of noises and the filters used to restore and reconstruct the images.</p> <p>CO 4: To create color images and pseudo images with smoothening and sharpening techniques.</p> <p>CO 5: To compare the various lossy and lossless compression mechanisms.</p>
19MCAGE24	Artificial Intelligence & Expert	CO 1: Identify problems that are amenable to solution



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	Systems	<p>by AI methods.</p> <p>CO 2: Formulate search problems and implement search algorithms using admissible heuristics.</p> <p>CO 3: Design and carry out an empirical evaluation of different algorithms on a predicate logic and state the conclusions that the evaluation supports.</p> <p>CO 4: Analyze games playing as adversarial search problems and implement optimal and efficient solutions.</p> <p>CO 5: Apply the concepts of Expert Systems in machine learning</p>
19MCAGE25	Soft Computing	<p>CO 1: Explore the functional components of artificial neural networks.</p> <p>CO 2: Examine the principles of back propagation</p>



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		<p>networks.</p> <p>CO 3: Expose the students to the concepts of predicting the functionalities of ART.</p> <p>CO 4: Analyze the logic principle of classical sets and fuzzy set operations in fuzzy set theory.</p> <p>CO 5: Identify the concept of fuzzification and defuzzification involved in various systems</p>
19MCAGE26	Cloud Computing	<p>CO 1: Compare the strengths and limitations of cloud computing.</p> <p>CO 2: Identify the architecture, infrastructure and delivery models of cloud computing.</p> <p>CO 3: Apply suitable virtualization concept.</p>



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		<p>CO 4: Choose the appropriate Cloud player, Programming Models and approach.</p> <p>CO 5: Address the core issues of cloud computing such as security, privacy and interoperability</p>
19MCAGE27	Advanced Dbms Techniques	<p>CO 1: Design the basic concepts of the advanced database design and dependencies.</p> <p>CO 2: Compare the different data models.</p> <p>CO 3: Compile the implementation concepts of storage structures.</p> <p>CO 4: Analyze on the advanced transaction management techniques.</p> <p>CO 5: Discuss on the advanced databases</p>



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20MCAAD01	Data Mining Techniques	<p>CO 1: Identify the functionalities of Data Mining and various techniques to extract knowledge.</p> <p>CO 2: Analyze the methods to discover Association Rules</p> <p>CO 3: Design & deploy the appropriate Clustering techniques.</p> <p>CO 4: Outline web mining, temporal and spatial data mining</p> <p>CO 5: Examine and Explore weka techniques</p>
20MCADA02	Data Analytics and Visualization Using Spreadsheets	<p>CO 1: Ability to analyze data is a powerful skill that helps you make better decisions</p> <p>CO 2: Identify the basic principles of a Pivot Table</p>



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		<p>CO 3: Recognize how to use Pivot Table and Pivot chart</p> <p>CO 4: Use Excel's powerful functions to efficiently transform mountains of raw data into clear insights</p> <p>CO 5: Use your new-found Excel skills like Descriptive Statistics and Inferential Statistics to analyze what makes a successful project.</p>
20MCADA03	Big Data Analytics	<p>CO 1: Understand the fundamentals of various big data analysis techniques</p> <p>CO 2: Analyze the big data analytic techniques for useful business applications</p> <p>CO3: Examine the HADOOP and Map Reduce technologies associated with big data analytics</p> <p>CO 4: Scrutinize the various storage architecture using</p>



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		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



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		<p>descriptively using the tool</p> <p>CO 3: Explore data and business analytic process</p> <p>CO 4: Apply various supervised and un supervised Machine learning techniques</p> <p>CO 5: Learn to apply different algorithms of regression for business problems</p>
20MCADA06	Big Data Security	<p>CO 1: Identify the need for security and best practices in a big data environment</p> <p>CO 2: Analyze the steps to secure big data</p> <p>CO 3: Build security in hadoop eco system</p> <p>CO 4: Assess the sensitivity of data in Hadoop</p> <p>CO 5: Outline data security and event logging</p>



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20MCADS01	Data Communication & Networking	<p>CO 1: Identify the functionalities of Networking layers of both OSI and TCP/IP reference models.</p> <p>CO 2: Analyze the design issues of Datalink layer and techniques to resolve it.</p> <p>CO 3: Compare the principles of Switching and Routing algorithm.</p> <p>CO 4: Predict the TCP and UDP related procedures.</p> <p>CO 5: Outline the Application layer protocols.</p>
20MCADS02	Wireless Communication & Security	<p>CO 1: Identify, Predict and Evaluate MAC, SDMA, TDMA, FDMA, CDMA</p> <p>CO 2: Demonstrate the architectures, challenges and solutions of Wireless communication</p>



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		<p>CO 3: Assess the role of Wireless Networks in shaping the future internet.</p> <p>CO 4: Design Mobile IP to support seamless and continuous Internet connectivity</p> <p>CO 5: Design SIP to create, modify, and terminate a multimedia session over the Internet Protocol</p>
20MCADS03	Cryptography & Network Security	<p>CO 1 Evaluate the fundamentals of networks security, security architecture, threats and vulnerabilities</p> <p>CO 2 Compare Stream ciphers and block ciphers.</p> <p>CO 3 Apply the different cryptographic operations of public key cryptography.</p> <p>CO 4 Pertain the various Authentication schemes to</p>



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		<p>simulate different applications.</p> <p>CO 5Applying CrypTool 2 to encrypt and decrypt texts using different ciphers.</p>
20MCADS04	Cyber Forensics	<p>CO 1Predict the forensics fundamentals and the various technologies used to avoid computer crimes</p> <p>CO 2Illustrate different methods to collect and preserve digital evidence and Digital Crime Scene.</p> <p>CO 3Identify and Analyze Forensic Technical Surveillance Devices.</p> <p>CO 4Evaluate the Various tools and tactics followed in military.</p> <p>CO 5Demonstrate the Usage of surveillance tools for</p>



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		tracking cyber criminals
20MCADS05	Cloud Security	<p>CO 1 Examine the security threats in cloud platforms</p> <p>CO 2 Evaluate Data Asset and Identity Access Management</p> <p>CO 3 Manage the vulnerable cloud environment</p> <p>CO 4 Understand the security issues that arises over a Network</p> <p>CO 5 Explore the security incidents by detecting, responding and recovering</p>
20MCADS06	High Speed Networks	<p>CO 1 Work Identify the building blocks and operation of high speed networking and ATM.</p> <p>CO 2 Analyze the cause of congestion, traffic slow down and related factors for Quality of Service Identify.</p>



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		<p>CO 3 Apply the concepts learnt in this course to optimize performance of high-speed networks using Flow Control.</p> <p>CO 4 Compare the different architectures used for HSN.</p> <p>CO 5 Describe the protocols that are used to design high speed networks.</p>
20MCAAM01	Artificial Intelligence & Expert Systems	<p>CO 1: Identify problems that are amenable to solution by AI methods.</p> <p>CO 2: Formulate search problems and implement search algorithms using admissible heuristics.</p> <p>CO 3: Design and carry out an empirical evaluation of different algorithms on a predicate logic and state the conclusions that the evaluation supports.</p>



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		<p>CO 4: Analyze games playing as adversarial search problems and implement optimal and efficient solutions.</p> <p>CO 5: Apply the concepts of Expert Systems in machine learning, Examine and Explore scikit learn techniques</p>
20MCAAM02	Soft Computing	<p>CO 1: Explore the functional components of artificial neural networks..</p> <p>CO 2: Examine the principles of back propagation networks.</p> <p>CO 3: Expose the students to the concepts of predicting the functionalities of ART.</p> <p>CO 4: Analyze the logic principle of classical sets and fuzzy set operations in fuzzy set theory.</p> <p>CO 5: Identify the concept of fuzzification and</p>



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		defuzzification involved in various systems.
20MCAAM03	Machine Learning	<p>CO 1 Identify the concepts of machine learning</p> <p>CO 2 Demonstrate Decision Tree learning and Bayesian Learning for classification.</p> <p>CO 3 Analyze the logic behind Genetic Algorithms.</p> <p>CO 4 Compare various set of rules available for Learning.</p> <p>CO 5 Propose solution for real world problems based on Inductive and Analytical Learning.</p>
20MCAAM04	Neural Networks	<p>CO 1 Identify problems that are amenable to solution by Neural networks methods.</p> <p>CO 2 Formulate searching rules and implement Single Layer Perceptron and Multilayer Perceptron Networks.</p>



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		<p>CO 3 Design and carry out an empirical evaluation of different algorithms on Pattern Association</p> <p>CO 4 Analyze Feedback and Feed forward Network and implement optimal and efficient solutions.</p> <p>CO 5 Apply the application of Neural Networks in Arts, Bioinformatics and use of Neural Networks in Knowledge Extraction.</p>
20MCAAM05	Human Computer Interaction	<p>CO 1 Design effective dialog for HCI</p> <p>CO 2 Design effective HCI for individuals and persons with disabilities</p> <p>CO 3 Assess the importance of user feedback</p>



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		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



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		<p>technologies to produce organizational documents</p> <p>CO 2: Develop, open and explore the Microsoft Office Excel environment</p> <p>CO 3: Design and edit charts and graphs with the use of functions and formulas.</p> <p>CO 4: Implement and query a database using different methods</p> <p>CO 5: Generate slide presentations that include text, graphics, animation, and transitions.</p>
20MCAGE02	Financial Management and Accounting	<p>CO 1: Preparation and analysis of balance sheet.</p> <p>CO 2: Predict the Classification of Costing.</p> <p>CO 3: Decide the budget preparation and control of a company.</p>



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		<p>CO 4: Analyze the flow of funds.</p> <p>CO 5: Use Tally to implement the needs of financial accounting</p>
20MCAGE04	E-Commerce	<p>CO 1: Gain a comprehensive understanding of the E-Commerce landscape, current and emerging technology and infrastructure underpinnings of the business.</p> <p>CO 2: Analyze the impact of E-commerce on business models and strategy.</p> <p>CO 3: Develop an understanding on how internet can help business grow/ Describe the infrastructure for E-commerce</p> <p>CO 4: Assess electronic payment systems</p> <p>CO 5: Gain an understanding on the importance of</p>



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		security, privacy, and ethical issues as they relate to E-Commerce.
20MCAGE05	Ethics In Computing	<p>CO 1: Predict the relationship between the law, ethics and computer technology.</p> <p>CO 2: Outline the philosophical and ethical debates with the ideas and the nature of intellectual creativity.</p> <p>CO 3: Design the impact of computer technology on free speech.</p> <p>CO 4: Formulate the ethical and legal issues of the impact that computing technologies had on workplace.</p> <p>CO 5: Develop a personal standpoint in relation to</p>



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



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20MCAGE07	Entrepreneurship Development	<p>CO1: Highlight the salient characteristics of successful entrepreneur</p> <p>CO2: Enumerate the competencies relevant for Entrepreneurial development.</p> <p>CO3: Delineate the growth of women Entrepreneurship in India.</p> <p>CO4: Identify the major problems faced in conducting EDPs.</p> <p>CO5: Discuss the methods of project appraisal used for small scale enterprises</p>
20MCAGE08	Wireless Sensor Networks	<p>CO 1: Formulate the basic standardization of wireless networks.</p> <p>CO 2: Analyze the implementation of technologies</p>



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		<p>related to WSN.</p> <p>CO 3: Identify and understand the security issues in ad hoc and sensor networks.</p> <p>CO 4: Compare the protocols and to promote the research work in this area.</p> <p>CO 5: Apply and solve problems in the applications of Wireless Networking Area.</p>
20MCAGE09	Research Methodology	<p>CO 1: Predict the different stages of research process.</p> <p>CO 2: Apply methods to collect best data.</p> <p>CO 3: Assess the suitable research design & work.</p> <p>CO 4: Compare categorical and continuous measures.</p> <p>CO 5: Analyze the process of various reports writing.</p>



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20MCAGE10	Digital Image Processing	<p>CO 1: To review the fundamental concepts of a digital image processing system.</p> <p>CO 2: To examine various types of images, their intensity transformations and spatial filtering.</p> <p>CO 3: To analyze the different types of noises and the filters used to restore and reconstruct the images.</p> <p>CO 4: To create color images and pseudo images with smoothening and sharpening techniques.</p> <p>CO 5: To compare the various lossy and lossless compression mechanisms.</p>
20MCAGE11	Cloud Computing	<p>CO 1: Compare the strengths and limitations of cloud computing.</p> <p>CO 2: Identify the architecture, infrastructure and</p>



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		<p>delivery models of cloud computing.</p> <p>CO 3: Apply suitable virtualization concept.</p> <p>CO 4: Choose the appropriate Cloud player, Programming Models and approach.</p> <p>CO 5: Address the core issues of cloud computing such as security, privacy and interoperability</p>
20MCAGE12	Agile Software Engineering	<p>CO 1</p> <p>Explain the fundamental principles and practices of the agile development methods.</p> <p>CO 2</p> <p>Analyze the planning and execution of the agile manifesto</p> <p>CO 3</p>



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		<p>Monitor the management to achieve complete product development.</p> <p>CO 4</p> <p>Practice the integration of development and operations in software projects.</p> <p>CO 5</p> <p>Present the software project by following the principles that best fit the technical and market demands.</p>
19MCADS03	Data Analytics Using Pig & Hive	CO 1: Outline the programming constructs of Pig and database management using HiveQL



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		<p>CO 2: Write scripts using Pig latin and perform various HiveQLqueries by applying RDBMS concepts</p> <p>CO 3: Apply the concepts of Pig and Hive in simple tasks</p> <p>CO 4: Formulate and analyse different databases for different situations</p> <p>CO 5: Create real time applications</p>
19MCANW03	High Speed Networks	<p>CO 1: Identify the building blocks and operation of high speed networking and ATM.</p> <p>CO 2: Analyze the cause of congestion, traffic slow down and related factors for Quality of Service Identify.</p> <p>CO 3: Apply the concepts learnt in this course to optimize performance of high-speed networks using Flow</p>



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		<p>Control.</p> <p>CO 4: Compare the different architectures used for HSN.</p> <p>CO 5: Describe the protocols that are used to design high speed networks</p>
19MCAAD03	Software Development Frameworks	<p>CO1: Explain the fundamental principles and practices of the agile development methods.</p> <p>CO2: Analyze the planning and execution of the agile manifesto</p> <p>CO3: Monitor the management to achieve complete product development.</p> <p>CO4: Practice the integration of development and operations</p>



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		<p>in software projects.</p> <p>CO5: Present the software project by following the principles that best fit the technical and market demands.</p>
19MCAGE01	Resource Management Techniques	<p>CO 1: Identify the applications of Operations Research and methods to solve business problems.</p> <p>CO 2: Apply linear programming to solve operational problem with constraints.</p> <p>CO 3: Apply transportation and assignment models to find optimal solution in warehousing and Travelling,</p> <p>CO 4: Prepare project scheduling using PERT and CPM.</p> <p>CO 5: Use optimization concepts in real world problems</p>



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19MCAGE02	Financial Management & Accounting	<p>CO 1: Preparation and analysis of balance sheet.</p> <p>CO 2: Predict the Classification of Costing.</p> <p>CO 3: Decide the budget preparation and control of a company.</p> <p>CO 4: Analyze the flow of funds.</p> <p>CO 5: Use Tally to implement the needs of financial accounting</p>
19MCAGE03	Management Information Systems	<p>CO 1: Analyze and synthesize business information needs to facilitate evaluation of strategic alternatives.</p> <p>CO 2: Apply MIS knowledge and skills learned to facilitate development, deployment and management of</p>



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		<p>information systems.</p> <p>CO 3: Predict the use of information technology for business processes.</p> <p>CO 4: Assess the use of technology of Information Systems for effective management.</p> <p>CO 5: Identify the security features and global issues in organization and society</p>
19MCAGE04	E-Commerce	<p>CO 1: Gain a comprehensive understanding of the E-Commerce landscape, current and emerging technology and infrastructure underpinnings of the business.</p> <p>CO 2: Analyze the impact of E-commerce on business models and strategy.</p> <p>CO 3: Develop an understanding on how internet can</p>



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		<p>help business grow/ Describe the infrastructure for E-commerce</p> <p>CO 4: Assess electronic payment systems</p> <p>CO 5: Gain an understanding on the importance of security, privacy, and ethical issues as they relate to E-Commerce</p>
19MCAGE05	Cyber Forensics	<p>CO 1: Predict the forensics fundamentals and the various technologies used to avoid computer crimes.</p> <p>CO 2: Illustrate different methods to collect and preserve digital evidence and Digital Crime Scene.</p> <p>CO 3: Identify and Analyze Forensic Technical Surveillance Devices.</p> <p>CO 4: Evaluate the Various tools and tactics followed in</p>



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		<p>military.</p> <p>CO 5: Demonstrate the Usage of surveillance tools for tracking cyber criminals</p>
19MCAGE06	Ethics in Computing	<p>COURSE OUTCOMES</p> <p>CO 1: Predict the relationship between the law, ethics and computer technology.</p> <p>CO 2: Outline the philosophical and ethical debates with the ideas and the nature of intellectual creativity.</p> <p>CO 3: Design the impact of computer technology on free speech.</p> <p>CO 4: Formulate the ethical and legal issues of the impact that computing technologies had on workplace.</p>



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		CO 5: Develop a personal standpoint in relation to DataBase society and the usage of biometric data.
19MCAGE07	Entrepreneurship Development	<p>CO1: Highlight the salient characteristics of successful entrepreneur</p> <p>CO2: Enumerate the competencies relevant for Entrepreneurial development.</p> <p>CO3: Delineate the growth of women Entrepreneurship in India.</p> <p>CO4: Identify the major problems faced in conducting EDPs.</p> <p>CO5: Discuss the methods of project appraisal used for small scale enterprises.</p>



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19MCAGE21	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.
19MCAGE22	Data Mining & Data warehousing	CO 1: Practice the pre-processing operations of data. CO 2: Compare & contrast OLTP, OLAP and Data mining as techniques for extracting knowledge



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		<p>from a Data Warehouse.</p> <p>CO 3: Perform Association Rule Mining for Market Basket Analysis.</p> <p>CO 4: Design & deploy the appropriate Classification and Clustering techniques.</p> <p>CO 5: Explore the recent trends in data mining.</p>
19MCAGE23	Digital Image Processing	<p>CO 1: To review the fundamental concepts of a digital image processing system.</p> <p>CO 2: To examine various types of images, their intensity transformations and spatial filtering.</p> <p>CO 3: To analyze the different types of noises and the filters used to restore and reconstruct the images.</p>



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		<p>CO 4: To create color images and pseudo images with smoothening and sharpening techniques.</p> <p>CO 5: To compare the various lossy and lossless compression mechanisms.</p>
19MCAGE24	Artificial Intelligence&Expert Systems	<p>CO 1: Identify problems that are amenable to solution by AI methods.</p> <p>CO 2: Formulate search problems and implement search algorithms using admissible heuristics.</p> <p>CO 3: Design and carry out an empirical evaluation of different algorithms on a predicate logic and state the conclusions that the evaluation supports.</p> <p>CO 4: Analyze games playing as adversarial search</p>



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		problems and implement optimal and efficient solutions. CO 5: Apply the concepts of Expert Systems in machine learning.
19MCAGE25	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.



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		CO 5: Identify the concept of fuzzification and defuzzification involved in various systems.
19MCAGE26	Cloud Computing	<p>CO 1: Compare the strengths and limitations of cloud computing.</p> <p>CO 2: Identify the architecture, infrastructure and delivery models of cloud computing.</p> <p>CO 3: Apply suitable virtualization concept.</p> <p>CO 4: Choose the appropriate Cloud player, Programming Models and approach.</p> <p>CO 5: Address the core issues of cloud computing such as security, privacy and interoperability</p>



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19MCAGE27	Advanced DBMS Techniques	<p>CO 1: Design conceptual models of a database using ER model.</p> <p>CO 2: Outline the features of DBMS and Relational Database design.</p> <p>CO 3: Retrieve information from database by formulating complex SQL Queries.</p> <p>CO 4: Utilize PL/SQL programming to solve problems.</p> <p>CO 5: Implement Packages, Triggers for efficient retrieval of information.</p>
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