FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018

NAME OF THE PROGRAMME: M.C.A **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.

PROGRAMME SPECIFIC OUTCOMES:

PSO 1: Ability to design and develop applications in the computing discipline to meet the customer's business objectives.

PSO 2: Ability to Integrate various system components to provide user interactive solutions for various challenges

PSO 3: Ability to test and maintain the software applications with latest computing tools and technologies.

PSO 4: Ability to understand the evolutionary changes in the practices and strategies in software project development.

PSO 5: Ability to enhance teamwork and leadership skills to solve time critical problems

2019 - 2020

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
19MCA101	Mathematical Foundation of Computer Science	CO 1:Perform Logical operations and predicate calculus needed for computing skill. CO 2:Analyze and Compare the various techniques for solving numerical equations. CO 3: Apply the techniques of statistics and numerical methods to unravel problems by computers. CO 4: Explain the set theory logic. CO 5: Utilize the Knowledge of matrices for designing and solving problems
19MCA102	Computer Organization and Architecture	CO 1: Ability to perform arithmetic operations in various number systems. CO 2: Conceptualize the basics of organizational and architectural issues of a digital computer. CO 3: Demonstrate and perform computer arithmetic operations

		on integer and real numbers. CO 4: Identify logic for assembly language programming. CO 5: Analyze the performance of Reduced Instruction Set Architecture.
19MCA103	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.
19MCA104	Programming In C	CO 1: Identify the basic terminologies used in C programming. CO 2: Design programs involving decision structures and loops. CO 3: Implement code reusability with the help of user defined functions. CO 4: Develop advanced applications using nested structures. CO 5: Demonstrate the dynamics of memory by the use of

		pointers and files.
19MCA105	Lab I- Visual Programming	CO 1: Develop GUI applications. CO 2: Design and Deploy application programs. CO 3: Design and implement applications using databases.
19MCA106	Lab II - C Programming	CO 1: Develop programs using branching statements and control statements. CO 2: Create applications using arrays, functions, pointers and files. CO 3: Gain skills to handle strings and files.
19MCA 107	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.
19MCA108	Soft Skills I -	CO 1: Display competence in oral and written communication.

	Communicative English	CO 2: Use current technology related to the communication.
19MCA201	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.
19MCA202	Software Engineering	CO 1: Compare the different domains and process models. CO 2: Identify the data, class and flow oriented modeling concepts. CO 3: Analyze on the design oriented concepts. CO 4: Identify the managerial aspects of software development. CO 5: Generate project schedule for different activities of software development

19MCA203	Relational Database Management Systems	CO 1: Design conceptual models of a database using ER model. CO 2: Outline the features of DBMS and Relational Database design. CO 3: Retrieve information from database by formulating complex SQL Queries. CO 4: Utilize PL/SQL programming to solve problems. CO 5: Implement Packages, Triggers for efficient retrieval of information.
19MCA204	Object Oriented Programming In C++	CO 1: Outline the process and mechanism of functions. CO 2: Identify the relation between arrays and pointers, and use them efficiently in program CO 3: Use C++ classes for code reusability. CO 4: Discuss on the concept of function and operator overloading, virtual functions and polymorphism CO 5: Demonstrate the power of templates for generic programming.

19MCA205	Lab III – 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.
19MCA206	Lab IV - C++ Programming	CO 1: Develop programs in object oriented paradigm. CO 2: Analyze, use, and create different types of functions and classes. CO 3: Design programs to implement various data structure concepts
19MCA207	Skill Based Lab II – HTML & CSS	CO 1: Design and develop attractive WebPages. CO 2: Implement a variety of presentation effects in html documents using CSS. CO 3: Write valid standards-conformant html documents using variety of form elements
19MCA208	Soft Skills II – Colloquium	CO 1: Identify the communication differences in working environment with different cultural styles.

		CO 2: Practice the skills and behaviours required to facilitate a group. CO 3: Demonstrate an effective presentation in a meeting.
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.
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	• 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.
19MCA306	Networking Tools	• To implement wired and wireless networks. • To analyze various protocols in wired and wireless environment
19MCA307	Quantitative Aptitude	• Apply quantitative techniques to solve variety of problems. • Perform statistical analysis to interpret information
19MCA401	Compiler Design	• To analyze 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. • Apply Location Based Services of Android for ensuring women's safety and security
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.
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	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	Technical Aptitude	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive examinations
19MCADS01	Big Data Analytics	• Work with big data platform and 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	• Formulate the basic standardization of wireless networks. • Analyze the implementation of technologies related to WSN. • Identify and understand the security issues in ad hoc and sensor networks. • Compare the protocols and to promote the research work in this area. • Apply and solve problems in the applications of Wireless Networking Area.
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 ECMA Script 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 reconstruct the images. • To create colour 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	• Compare the strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of cloud computing. • Apply suitable virtualization concept. • Choose the appropriate Cloud player, Programming Models and approach. • Address the core issues of cloud computing such as security, privacy and interoperability
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
COURSE CODE	**COURSE TITLE**	**COURSE OBJECTIVES**
MCA545	Cloud Computing	• Compare the strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of cloud computing. • Apply suitable virtualization concept. • Choose the appropriate Cloud player, Programming Models and approach. • Address the core issues of cloud computing such as security, privacy and interoperability
MCA546E1	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 reconstruct the images. • To create color images and pseudo images with smoothening and sharpening techniques. • To compare the various lossy and lossless compression mechanisms.
MCA546E2	Big Data Analytics	• Work with big data platform and 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
MCA546E3	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
MCA546E4	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.
MCA547E1	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
MCA547E2	Wireless Sensor Networks	• Formulate the basic standardization of wireless networks. • Analyze the implementation of technologies related to WSN. • Identify and understand the security issues in ad hoc and sensor networks. • Compare the protocols and to promote the research work in this area. • Apply and solve problems in the applications of Wireless Networking Area.
MCA547E3	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 • Predict the behaviour of people working in teams and to explore the ways of Managing people in Software Environments.
MCA547E4	Service Oriented Architecture	• The creation of SOA compliant web service using various technologies • Predict the various service oriented analysis techniques • CO 3 : Apply the knowledge on advanced concepts of service composition, Orchestration and Choreography. • Understand web service framework with respect to SOA. • Understand various open standards available for developing SOA compliant web services.
MCA548	Internet Programming Using J2ee	• Create dynamic web pages, using Servlets and JSP. • Make a reusable software component, using Java Bean. • invoke the remote methods in an application using Remote

		Method Invocation (RMI) • understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB)
MCA549	. Net Programming	• Know about multi-tier application development. • Create user interactive web pages using ASP.Net. • Create simple data binding applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications. • Develop web services.
MCA550	Lab Ix- J2ee Programming	• Design and develop Web applications • Designing Enterprise based applications by encapsulating an application's business logic. • Designing applications using pre-built frameworks.
MCA551	Lab X- . Net Programming	• .Create user interactive web pages using ASP.Net. CO • Create simple data binding applications using ADO.Net connectivity.

		• Performing Database operations for Windows Form and web applications.
MCA552	Skill Based Lab V- Domain Study	• Identify the domain to be analyzed • Prepare an in depth study on the recent trends in the chosen domain • Present the various analysis using various tools • Create a model on the analysis done • Create a research paper from the analysis and findings
MCA553	Soft Skills V- Interpersonal Skill For Corporate Readiness	• Outline the roles played in workgroups and teams • Describe how good communication influences working relationship.
MCA554	Open Source Lab– Iii – Netbeans	• Starts with Java development with Maven in NetBeans IDE • Describe the complete Java development workflow, including testing

2018 - 2019

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MCA101	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
MCA102	Computer Organization and Architecture	• Ability to perform arithmetic operations in various number systems. • Conceptualize the basics of organizational and architectural issues of a digital computer. • Demonstrate and perform computer arithmetic operations on integer and real numbers. • Identify logic for assembly language programming.

		• Analyze the performance of Reduced Instruction Set Architecture.
MCA103	Operating Systems	• Identify the components and processes. • Analyze on scheduling algorithms and deadlocks. • Demonstrate the mapping between the physical memory and virtual memory. • Identify the secondary memory management techniques. • Analyze on the distributed systems and security issues.
MCA104	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.
MCA105	Programming in C	• Identify the basic terminologies used in C programming.

		• Design programs involving decision structures and loops. • Implement code reusability with the help of user defined functions. • Develop advanced applications using nested structures. • Demonstrate the dynamics of memory by the use of pointers and files.
MCA106	Lab I – Visual Programming	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.
MCA107	Lab II- C Programming	• Develop programs using branching statements and control statements. • Create applications using arrays, functions, pointers and files. • Gain skills to handle strings and files.
MCA108	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.

MCA109	Soft Skills I - Communicative English	• Display competence in oral and written communication. • Use current technology related to the communication.
MCA110	Open Source Lab I– Libre Office	• Recognize when to use each of the Libre Office programs to create professional and academic documents. • Use Libre Office programs to create personal, academic and business documents following current professional and/or industry standards.
MCA212	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
MCA213	Software Engineering	• Compare the different domains and process models. • Identify the data, class and flow oriented modelling concepts. • Analyze on the design oriented concepts. • Identify the managerial aspects of software development. • Generate project schedule for different activities of software

		development
MCA214	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. Interpret how to use information technology to solve business problems.
MCA215	Relational Database Management Systems	• Design conceptual models of a database using ER model. • Outline the features of DBMS and Relational Database design. • Retrieve information from database by formulating complex SQL Queries. • Utilize PL/SQL programming to solve problems.

		• Implement Packages, Triggers for efficient retrieval of information.
MCA216	Object Oriented Programming in C++	• Outline the process and mechanism of functions. • Identify the relation between arrays and pointers, and use them efficiently in program • Use C++ classes for code reusability. • Discuss on the concept of function and operator overloading, virtual functions and polymorphism • Demonstrate the power of templates for generic programming.
MCA217	Lab III- 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.
MCA218	Lab IV- C++ Programming	• Develop programs in object oriented paradigm. • Analyze, use, and create different types of functions and classes. • Design programs to implement various data structure concepts

MCA219	Skill Based Lab II -Tally	• Use accounting and business terminology • explain the objective of financial reporting and related key accounting assumptions and principles. • Create company, enter accounting voucher entries including advance voucher entries. • Do reconcile bank statement, do accrual adjustments, and also print financial statements. • Generate reports
MCA220	Soft Skills II –Colloquium	• Identify the communication differences in working environment with different cultural styles. • Practice the skills and behaviors required to facilitate a group. • Demonstrate an effective presentation in a meeting.
MCA221	Open Source Lab II – Blender	• Learn to Use Blender to Create Beautiful 3D Models From Zero. • create valid and complete 3D meshes for use in visualisation, games design, and 3D printing.
MCA321	System Software	• Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.

		• Describe the various concepts of assemblers and macro-processors. • Understand the various phases of compiler and compare its working with assembler.
MCA322	Data Communication And 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 Switching and Routing algorithm. • Predict the TCP and UDP related procedures. • Outline the Application layer protocols.
MCA323E1	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.
MCA323E2	Distributed Operating System	• To learn the fundamentals of Distributed Operating Systems. • To learn the mechanisms involved in memory management in Distributed OS • .Analyze the various device and resource management techniques for timesharing and distributed systems • Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system • Interpret the mechanisms adopted for file sharing in distributed Applications
MCA323E3	Theory of Computation	• Discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving. • Explain the models of computation, including formal languages, grammars and automata, and their connections. • State and explain the Church-Turing thesis and its significance.

		• Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars. • Solve computational problems regarding their computability and complexity and prove the basic results of the theory of computation.
MCA323E4	Embedded Systems	• Understand hardware and software design requirements of embedded systems. • Analyze the embedded systems' specification and develop software programs. • Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.
MCA324	Advanced Programming Principles	• Design, implement, test and debug programs that use loops and arrays. • Design, implement, test and debug programs that use functions. • Design, implement, test and debug programs that use arrays for character strings and that use pointers for character strings.

		• Use if-else statements and switch-case statements to write programs in Python to tackle any decision-making scenario. • Master Object-oriented programming to create an entire Python project using objects and classes. • Store and retrieve information using variables
MCA325	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.
MCA326	Lab – V- Advanced C & Python Programming	• Understand basic data structures such as arrays, linked lists, stack using pointers • Describe the Python language syntax including control statements, loops and functions to write programs • Examine the core data structures like lists, dictionaries, tuples and sets in Python to store, process and sort the data

MCA327	Lab – VI- JAVA Programming	• 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.
MCA328	Skill Based Lab III-HTML, CSS.	• Design and develop attractive WebPages. • Implement a variety of presentation effects in html documents using CSS. • Write valid standards-conformant html documents using variety of form elements
MCA329	Soft skills III – Quantitative Aptitude	• Apply quantitative techniques to solve variety of problems. • Perform statistical analysis to interpret information
MCA330	Open Source Lab– I Blender	• Learn to Use Blender to Create Beautiful 3D Models From Zero. • create valid and complete 3D meshes for use in visualization, games design, and 3D printing.

MCA433	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
MCA434E1	Computer Graphics	• To list the basic concepts used in computer graphics. • To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping. • To describe the importance of 2 dimensional and 3 dimensional transformations. • To define the fundamentals of multimedia systems and compression. • To understand different standards of file format and multimedia Input/ Output technologies.
MCA434E2	Data Mining & Data	• Practice the pre-processing operations of data. • Compare & contrast OLTP, OLAP and Data mining as

	Warehousing	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.
MCA434E3	Compiler Design	• To analyze 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
MCA434E4	Network Security and Cryptography	• 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
MCA435E1	Software Testing	• List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects. • Distinguish characteristics of structural testing methods. • Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible. • Discuss about the functional and system testing methods. • Demonstrate various issues for object oriented testing.
MCA435E2	OOAD & UML	• Describe the three pillars of object-orientation and explain the benefits of each. • Create use case documents that capture requirements for a software system.

		• Create class diagrams that model both the domain model and design model of a software system. • Create interaction diagrams that model the dynamic aspects of a software system. • Explain the facets of the Unified Process approach to designing and building a software system. • Describe how design patterns facilitate development and list several of the most popular patterns.
MCA435E3	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.
MCA435E4	Client/ Server Computing	• Understand fundamental concepts of Client Server systems,

		system models of distributed systems, networks that distributed systems run on. • Explore communication protocols between processes in distributed systems, Middleware, Enterprise Application integration, and Web Services Security • Gain Exposure on most common used servers. • Understand the concept of client-server development and learn problem solving skills through design scenarios for network environment. • Develop a client –server based application.
MCA436	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.

		• Apply Location Based Services of Android for ensuring women's safety and security
MCA437	Web Based Programming	• Develop a dynamic webpage by the use of java script and DHTML. • Connect with a DBMS and perform insert, update and delete operations on DBMS table. • Write a server side program • Perform various MySQL database queries
MCA438	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.
MCA439	Lab – VIII- PHP & MYSQL Lab	• Create a PHP web page that is unique to each visitor • Validate user input • Create, back up and restore a MySQL database

		• Perform various MySQL database queries
MCA440	Skill Based Lab IV- Software Testing Tools Lab	• 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
MCA441	Soft skills IV- Technical Aptitude	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive examinations
MCA442	Open Source Lab– II GIMP	• Demonstrate working with images. • Demonstrate working with selections, layers, and painting tools. • Demonstrate methods for photo retouching. • Demonstrate methods for making color corrections. • Demonstrate using masks and the quick mask mode
MCA545	Cloud Computing	• Compare the strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of

		cloud computing. • Apply suitable virtualization concept. • Choose the appropriate Cloud player, Programming Models and approach. • Address the core issues of cloud computing such as security, privacy and interoperability
MCA546E1	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 reconstruct the images. • To create color images and pseudo images with smoothening and sharpening techniques. • To compare the various lossy and lossless compression mechanisms.
MCA546E2	Big Data Analytics	• Work with big data platform and 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
MCA546E3	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
MCA546E4	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.
MCA547E1	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
MCA547E2	Wireless Sensor Networks	• Formulate the basic standardization of wireless networks. • Analyze the implementation of technologies related to WSN. • Identify and understand the security issues in ad hoc and sensor networks.

		• Compare the protocols and to promote the research work in this area. • Apply and solve problems in the applications of Wireless Networking Area.
MCA547E3	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 • Predict the behaviour of people working in teams and to explore the ways of Managing people in Software Environments.
MCA547E4	Service Oriented Architecture	• The creation of SOA compliant web service using various technologies

		• Predict the various service oriented analysis techniques • Apply the knowledge on advanced concepts of service composition, Orchestration and Choreography. • Understand web service framework with respect to SOA. • Understand various open standards available for developing SOA compliant web services.
MCA548	Internet Programming using J2EE	• Create dynamic web pages, using Servlets and JSP. Make a reusable software component, using Java Bean. • invoke the remote methods in an application using Remote Method Invocation (RMI) • understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB)
MCA549	. NET Programming	• Know about multi-tier application development. • Create user interactive web pages using ASP.Net. • Create simple data binding applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications.

		• Develop web services.
MCA550	Lab IX- J2EE Programming	• Design and develop Web applications • Designing Enterprise based applications by encapsulating an application's business logic. • Designing applications using pre-built frameworks.
MCA551	Lab X- . Net Programming	• Create user interactive web pages using ASP.Net. CO Create simple data binding applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications.
MCA552	Skill Based Lab V- Domain Study	• Identify the domain to be analyzed • Prepare an in depth study on the recent trends in the chosen domain • Present the various analysis using various tools • Create a model on the analysis done • Create a research paper from the analysis and findings
MCA553	Soft skills V- Interpersonal Skill for	• Outline the roles played in workgroups and teams • Describe how good communication influences working

	Corporate Readiness	relationship.
MCA554	Open Source Lab– III – Netbeans	• Starts with Java development with Maven in NetBeans IDE • Describe the complete Java development workflow, including testing

2017 – 2018

COURSE CODE	COURSE TITLE	COURSE OBJECTIVES
MCA101	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
MCA102	Digital Principles and Computer Organization	• Ability to perform arithmetic operations in various number systems. • Conceptualize the basics of organizational and architectural issues of a digital computer. • Demonstrate and perform computer arithmetic operations on integer and real numbers. • Identify logic for assembly language programming. • Analyze the performance of Reduced Instruction Set Architecture.
MCA103	Operating Systems	• Ability to perform arithmetic operations in various number systems. • Conceptualize the basics of organizational and architectural issues of a digital computer. • Demonstrate and perform computer arithmetic operations on integer and real numbers. • Identify logic for assembly language programming. • Analyze the performance of Reduced Instruction Set

		Architecture.
MCA104	Visual Programming	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.
MCA105	Programming in C	• Identify the basic terminologies used in C programming. • Design programs involving decision structures and loops. • Implement code reusability with the help of user defined functions. • Develop advanced applications using nested structures. • Demonstrate the dynamics of memory by the use of pointers and files.
MCA106	Lab II- Visual Programming & Tally	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.
MCA107	Lab II- C Programming	• Develop programs using branching statements and control statements. • Create applications using arrays, functions, pointers and files.

		• Gain skills to handle strings and files.
MCA108	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.
MCA109	Soft Skills I - Communicative English	• Display competence in oral and written communication. • Use current technology related to the communication
MCA211	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
MCA212	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.
MCA213	Software Engineering	• Compare the different domains and process models. • Identify the data, class and flow oriented modeling concepts. • Analyze on the design oriented concepts. • Identify the managerial aspects of software development. • Generate project schedule for different activities of software development
MCA214	Relational Database Management Systems	• Design conceptual models of a database using ER model. • Outline the features of DBMS and Relational Database design. • Retrieve information from database by formulating complex SQL Queries. • Utilize PL/SQL programming to solve problems. • Implement Packages, Triggers for efficient retrieval of

		information.
MCA215	Objected Oriented Programming in C++	• Outline the process and mechanism of functions. • Identify the relation between arrays and pointers, and use them efficiently in program • Use C++ classes for code reusability. • Discuss on the concept of function and operator overloading, virtual functions and polymorphism • Demonstrate the power of templates for generic programming.
MCA216	Lab –III RDBMS Lab	• 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.
MCA217	Lab IV- C++ Lab	• Develop programs in object oriented paradigm. • Analyze, use, and create different types of functions and classes. • Design programs to implement various data structure concepts

MCA218	Skill Based Lab II- Multimedia Lab	• Model objects using a variety of techniques • Design and apply materials • Adjust basic lighting • Animate simple objects • Build and animate simple, effective environments
MCA219	Soft Skills II – Colloquium	• Identify the communication differences in working environment with different cultural styles. • Practice the skills and behaviors required to facilitate a group. • Demonstrate an effective presentation in a meeting.
MCA321	System Software	• Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger. • Describe the various concepts of assemblers and macro-processors. • Understand the various phases of compiler and compare its working with assembler.
MCA322	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.
MCA323E1	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.
MCA323E2	Distributed Operating System	• To learn the fundamentals of Distributed Operating Systems. • To learn the mechanisms involved in memory management in Distributed OS

		• .Analyze the various device and resource management techniques for timesharing and distributed systems • Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system • Interpret the mechanisms adopted for file sharing in distributed Applications
MCA323E3	Theory of Computation	• Discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving. • Explain the models of computation, including formal languages, grammars and automata, and their connections. • State and explain the Church-Turing thesis and its significance. • Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars. • Solve computational problems regarding their computability and complexity and prove the basic results of the theory of computation.
MCA323E4	Embedded Systems	• Understand hardware and software design requirements

		of embedded systems. • Analyze the embedded systems' specification and develop software programs. • Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.
MCA324	Advanced Programming Principles	• Design, implement, test and debug programs that use loops and arrays. • Design, implement, test and debug programs that use functions. • Design, implement, test and debug programs that use arrays for character strings and that use pointers for character strings. • Use if-else statements and switch-case statements to write programs in Python to tackle any decision-making scenario. • Master Object-oriented programming to create an entire Python project using objects and classes. • Store and retrieve information using variables
MCA325	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.
MCA326	Lab – V- Advanced C & Python Programming	• Understand basic data structures such as arrays, linked lists, stack using pointers • Describe the Python language syntax including control statements, loops and functions to write programs • Examine the core data structures like lists, dictionaries, tuples and sets in Python to store, process and sort the data
MCA327	Lab – VI- JAVA Programming	• 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.
MCA328	Skill Based Lab III- HTML, CSS.	• Design and develop attractive WebPages. • Implement a variety of presentation effects in html documents using CSS. • Write valid standards-conformant html documents using variety of form elements
MCA329	Soft skills III – Quantitative Aptitude	• Apply quantitative techniques to solve variety of problems. • Perform statistical analysis to interpret information
MCA330	Open Source Lab– I Blender	• Learn to Use Blender to Create Beautiful 3D Models From Zero. • create valid and complete 3D meshes for use in visualization, games design, and 3D printing.
MCA433	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
MCA434E1	Computer Graphics	• To list the basic concepts used in computer graphics. • To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping. • To describe the importance of 2 dimensional and 3 dimensional transformations. • To define the fundamentals of multimedia systems and compression. • To understand different standards of file format and multimedia Input/Output technologies.
MCA434E2	Data Mining & 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.

MCA434E3	Compiler Design	• To analyze 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
MCA434E4	Network Security and Cryptography	• 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
MCA435E1	Software Testing	• List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects. • Distinguish characteristics of structural testing methods. • Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible. • Discuss about the functional and system testing methods. • Demonstrate various issues for object oriented testing.
MCA435E2	OOAD & UML	• Describe the three pillars of object-orientation and explain the benefits of each. • Create use case documents that capture requirements for a software system. • Create class diagrams that model both the domain model and design model of a software system. • Create interaction diagrams that model the dynamic aspects of a software system. • Explain the facets of the Unified Process approach to designing

		and building a software system. • Describe how design patterns facilitate development and list several of the most popular patterns.
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MCA435E4	Client/ Server Computing	• Understand fundamental concepts of Client Server systems, system models of distributed systems, networks that distributed systems run on. • Explore communication protocols between processes in distributed systems, Middleware, Enterprise Application integration, and Web Services Security

		• Gain Exposure on most common used servers. • Understand the concept of client-server development and learn problem solving skills through design scenarios for network environment. • Develop a client –server based application.
MCA436	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. • Apply Location Based Services of Android for ensuring women's safety and security
MCA437	Web Based Programming	• Develop a dynamic webpage by the use of java script and DHTML.

		• Connect with a DBMS and perform insert, update and delete operations on DBMS table. • Write a server side program • Perform various MySQL database queries
MCA438	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.
MCA439	Lab – VIII- PHP & MYSQL Lab	• Create a PHP web page that is unique to each visitor • Validate user input • Create, back up and restore a MySQL database
MCA440	Skill Based Lab IV- Software Testing Tools Lab	• 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

MCA441	Soft skills IV- Technical Aptitude	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive examinations
MCA442	Open Source Lab– II GIMP	• Demonstrate working with images. • Demonstrate working with selections, layers, and painting tools. • Demonstrate methods for photo retouching. • Demonstrate methods for making color corrections. • Demonstrate using masks and the quick mask mode
MCA545	Cloud Computing	• Compare the strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of cloud computing. • Apply suitable virtualization concept. • Choose the appropriate Cloud player, Programming Models and approach. • Address the core issues of cloud computing such as security, privacy and interoperability
MCA546E1	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 reconstruct the images. • To create color images and pseudo images with smoothening and sharpening techniques. • To compare the various lossy and lossless compression mechanisms.
MCA546E2	Big Data Analytics	• Work with big data platform and 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

MCA546E3	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
MCA546E4	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.

MCA547E1	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
MCA547E2	Wireless Sensor Networks	• Formulate the basic standardization of wireless networks. • Analyze the implementation of technologies related to WSN. • Identify and understand the security issues in ad hoc and sensor networks. • Compare the protocols and to promote the research work in this area. • Apply and solve problems in the applications of Wireless Networking Area.
MCA547E3	Software Project	• Deliver successful software projects that support organization's strategic goals

	Management	• 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 • Predict the behavior of people working in teams and to explore the ways of Managing people in Software Environments.
MCA547E4	Service Oriented Architecture	• The creation of SOA compliant web service using various technologies • Predict the various service oriented analysis techniques • Apply the knowledge on advanced concepts of service composition, Orchestration and Choreography. • Understand web service framework with respect to SOA. • Understand various open standards available for developing SOA compliant web services.

MCA548	Internet Programming using J2EE	• Create dynamic web pages, using Servlets and JSP. Make a reusable software component, using Java Bean. • invoke the remote methods in an application using Remote Method Invocation (RMI) • Understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB)
MCA549	. NET Programming	• Know about multi-tier application development. • Create user interactive web pages using ASP.Net. • Create simple data binding applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications. • Develop web services.
MCA550	Lab IX- J2EE Programming	• Design and develop Web applications • Designing Enterprise based applications by encapsulating an application's business logic. • Designing applications using pre-built frameworks.

MCA551	Lab X- . Net Programming	• .Create user interactive web pages using ASP.Net. • Create simple data binding applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications.
MCA552	Skill Based Lab V- Domain Study	• Identify the domain to be analysed • Prepare an in depth study on the recent trends in the chosen domain • Present the various analysis using various tools • Create a model on the analysis done • Create a research paper from the analysis and findings
MCA553	Soft skills V- Interpersonal Skill for Corporate Readiness	• Outline the roles played in workgroups and teams • Describe how good communication influences working relationship.
MCA554	Open Source Lab– III – Netbeans	• Starts with Java development with Maven in NetBeans IDE • Describe the complete Java development workflow, including testing

2016 – 2017

COURSE CODE	COURSE TITLE	COURSE OBJECTIVES
MCA101	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
MCA102	Digital Principles and Computer Organization	• Ability to perform arithmetic operations in various number systems. • Conceptualize the basics of organizational and architectural issues of a digital computer. • Demonstrate and perform computer arithmetic operations on integer and real numbers. • Identify logic for assembly language programming.

		• Analyze the performance of Reduced Instruction Set Architecture.
MCA103	Operating Systems	• Ability to perform arithmetic operations in various number systems. • Conceptualize the basics of organizational and architectural issues of a digital computer. • Demonstrate and perform computer arithmetic operations on integer and real numbers. • Identify logic for assembly language programming. • Analyze the performance of Reduced Instruction Set Architecture.
MCA104	Visual Programming	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.
MCA105	Programming in C	• Identify the basic terminologies used in C programming. • Design programs involving decision structures and loops. • Implement code reusability with the help of user defined functions. • Develop advanced applications using nested structures. • Demonstrate the dynamics of memory by the use of pointers and files.

MCA106	Lab II- Visual Programming & Tally	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.
MCA107	Lab II- C Programming	• Develop programs using branching statements and control statements. • Create applications using arrays, functions, pointers and files. • Gain skills to handle strings and files.
MCA108	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.
MCA109	Soft Skills I - Communicative English	• Display competence in oral and written communication. • Use current technology related to the communication.
MCA211	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
MCA212	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.
MCA213	Software Engineering	• Compare the different domains and process models. • Identify the data, class and flow oriented modeling concepts. • Analyze on the design oriented concepts. • Identify the managerial aspects of software development.

		• Generate project schedule for different activities of software development
MCA214	Relational Database Management Systems	• Design conceptual models of a database using ER model. • Outline the features of DBMS and Relational Database design. • Retrieve information from database by formulating complex SQL Queries. • Utilize PL/SQL programming to solve problems. • Implement Packages, Triggers for efficient retrieval of information.
MCA215	Objected Oriented Programming in C++	• Outline the process and mechanism of functions. • Identify the relation between arrays and pointers, and use them efficiently in program • Use C++ classes for code reusability. • Discuss on the concept of function and operator overloading, virtual functions and polymorphism

		• Demonstrate the power of templates for generic programming.
MCA216	Lab –III RDBMS Lab	• 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.
MCA217	Lab IV- C++ Lab	• Develop programs in object oriented paradigm. • Analyze, use, and create different types of functions and classes. • Design programs to implement various data structure concepts
MCA218	Skill Based Lab II- Multimedia Lab	• Model objects using a variety of techniques • Design and apply materials • Adjust basic lighting • Animate simple objects • Build and animate simple, effective environments
MCA219	Soft Skills II - Colloquium	• Identify the communication differences in working environment

		with different cultural styles. • Practice the skills and behaviors required to facilitate a group. • Demonstrate an effective presentation in a meeting.
MCA321	System Software	• Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger. • Describe the various concepts of assemblers and macro-processors. • Understand the various phases of compiler and compare its working with assembler.
MCA322	Data Communication And 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 Switching and Routing algorithm. • Predict the TCP and UDP related procedures. • Outline the Application layer protocols.

MCA323E1	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.
MCA323E2	Distributed Operating System	• To learn the fundamentals of Distributed Operating Systems. • To learn the mechanisms involved in memory management in Distributed OS • .Analyze the various device and resource management techniques for timesharing and distributed systems • Understand the Mutual exclusion, Deadlock detection and

		agreement protocols of Distributed operating system • Interpret the mechanisms adopted for file sharing in distributed Applications
MCA323E3	Theory of Computation	• Discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving. • Explain the models of computation, including formal languages, grammars and automata, and their connections. • State and explain the Church-Turing thesis and its significance. • Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars. • solve computational problems regarding their computability and complexity and prove the basic results of the theory of computation.
MCA323E4	Embedded Systems	• Understand hardware and software design requirements of embedded systems. • Analyze the embedded systems' specification and develop software programs. • Evaluate the requirements of programming Embedded Systems,

		related software architectures and tool chain for Embedded Systems.
MCA324	Advanced Programming Principles	• Design, implement, test and debug programs that use loops and arrays. • Design, implement, test and debug programs that use functions. • Design, implement, test and debug programs that use arrays for character strings and that use pointers for character strings. • Use if-else statements and switch-case statements to write programs in Python to tackle any decision-making scenario. • Master Object-oriented programming to create an entire Python project using objects and classes. • Store and retrieve information using variables
MCA325	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.
MCA326	Lab – V- Advanced C & Python Programming	• Understand basic data structures such as arrays, linked lists, stack using pointers • Describe the Python language syntax including control statements, loops and functions to write programs • Examine the core data structures like lists, dictionaries, tuples and sets in Python to store, process and sort the data
MCA327	Lab – VI- JAVA Programming	• 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.
MCA328	Skill Based Lab III- HTML, CSS.	• Design and develop attractive WebPages. • Implement a variety of presentation effects in html documents using CSS.

		• Write valid standards-conformant html documents using variety of form elements
MCA329	Soft skills III – Quantitative Aptitude	• Apply quantitative techniques to solve variety of problems. • Perform statistical analysis to interpret information
MCA330	Open Source Lab– I Blender	• Learn to Use Blender to Create Beautiful 3D Models From Zero. • create valid and complete 3D meshes for use in visualization, games design, and 3D printing.
MCA433	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
MCA434E1	Computer Graphics	• To list the basic concepts used in computer graphics.

		• To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping. • To describe the importance of 2 dimensional and 3 dimensional transformations. • To define the fundamentals of multimedia systems and compression. • To understand different standards of file format and multimedia Input/Output technologies.
MCA434E2	Data Mining & 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.
MCA434E3	Compiler Design	• To analyze 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
MCA434E4	Network Security and Cryptography	• 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
MCA435E1	Software Testing	• List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects. • Distinguish characteristics of structural testing methods.

		• Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible. • Discuss about the functional and system testing methods. • Demonstrate various issues for object oriented testing.
MCA435E2	OOAD & UML	• Describe the three pillars of object-orientation and explain the benefits of each. • Create use case documents that capture requirements for a software system. • Create class diagrams that model both the domain model and design model of a software system. • Create interaction diagrams that model the dynamic aspects of a software system. • Explain the facets of the Unified Process approach to designing and building a software system. • Describe how design patterns facilitate development and list several of the most popular patterns.
MCA435E3	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.
MCA435E4	Client/ Server Computing	• Understand fundamental concepts of Client Server systems, system models of distributed systems, networks that distributed systems run on. • Explore communication protocols between processes in distributed systems, Middleware, Enterprise Application integration, and Web Services Security • Gain Exposure on most common used servers. • Understand the concept of client-server development and learn problem solving skills through design scenarios for network environment.

		• Develop a client –server based application.
MCA436	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. • Apply Location Based Services of Android for ensuring women's safety and security
MCA437	Web Based Programming	• Develop a dynamic webpage by the use of java script and DHTML. • Connect with a DBMS and perform insert, update and delete operations on DBMS table. • Write a server side program • Perform various MySQL database queries
MCA438	Lab – VII – Mobile Application	• Install and configure Android application development tools. • Design and develop user Interfaces for the Android platform.

	Development	• Apply Java programming concepts to Android application development. • Familiar with technology and business trends impacting mobile applications.
MCA439	Lab – VIII- PHP &MYSQL Lab	• Create various dynamic PHP web pages • Validate user input • Create, back up and restore a MySQL database
MCA440	Skill Based Lab IV- Software Testing Tools Lab	• 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
MCA441	Soft skills IV- Technical Aptitude	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive examinations
MCA442	Open Source Lab– II GIMP	• Demonstrate working with images. • Demonstrate working with selections, layers, and painting tools. • Demonstrate methods for photo retouching. • Demonstrate methods for making color corrections.

		• Demonstrate using masks and the quick mask mode
MCA545	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 • Predict the behaviour of people working in teams and to explore the ways of Managing people in Software Environments.
MCA546E1	Cloud Computing	• Compare the strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of cloud computing. • Apply suitable virtualization concept. • Choose the appropriate Cloud player, Programming Models and approach.

		• Address the core issues of cloud computing such as security, privacy and interoperability
MCA546E2	Wireless Sensor Networks	• Formulate the basic standardization of wireless networks. • Analyze the implementation of technologies related to WSN. • Identify and understand the security issues in ad hoc and sensor networks. • Compare the protocols and to promote the research work in this area. • Apply and solve problems in the applications of Wireless Networking Area.
MCA546E3	Human Resource Management	• Explain the various functions of human resource management and identify their relationship to the workplace from the perspective of both employee and employer. • Apply the principles of human resource management to the automotive industry in the areas of hiring, compensation and benefits. Government legislation. • Identify social issues relating to human resource management • Identify and predict human resource management trends in the

		automotive industry and develop proactive solutions and techniques of adaptation to changing industry demands. • Understand the polices and government legislation
MCA546E4	Service Oriented Architecture	• The creation of SOA compliant web service using various technologies • Predict the various service oriented analysis techniques • Apply the knowledge on advanced concepts of service composition, Orchestration and Choreography. • Understand web service framework with respect to SOA. • Understand various open standards available for developing SOA compliant web services.
MCA547E1	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
MCA547E2	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.
MCA547E3	Embedded Systems	• Understand hardware and software design requirements of embedded systems. • Analyze the embedded systems' specification and develop software programs. • Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.

MCA547E4	Distributed Systems	• List the principles of distributed systems and describe the problems and challenges associated with these principles. • Understand Distributed Computing techniques, Synchronous and Processes. • Apply Shared Data access and Files concepts. • Design a distributed system that fulfils requirements with regards to key distributed systems properties. • Understand Distributed File Systems and Distributed Shared Memory. • Understand the importance of security in distributed systems
MCA548	Internet Programming using J2EE	• Create dynamic web pages, using Servlets and JSP. Make a reusable software component, using Java Bean. • invoke the remote methods in an application using Remote Method Invocation (RMI) • Understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB)
MCA549	. NET Programming	• Know about multi-tier application development.

		• Create user interactive web pages using ASP.Net. • Create simple data binding applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications. • Develop web services.
MCA550	Lab XI- J2EE Programming	• Design and develop Web applications • Designing Enterprise based applications by encapsulating an application's business logic. • Designing applications using pre-built frameworks.
MCA551	Lab XII- . Net Programming	• Create user interactive web pages using ASP.Net. Create simple data binding applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications.
MCA552	Skill Based Lab V- Domain Study	• Identify the domain to be analyzed • Prepare an in depth study on the recent trends in the chosen domain

		• Present the various analysis using various tools • Create a model on the analysis done • Create a research paper from the analysis and findings
MCA553	Soft skills V- Interpersonal Skill for Corporate Readiness	• Outline the roles played in workgroups and teams • Describe how good communication influences working relationship.

2015 – 2016

COURSE CODE	COURSE TITLE	COURSE OBJECTIVES
MCA101	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
MCA102	Digital Principles and Computer Organization	• Ability to perform arithmetic operations in various number systems. • Conceptualize the basics of organizational and architectural issues of a digital computer. • Demonstrate and perform computer arithmetic operations on integer and real numbers.

		• Identify logic for assembly language programming. • Analyze the performance of Reduced Instruction Set Architecture.
MCA103	Operating Systems	• Ability to perform arithmetic operations in various number systems. • Conceptualize the basics of organizational and architectural issues of a digital computer. • Demonstrate and perform computer arithmetic operations on integer and real numbers. • Identify logic for assembly language programming. • Analyze the performance of Reduced Instruction Set Architecture.
MCA104	Visual Programming	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.
MCA105	Programming in C	• Identify the basic terminologies used in C programming. • Design programs involving decision structures and loops.

		• Implement code reusability with the help of user defined functions. • Develop advanced applications using nested structures. • Demonstrate the dynamics of memory by the use of pointers and files.
MCA106	Lab II- Visual Programming & Tally	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.
MCA107	Lab II- C Programming	• Develop programs using branching statements and control statements. • Create applications using arrays, functions, pointers and files. • Gain skills to handle strings and files.
MCA108	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.
MCA109	Soft Skills I -	• Display competence in oral and written communication.

	Communicative English	• Use current technology related to the communication.
MCA211	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
MCA212	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.

MCA213	Software Engineering	• Compare the different domains and process models. • Identify the data, class and flow oriented modelling concepts. • Analyze on the design oriented concepts. • Identify the managerial aspects of software development. • Generate project schedule for different activities of software development
MCA214	Relational Database Management Systems	• Design conceptual models of a database using ER model. • Outline the features of DBMS and Relational Database design. • Retrieve information from database by formulating complex SQL Queries. • Utilize PL/SQL programming to solve problems. • Implement Packages, Triggers for efficient retrieval of information.
MCA215	Objected Oriented Programming in C++	• Outline the process and mechanism of functions. • Identify the relation between arrays and pointers, and use them efficiently in program • Use C++ classes for code reusability. • Discuss on the concept of function and operator overloading,

		virtual functions and polymorphism • Demonstrate the power of templates for generic programming.
MCA216	Lab –III RDBMS Lab	• 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.
MCA217	Lab IV- C++ Lab	• Develop programs in object oriented paradigm. • Analyze, use, and create different types of functions and classes. • Design programs to implement various data structure concepts
MCA218	Skill Based Lab II- Multimedia Lab	• Model objects using a variety of techniques • Design and apply materials • Adjust basic lighting • Animate simple objects • Build and animate simple, effective environments
MCA219	Soft Skills II - Colloquium	• Identify the communication differences in working environment with different cultural styles.

		• Practice the skills and behaviours required to facilitate a group. • Demonstrate an effective presentation in a meeting.
MCA220	Comprehensive Viva-II	• Identify the communication differences in working environment with different cultural styles. • Practice the skills and behaviours required to facilitate a group. • Demonstrate an effective presentation in a meeting.
MCA323	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
MCA324	Data Communication And 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 Switching and Routing algorithm. • Predict the TCP and UDP related procedures. • Outline the Application layer protocols.
MCA325E1	System Programming	• Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger. • Describe the various concepts of assemblers and macro-processors. • Understand the various phases of compiler and compare its working with assembler.
MCA325E2	Distributed Operating Systems	• To learn the fundamentals of Distributed Operating Systems. • To learn the mechanisms involved in memory management in Distributed OS • .Analyze the various device and resource management techniques for timesharing and distributed systems • Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system • Interpret the mechanisms adopted for file sharing in distributed

		Applications
MCA325E3	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.
MCA325E4	OOAD & UML	• Describe the three pillars of object-orientation and explain the benefits of each. • Create use case documents that capture requirements for a software system. • Create class diagrams that model both the domain model and design model of a software system. • Create interaction diagrams that model the dynamic aspects of a

		software system. • Explain the facets of the Unified Process approach to designing and building a software system. • Describe how design patterns facilitate development and list several of the most popular patterns.
MCA326	Web Technologies	• Develop a dynamic webpage by the use of java script and DHTML. • Connect with a DBMS and perform insert, update and delete operations on DBMS table. • CO3 3: Write a server side program
MCA327	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.

MCA328	Lab – VII- Web Programming	• Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's. • Have a Good grounding of Web Application Terminologies, Internet Tools
MCA329	Lab – VIII- JAVA Programming	• 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.
MCA330	Skill Based Lab III- 3D Animation	• Model objects using a variety of techniques • Design and apply materials • Adjust basic lighting • Animate simple objects • Build and animate simple, effective environments
MCA331	Soft skills III –	• Apply quantitative techniques to solve variety of problems.

	Quantitative Aptitude	• Perform statistical analysis to interpret information
MCA434	Software Testing and Quality Assurance	• Understand software testing and quality assurance as a fundamental component of software life cycle • C0 2: Define the scope of SW T&QA projects • Efficiently perform T&QA activities using modern software tools • Estimate cost of a T&QA project and manage budgets • Prepare test plans and schedules for a T&QA project Develop T&QA project staffing requirements
MCA435E1	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.
MCA435E2	Network Protocols and Management	• Appreciate the need for interoperable network protocols and management

		• Understand general concepts and architecture behind standards based on network management • Understand concepts and terminology associated with SNMP and TMN • Analyse the various network protocols and management techniques in and as a typical distributed application • Understand Advanced Information Processing Techniques such as Distributed Object Technologies, Software Agents and Internet
MCA435E3	Compiler Design	• To analyze 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
MCA435E4	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 reconstruct the images. • To create color images and pseudo images with smoothening and sharpening techniques. • To compare the various lossy and lossless compression mechanisms.
MCA436E1	Client / Server Computing	• Understand fundamental concepts of Client Server systems, system models of distributed systems, networks that distributed systems run on. • Explore communication protocols between processes in distributed systems, Middleware, Enterprise Application integration, and Web Services Security • Gain Exposure on most common used servers.

		• Understand the concept of client-server development and learn problem solving skills through design scenarios for network environment. • Develop a client –server based application.
MCA436E2	Network Security and Crypt Analysis	• 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
MCA436E3	Computer Graphics and Multimedia	• To list the basic concepts used in computer graphics. • To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping. • To describe the importance of 2 dimensional and 3 dimensional transformations.

		• To define the fundamentals of multimedia systems and compression. • To understand different standards of file format and multimedia Input/Output technologies.
MCA436E4	Component Based Technologies	• Utilize framework and components in real time application creation. • Understand different COM objects. • Use Applet and Servlets in their component framework creation. • Differentiate framework Vs Connectors. • Know about Component distribution and acquisition.
MCA437	Mobile communication & Application Development	• C01: Identify, Predict and Evaluate Wireless Communication Protocols • C02: Compare and analyze various multiplexing techniques in mobile environment. • C03: Demonstrate the architectures, challenges and solutions of Wireless communication. • C04: Assess the role of Wireless Networks in shaping the future internet.

		• C05: Design and develop apps for mobiles using Android. • C06: Apply Location Based Services of Android for ensuring women's safety and security
MCA438	Web Engineering	• Develop a web application using server side programming languages and components. • Apply the web engineering methodologies for Web application development. • Develop a component based web solution and use UML diagrams to describe such a solution.
MCA439	Lab – IX – 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.
MCA440	Lab – X- Web Applications Using PHP	• Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.

	& MYSQL	• Have a Good grounding of Web Application Terminologies, Internet Tools
MCA441	Skill Based Lab IV- Software Testing Tools Lab	• 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
MCA442	Soft skills IV- Technical Aptitude	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive examinations
MCA545	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 • Predict the behaviour of people working in teams and to explore the ways of Managing people in Software Environments.
MCA546E1	Cloud Computing	• Compare the strengths and limitations of cloud computing. • Identify the architecture, infrastructure and delivery models of cloud computing. • Apply suitable virtualization concept. • Choose the appropriate Cloud player, Programming Models and approach. • Address the core issues of cloud computing such as security, privacy and interoperability
MCA546E2	Wireless Sensor Networks	• Formulate the basic standardization of wireless networks. • Analyze the implementation of technologies related to WSN. • Identify and understand the security issues in ad hoc and sensor networks. • Compare the protocols and to promote the research work in this area.

		• Apply and solve problems in the applications of Wireless Networking Area.
MCA546E3	Human Resource Management	• Explain the various functions of human resource management and identify their relationship to the workplace from the perspective of both employee and employer. • Apply the principles of human resource management to the automotive industry in the areas of hiring, compensation and benefits. Government legislation. • Identify social issues relating to human resource management • Identify and predict human resource management trends in the automotive industry and develop proactive solutions and techniques of adaptation to changing industry demands. • Understand the polices and government legislation
MCA546E4	Service Oriented Architecture	• The creation of SOA compliant web service using various technologies • Predict the various service oriented analysis techniques • Apply the knowledge on advanced concepts of service composition, Orchestration and Choreography.

		• Understand web service framework with respect to SOA. • Understand various open standards available for developing SOA compliant web services.
MCA547E1	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
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		• Develop a personal standpoint in relation to Database society and the usage of biometric data.
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MCA547E4	Distributed Systems	• List the principles of distributed systems and describe the problems and challenges associated with these principles. • Understand Distributed Computing techniques, Synchronous and Processes. • Apply Shared Data access and Files concepts. • Design a distributed system that fulfils requirements with regards to key distributed systems properties. • Understand Distributed File Systems and Distributed Shared Memory.

		• Understand the importance of security in distributed systems
MCA548	Internet Programming using J2EE	• Create dynamic web pages, using Servlets and JSP. • Make a reusable software component, using Java Bean. • invoke the remote methods in an application using Remote Method Invocation (RMI) • Understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB)
MCA549	. NET Programming	• Know about multi-tier application development. • Create user interactive web pages using ASP.Net. • Create simple data binding applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications. • Develop web services.
MCA550	Lab XI- J2EE Programming	• Design and develop Web applications • Designing Enterprise based applications by encapsulating an application's business logic.

		• Designing applications using pre-built frameworks.
MCA551	Lab XII- . Net Programming	• .Create user interactive web pages using ASP.Net. • Create simple data binding applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications.
MCA552	Skill Based Lab V- Domain Study	• Identify the domain to be analyzed • Prepare an in depth study on the recent trends in the chosen domain • Present the various analysis using various tools • Create a model on the analysis done • Create a research paper from the analysis and findings
MCA553	Soft skills V- Interpersonal Skill for Corporate Readiness	• Outline the roles played in workgroups and teams • Describe how good communication influences working relationship.