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	Nature of the Course (Local/ National/ Regional/ Global)	Course Description	Course Outcomes
19MCA101	Mathematical Foundation of Computer Science	National	This course provides the logical, analytical and mathematical concepts that are fundamental for 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	Global	This course provides the basic structure of digital computers and the organization of various units such as control unit, Arithmetic & Logical unit, Memory unit and I/O unit in a digital computer	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	Global	This course provides	CO 1: Identify the components and

	Systems		knowledge on the concepts of abstraction, scheduling mechanisms, implementations and manages a computer's resources, especially the allocation of those resources among other programmes	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	Global	This course provides the layout of a C program and venture into control statements, loops, functions and basic I/O. Development skills will be continued by learning more complex data types	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

			such as arrays, structures and pointers.	using nested structures. CO 5: Demonstrate the dynamics of memory by the use of pointers and files.
19MCA105	Lab I- Visual Programming	Global	This Course provides programming knowledge using Visual C#. This course content includes program development and design, object-oriented programming, screen design, structured programming techniques and event-driven programming using objects.	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	Global	This course provides exposure to problem-	CO 1: Develop programs using branching statements and control statements.

			solving through programming. It aims to train the students with the basic concepts of the C-programming language and its practical implementation	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	Global	This course provides focus on the fundamental tools and concepts of Linux and Unix OS. It gives practical exposure on topics such as LINUX environment, commands, file system, processes and utilities. Specific emphasis is given to the bash shell and user environment with several flavours of UNIX/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.

			using a version of Red Hat Linux.	
19MCA108	Soft Skills I - Communicative English	National	This course provides skills of oral and written communication to work in different environments, develop emotional sensitivity and an awareness of how to work and negotiate with people.	CO 1: Display competence in oral and written communication. CO 2: Use current technology related to the communication.
19MCA201	Data Structures And Algorithms	Global	This course provides knowledge on several fundamental algorithms and data structures and to implement them in C++ to be an effective designer, developer, or customer for new applications.	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	Global	This course provides the fundamental perception of Software Engineering which includes system requirements, finding the effective methods to analyze, design, code, test and implement the full application with appropriate tools	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	Global	This course provides an	CO 1: Design conceptual models of a

	Database Management Systems		introduction to the design and creation of relational databases with an examination on the characteristics of PL/SQL and its usage to extend and automate SQL to administer the Oracle database.	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++	Global	This course provides knowledge on variable types, operators, control flow, functions, program structure, input and output, arrays, classes, and object-oriented concepts of programming.	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	Global	This course provides practical knowledge in PL/SQL programming, utilizing the services provided by Oracle database in a stored procedure perspective. This also includes implementation of Subprograms, Triggers, and Cursors concepts in depth	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++	Global	This course provides an	CO 1: Develop programs in object

	Programming		introduction to the use of C++ programming language as an aid to solve mathematical and scientific problems.	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	Global	This course provides focus on hypertext mark up language and cascading style sheet implementation. It covers the foundation concepts of semantic coding, usability & accessibility. It includes code syntax, commenting, writing, testing and maintenance of HTML and 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 –	National	This course make the	CO 1: Identify the communication

	Colloquium		students groom their personality and prove themselves as good Samaritans of the Society. This course consists of individual or in-group class presentations pertaining to the applications of concepts, Theories or issues in human development.	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	Global	This course provides a basic knowlwdge of the structure of graphs and the techniques used to analyze problems in 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	Global	This course provides the basic concepts, design principles and underlying technologies of 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	Global	This course provides an exhaustive coverage of	• Apply the basic Java constructs to develop solutions to real time

	In Java		Core Java programming language features like OOPS and GUI programming.	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	Global	This course provides information about two powerful technologies. Together, these two technologies provide a powerful platform for building database-driven Web applications	• 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	Global	This course provides	• Apply the basic Java constructs to

	Programming		experiential learning in the implementation of Core Java Programming.	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	Global	This course provides a dependable and realistic experience to simulate wired and wireless networks.	• To implement wired and wireless networks. • To analyze various protocols in wired and wireless environment
19MCA307	Quantitative Aptitude	National	This course provides gamut of skills which facilitate the students to	• Apply quantitative techniques to solve variety of problems. • Perform statistical analysis to

			enhance their employability quotient and do well in the professional space. It makes them think critically and apply basic mathematics skills to interpret data, draw conclusions and solve problems	interpret information
19MCA401	Compiler Design	Global	The course provides knowledge on the theory and tools that can be employed in order to perform syntax-directed translation of a high-level programming language into an executable code along with data flows. The concepts covered are	• 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

			Parsing, Scanning, Semantic Analysis, and Code Generation combined with the theory of computation conversions.	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	Global	This course provides knowledge on key mobile system and wireless communication. It also aims at developing applications using Android	• 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	Global	This course provides the basics of writing and running Python scripts to more advanced features such as file operations, regular expressions, working with OOPs concept and using the extensive functionality of Python modules. Extra emphasis is placed on features unique to Python, such as tuples, array slices, and output formatting	• 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	Global	This course provides knowledge of developing applications for mobiles using native and hybrid frameworks.	• 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	Global	This course provides the practical knowledge of implementing Pythonprograms with loops, functions and represent compound data using lists, tuples and dictionaries.	• 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	Global	This course provides focus on the needs of automated testing tools. The testing tactics of a project are done by understanding the customer's requirements, test planning, test design scenarios, test cases, test execution, result analysis, defect tracking and reporting	• 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	National	This course provides skills that are imperative for students to establish a stronger connect with the technical environment in which they operate. An understanding of these skills will enable students	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive examinations

			to manage the placement challenges more effectively	
19MCADS01	Big Data Analytics	Global	This course provides familiarization to the important information technologies used in manipulating, storing and analyzing big data.	• 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	Global	This course provides an overview of the cutting	• Identify the need for security and best practices in a big data

			edge and new technologies in the area of big data security.	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	Global	This course provides knowledge on creating applications to analyze big data.	• 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	Global	This course provides basic understanding of previous attacks on cryptosystems with the aim of preventing future attacks and to provide security using various cryptographic tools	• 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	Global	This course provides knowledge on the architectures, functions	• Formulate the basic standardization of wireless networks.

			and performances of wireless sensor systems and platforms. It also describes and analyze the specific requirements for applications in wireless sensor networks regarding energy supply, memory, processing and transmission capacity	• 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	Global	This course covers the basics, architectures, protocols and technologies for high-speed networks. It includes LANs, Protocols, TCP/IP Suite, Data Networks, high speed LANs, link level flow and	• 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

			error control, transport level traffic control, routing, MPLS switching and Network security.	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	Global	This course focuses on the two broad divisions of web development, front-end and back-end development. It gives information on how to load a web application, design and how to interact with web pages using HTML, CSS and JavaScript	• 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	Global	This course provides an overview of client-side web UI frameworks of Bootstrap 4. It focuses on grids and responsive design using CSS pre-processors, Less and Sass and the basics of Node.js. It takes the students to move to the next level by building data-driven web apps using React	• 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	Global	This course provides an immersive experience in the technical, cultural and social aspects of Agile and Devops.	• 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	Global	This course provides solution to problems in different environment that needs decision making using optimization	• Identify the applications of Operations Research and methods to solve business problems. • Apply linear programming to solve operational problem with constraints.

			techniques.	• 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	Global	This course provides an overview of financial concepts, process and operations from a managerial perspective.	• 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	National	This course provides the concept and the role of management information	• Analyze and synthesize business information needs to facilitate evaluation of strategic

			systems to achieve strategic goals and to gain competitive advantages	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	Global	This course provides information on the combination of Internet with E-Commerce, options available for doing business on the Internet,	• 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

			features that helps to build E-Commerce web sites, marketing issues, payment options, security issues and customer service.	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	Global	This course provides the investigation of computer-related crimes with the goal of obtaining evidence to be presented in a court of law	• 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	Global	This course provides the basis for ethical decision-making and the methodology for reaching ethical decisions concerning computing matters	• 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	Entrepreneurs	Global	This course provides	• Highlight the salient characteristics

	hip Development		the skills necessary to succeed as an entrepreneur. It includes the fundamentals of starting and operating a business, developing a business plan, obtaining financing, marketing a product or service and developing an effective accounting system	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	Global	This course provides an overview of various methods employed in quantitative and qualitative research.	• 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	Global	This course provides the basic concepts, principles, methods, implementation techniques and applications of data mining	• 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	Global	This course provides an introduction to the basic concepts, methodologies and algorithms of digital	• To review the fundamental concepts of a digital image processing system. • To examine various types of images, their intensity transformations and

			image processing focusing image enhancement, image analysis and object recognition	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	Global	This course provides the basic principles of artificial intelligence. It will cover problem solving paradigms, constraint propagation and search strategies in the areas of applications including knowledge representation, natural language	• 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.

			processing, expert systems, vision and robotics	• 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	Global	This course provides the principal constituents of soft computing that is fuzzy logic, neural network theory and probabilistic reasoning. The course explores the features that are employed in various associated techniques	• 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	Global	This course provides comprehensive study of cloud concepts and capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Business Process as a Service (BPaaS).	• 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	Global	This course provides knowledge on the advanced topics of DBMS including query optimization, concurrency,	• Design the basic concepts of the advanced database design and dependencies. • Compare the different data models. • Compile the implementation concepts

			complex queries, transaction management, organization of database systems and advanced indexing.	of storage structures. • Analyze on the advanced transaction management techniques. • Discuss on the advanced databases
COURSE CODE	**COURSE TITLE**	**NATURE OF THE COURSE (LOCAL/ NATIONAL/ REGIONAL/ GLOBAL)**	**COURSE DESCRIPTION**	**COURSE OBJECTIVES**
MCA545	Cloud Computing	Global	This course provides comprehensive study of cloud concepts and capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as	• 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.

			a Service (SaaS), and Business Process as a Service (BPaaS).	• Address the core issues of cloud computing such as security, privacy and interoperability
MCA546E1	Digital Image Processing	Global	This course provides an introduction to the basic concepts, methodologies and algorithms of digital image processing focusing image enhancement, image analysis and object recognition	• 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	Global	This course provides familiarization to the	• Work with big data platform and Understand the fundamentals of

			important information technologies used in manipulating, storing and analyzing big data.	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	Global	This course provides the investigation of computer-related crimes with the goal of obtaining evidence to be presented in a court of law	• 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	Global	This course covers the basics, architectures, protocols and technologies for high-speed networks. It includes LANs, Protocols, TCP/IP Suite, Data Networks, high speed LANs, link level flow and error control, transport level traffic control, routing, MPLS switching and Network security.	• 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	Global	This course provides the principal constituents of soft computing that is fuzzy logic, neural network theory and probabilistic reasoning. The course explores the features that are employed in various associated techniques	• 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	Global	This course provides knowledge on the architectures, functions and performances of wireless sensor systems and platforms. It also	• Formulate the basic standardization of wireless networks. • Analyze the implementation of technologies related to WSN. • Identify and understand the security

			describes and analyze the specific requirements for applications in wireless sensor networks regarding energy supply, memory, processing and transmission capacity	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	Global	This course provides knowledge in applying different techniques to monitor & control project and people	• 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 behavior of people working in teams and to explore the ways of Managing people in Software Environments.
MCA547E4	Service Oriented Architecture	Global	The course provides the SOA platform basics - building blocks, SOA platform layers, Service technology architecture and Vendor platforms	• 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	Global	This course is to provide the ability to design console based, GUI based and web based applications.	• 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	Global	This course will cover the practical aspects of multi-tier application development using the .NET framework. The goal of this course is to	• Know about multi-tier application development. • Create user interactive web pages using ASP.Net. • Create simple data binding applications using ADO.Net

			introduce the students to the basics of distributed application development. We will introduce the students to Web Service development and .NET remoting. Technologies covered include the Common Language Runtime (CLR), .NET framework classes, C#, ASP.NET, and ADO.NET.	connectivity. • Performing Database operations for Windows Form and web applications. • Develop web services.
MCA550	Lab Ix- J2ee Programming	Global	This course aims to introduce the students to some concepts of *advanced programming* and practice on reusing components	• 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	Global	This course provides introduction to .Net IDE Component Framework, Programming concepts in .Net Framework and Creating website using ASP.Net Controls.	• .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	Global	The course train the students to critically evaluate a set of research topics on a particular domain based on the interest of the student.	• 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	Global	This course provides the skills needed to find a job and also the skills needed	• Outline the roles played in workgroups and teams • Describe how good communication

	Corporate Readiness		to excel at the time of entering a career.	influences working relationship.
MCA554	Open Source Lab– Iii – Netbeans	Global	This COURSE emphasizes the features of Netbeans environment.	• Starts with Java development with Maven in NetBeans IDE • Describe the complete Java development workflow, including testing

2018 - 2019

COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/ NATIONAL/ REGIONAL/ GLOBAL)	COURSE DESCRIPTION	COURSE OBJECTIVES
MCA101	Mathematical Foundation of Computer	National	This course provides the logical, analytical and mathematical concepts	• Perform Logical operations and predicate calculus needed for computing skill.

	Science		that are fundamental for Computer Science.	• 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	Global	This course provides the basic structure of digital computers and the organization of various units such as control unit, Arithmetic & Logical unit, Memory unit and I/O unit in a digital computer	• 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	Global	This course provides knowledge on the concepts of abstraction, scheduling mechanisms, implementations and manages a computer's resources, especially the allocation of those resources among other programmes	• 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	Global	This course provides knowledge on several fundamental algorithms and data structures and	• Select appropriate data structures as applied to specified problem definition. • Implement operations like searching,

			to implement them in C++ to be an effective designer, developer, or customer for new applications.	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	Global	This course provides the layout of a C program and venture into control statements, loops, functions and basic I/O. Development skills will be continued by learning more complex data types such as arrays, structures and pointers.	• 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	Global	This Course provides programming knowledge using Visual C#. This course content includes program development and design, object-oriented programming, screen design, structured programming techniques and event-driven programming using objects.	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.
MCA107	Lab II- C Programming	Global	This course provides exposure to problem-solving through programming. It aims to train the students with	• Develop programs using branching statements and control statements. • Create applications using arrays, functions, pointers and files. • Gain skills to handle strings and files.

			the basic concepts of the C-programming language and its practical implementation.	
MCA108	Skill Based lab I –Linux	Global	This course provides focus on the fundamental tools and concepts of Linux and Unix OS. It gives practical exposure on topics such as LINUX environment, commands, file system, processes and utilities. Specific emphasis is given to the bash shell and user environment with several flavours of UNIX/Linux using a version of Red Hat 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	National	This course provides skills of oral and written communication to work in different environments, develop emotional sensitivity and an awareness of how to work and negotiate with people.	• Display competence in oral and written communication. • Use current technology related to the communication.
MCA110	Open Source Lab I– Libre Office	Global	This course provides knowledge of rich applications for all your document production and data processing needs: Writer, Calc, Impress, Draw, Math and Base.	• 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	Global	This course provides an	• Preparation and analysis of balance

	Management and Accounting		overview of financial concepts, process and operations from a managerial perspective.	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	Global	This course provides the fundamental perception of Software Engineering which includes system requirements, finding the effective methods to analyze, design, code, test and implement the full application with appropriate tools	• 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	National	This course provides the	• Analyze and synthesize business

	Information Systems		concept and the role of management information systems to achieve strategic goals and to gain competitive advantages.	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	Global	This course provides an introduction to the design and creation of relational	• Design conceptual models of a database using ER model. • Outline the features of DBMS and

	Systems		databases with an examination on the characteristics of PL/SQL and its usage to extend and automate SQL to administer the Oracle database.	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++	Global	This course provides knowledge on variable types, operators, control flow, functions, program structure, input and output, arrays, classes, and object-oriented concepts of programming.	• 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	Global	This course provides practical knowledge in PL/SQL programming, utilizing the services provided by Oracle database in a stored procedure perspective. This also includes implementation of Subprograms, Triggers, and Cursors concepts in depth	• 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	Global	This course provides an introduction to the use of C++ programming language as an aid to solve mathematical and scientific problems.	• 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	National	The main aim of this course to introduce the students to the Basic of Accounts and the usage of Tally for accounting purpose. It covers how to maintain accounts with and without inventory.	• 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	Global	This course make the students groom their personality and prove themselves as good Samaritans of the Society. This course consists of individual or in-group	• 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

			class presentations pertaining to the applications of concepts, Theories or issues in human development.	in a meeting.
MCA221	Open Source Lab II – Blender	Global	This course provides knowledge to use Blender in 3D graphic design	• 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	Global	This course is to introduce the student to the collection of programs and documents which constitute the system software of a computer platform.	• 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	Global	This course provides the basic concepts, design principles and underlying technologies of 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	Global	This course provides information on the combination of Internet with E-Commerce, options available for doing business on the Internet,	• 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

			features that helps to build E-Commerce web sites, marketing issues, payment options, security issues and customer service.	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	Global	The course provides the fundamentals of Distributed Operating system and facilitate the students to gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion	• 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,

			algorithms, deadlock detection algorithms and agreement protocols	Deadlock detection and agreement protocols of Distributed operating system • Interpret the mechanisms adopted for file sharing in distributed Applications
MCA323E3	Theory of Computation	Global	The learning objectives of this course are to: introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.	• 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	Global	This course provides the fundamentals of embedded system hardware and firmware design will be explored	• 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	Global	This course builds upon the basic concept of C pointers and Python programming:.	• 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	Global	This course provides an exhaustive coverage of Core Java programming language features like OOPS and GUI 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.
MCA326	Lab – V- Advanced C & Python Programming	Global	This course aims to train the student to use the pointer concepts of the C language and provides the basics of writing and running Python scripts to more advanced features such as file operations, regular expressions, working with OOPs concept and using the extensive functionality of Python modules.	• 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	Global	This course provides experiential	• Apply the basic Java constructs to develop solutions to real time

			learning in the implementation of Core Java Programming.	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.	Global	This course provides focus on hypertext markup language and cascading stylesheet implementation. It covers the foundation concepts of semantic coding, usability & accessibility. It includes code syntax, commenting, writing, testing and maintenance of HTML and	• 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

			CSS	
MCA329	Soft skills III – Quantitative Aptitude	National	This course provides gamut of skills which facilitate the students to enhance their employability quotient and do well in the professional space. It makes them think critically and apply basic mathematics skills to interpret data, draw conclusions and solve problems	• Apply quantitative techniques to solve variety of problems. • Perform statistical analysis to interpret information
MCA330	Open Source Lab– I Blender	Global	This course provides knowledge to use Blender in 3D graphic design	• 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	Global	This course provides a basic knowlwdge of the structure of graphs and the techniques used to analyze problems in 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	Global	To learn the basic principles for design, use and understand the hardware and software components of graphics systems, techniques for designing 2D, 3D pictures and to provide a complete	• 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

			and balanced view on the multimedia field covering almost all major domains.	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	Global	This course provides the basic concepts, principles, methods, implementation techniques and applications of data mining	• 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	Global	The course provides knowledge on the theory and tools that can be employed in order to perform syntax-directed translation of a high-level programming language into an executable code along with data flows. The concepts covered are Parsing, Scanning, Semantic Analysis, and Code Generation combined with the theory of computation conversions.	• 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	Global	This course provides basic	• Evaluate the fundamentals of

	Security and Cryptography		understanding of previous attacks on cryptosystems with the aim of preventing future attacks and to provide security using various cryptographic tools	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	Global	This course will examine fundamental software testing and related program analysis techniques and emerging concepts such as test-case prioritization and	• 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

			their impact on testing will be examined	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	Global	This course provides the basic principles of object orientation and OO analysis and design Using the Unified Process and the Unified Modelling Language (UML) as tools.	• 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	Global	This course provides the basis for ethical decision-making and the methodology for reaching ethical decisions concerning computing matters	• 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	Global	To know the role of client and server in the Network, and the information exchanging. This course is to design and develop Components of Client/ Server Applications and connectivity.	• 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	Global	This course provides knowledge on key mobile system and wireless communication. It also aims at developing applications using Android	• 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	Global	This course provides a basic overview and understanding of many	• Develop a dynamic webpage by the use of java script and DHTML. • Connect with a DBMS and perform

			key Web technologies	insert, update and delete operations on DBMS table. • Write a server side program • Perform various MySQL database queries
MCA438	Lab – VII – Mobile Application Development	Global	This course provides knowledge of developing applications for mobiles using native and hybrid frameworks.	• 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	Global	This course is to understand the usage of PHP and MYSQL in	• Create a PHP web page that is unique to each visitor • Validate user input • Create, back up and restore a MySQL

			dynamic web development language.	database • Perform various MySQL database queries
MCA440	Skill Based Lab IV- Software Testing Tools Lab	Global	This course provides focus on the needs of automated testing tools. The testing tactics of a project are done by understanding the customer's requirements, test planning, test design scenarios, test cases, test execution, result analysis, defect tracking and reporting	• 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	National	This course provides skills that are imperative for students to establish a stronger connect with the	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive

			technical environment in which they operate. An understanding of these skills will enable students to manage the placement challenges more effectively	examinations
MCA442	Open Source Lab– II GIMP	Global	This course focuses how to Use GIMP for simple graphics needs without having to learn advanced image manipulation methods.	• 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	Global	This course provides comprehensive study of cloud concepts and	• Compare the strengths and limitations of cloud computing. • Identify the architecture,

			capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Business Process as a Service (BPaaS).	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	Global	This course provides an introduction to the basic concepts, methodologies and algorithms of digital image processing focusing image enhancement, image analysis and object recognition	• 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	Global	This course provides familiarization to the important information technologies used in manipulating, storing and analyzing big data.	• 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	Global	This course provides the investigation of computer-related crimes with the	• Predict the forensics fundamentals and the various technologies used to avoid computer crimes.

			goal of obtaining evidence to be presented in a court of law	• 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	Global	This course covers the basics, architectures, protocols and technologies for high-speed networks. It includes LANs, Protocols, TCP/IP Suite, Data Networks, high speed LANs, link level flow and error control, transport level traffic	• 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, routing, MPLS switching and Network security.	Control. • Compare the different architectures used for HSN. • Describe the protocols that are used to design high speed networks.
MCA547E1	Soft Computing	Global	This course provides the principal constituents of soft computing that is fuzzy logic, neural network theory and probabilistic reasoning. The course explores the features that are employed in various associated techniques	• 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	Global	This course provides knowledge on the architectures, functions and performances of wireless sensor systems and platforms. It also describes and analyze the specific requirements for applications in wireless sensor networks regarding energy supply, memory, processing and transmission capacity	• 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	Global	This course provides knowledge in applying different techniques to monitor & control project and people	• 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	Global	The course provides the SOA platform basics - building blocks, SOA platform layers, Service technology architecture and Vendor platforms	• 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	Global	This course is to provide the ability to design console based, GUI based and web based applications.	• 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	Global	This course will cover the practical aspects of multi-tier application development using the .NET framework. The goal	• Know about multi-tier application development. • Create user interactive web pages using ASP.Net. • Create simple data binding

			of this course is to introduce the students to the basics of distributed application development. We will introduce the students to Web Service development and .NET remoting. Technologies covered include the Common Language Runtime (CLR), .NET framework classes, C#, ASP.NET, and ADO.NET.	applications using ADO.Net connectivity. • Performing Database operations for Windows Form and web applications. • Develop web services.
MCA550	Lab IX- J2EE Programming	Global	This course aims to introduce the students to some concepts of *advanced programming* and practice on reusing components	• 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	Global	This course provides introduction to .Net IDE Component Framework, Programming concepts in .Net Framework and Creating website using ASP.Net Controls.	• 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	Global	The course train the students to critically evaluate a set of research topics on a particular domain based on the interest of the student.	• 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	Global	This course provides the skills needed to find a job and also the skills needed	• Outline the roles played in workgroups and teams • Describe how good communication

	Corporate Readiness		to excel at the time of entering a career.	influences working relationship.
MCA554	Open Source Lab– III – Netbeans	Global	This COURSE emphasizes the features of Netbeans environment.	• Starts with Java development with Maven in NetBeans IDE • Describe the complete Java development workflow, including testing

2017 – 2018

Course Code	Course Title	Nature of the Course (Local/ National/ Regional /Global)	Course Description	Course Objectives
MCA101	Mathematical Foundation of Computer Science	National	This course provides the logical, analytical and mathematical concepts that are fundamental for 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	Global	This course provides the basic structure of digital computers and the organization of various units such as control unit, Arithmetic & Logical unit, Memory unit and I/O unit in a digital computer	• 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	Global	This course provides the basic structure of digital computers and the organization of various units	• Ability to perform arithmetic operations in various number systems.

			such as control unit, Arithmetic & Logical unit, Memory unit and I/O unit in a digital computer	• 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	National	This Course provides programming knowledge using Visual C#. This course content includes program development and design, object-oriented programming, screen design, structured programming techniques and event-driven programming using objects.	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.

MCA105	Programming in C	Global	This course provides the layout of a C program and venture into control statements, loops, functions and basic I/O. Development skills will be continued by learning more complex data types such as arrays, structures and pointers.	• 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	Global	This Course provides programming knowledge using Visual C#. This course content includes program development and design, object-oriented programming, screen design, structured programming techniques and event-driven	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.

			programming using objects.	
MCA107	Lab II- C Programming	Global	This course provides exposure to problem-solving through programming. It aims to train the students with the basic concepts of the C-programming language and its practical implementation	• 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	Global	This course provides focus on the fundamental tools and concepts of Linux and Unix OS. It gives practical exposure on topics such as LINUX environment, commands, file system, processes and utilities. Specific emphasis is given to the bash shell and user environment with several flavours of UNIX/Linux using a version of Red Hat 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	National	This course provides skills of oral and written communication to work in different environments, develop emotional sensitivity and an awareness of how to work and negotiate with people.	• Display competence in oral and written communication. • Use current technology related to the communication
MCA211	Resource Management Techniques	Global	This course provides solution to problems in different environment that needs decision making using optimization 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	Global	This course provides knowledge on several fundamental algorithms and data structures and to implement them in C++ to be an effective designer, developer, or customer for new applications.	• 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	Global	This course provides the fundamental perception of Software Engineering which includes system requirements,	• Compare the different domains and process models. • Identify the data, class and flow oriented modeling concepts.

			finding the effective methods to analyze, design, code, test and implement the full application with appropriate tools	• 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	Global	This course provides an introduction to the design and creation of relational databases with an examination on the characteristics of PL/SQL and its usage to extend and automate SQL to administer the Oracle database.	• 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++	Global	This course provides knowledge on variable types, operators, control flow, functions, program structure, input and output, arrays, classes, and object-oriented concepts of programming.	• 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	Global	This course provides practical knowledge in PL/SQL programming, utilizing the services provided by Oracle database in a stored procedure perspective. This also includes implementation of Subprograms, Triggers, and	• Enhance Programming skills and techniques. • Formulate complex queries using SQL • Use the PL/SQL code constructs of IF-THEN-ELSE and LOOP types as

			Cursors concepts in depth	well as syntax and command functions.
MCA217	Lab IV- C++ Lab	Global	This course provides an introduction to the use of C++ programming language as an aid to solve mathematical and scientific problems.	• 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	Global	This course is to teach students the essentials of working in 3D using an array of features and tools. This course teaches new users the basics of creating, embellishing, and animating 3D scenes.	• 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	National	This course make the students groom their personality and prove	• Identify the communication differences in working environment

			themselves as good Samaritans of the Society. This course consists of individual or in-group class presentations pertaining to the applications of concepts, Theories or issues in human development.	with different cultural styles. • Practice the skills and behaviors required to facilitate a group. • Demonstrate an effective presentation in a meeting.
MCA321	System Software	Global	This course is to introduce the student to the collection of programs and documents which constitute the system software of a computer platform.	• 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	Global	This course provides the basic concepts, design principles and underlying technologies of	• Identify the functionalities of Networking layers of both OSI and TCP/IP reference models.

	Networking		networking.	• 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	Global	This course provides information on the combination of Internet with E-Commerce, options available for doing business on the Internet, features that helps to build E-Commerce web sites, marketing issues, payment options, security issues and customer service.	• 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	Global	The course provides the fundamentals of Distributed Operating system and facilitate the students to gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols	• 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	Global	The learning objectives of this course are to: introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.	• 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	Global	This course provides the fundamentals of embedded system hardware and firmware design will be explored	• 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	Global	This course builds upon the basic concept of C pointers and Python programming:.	• 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	Global	This course provides an exhaustive coverage of Core Java programming language features	• Apply the basic Java constructs to develop solutions to real time problems.

			like OOPS and GUI programming.	• 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	Global	This course aims to train the student to use the pointer concepts of the C language and provides the basics of writing and running Python scripts to more advanced features such as file operations, regular expressions, working with OOPs concept and using the extensive functionality of Python modules.	• 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	Global	This course provides experiential learning in the implementation of Core 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.	Global	This course provides focus on hypertext mark-up language and cascading style sheet implementation. It covers the foundation concepts of semantic coding, usability & accessibility. It	• Design and develop attractive WebPages. • Implement a variety of presentation effects in html documents using CSS. • Write valid standards-conformant

			includes code syntax, commenting, writing, testing and maintenance of HTML and CSS	html documents using variety of form elements
MCA329	Soft skills III – Quantitative Aptitude	National	This course provides gamut of skills which facilitate the students to enhance their employability quotient and do well in the professional space. It makes them think critically and apply basic mathematics skills to interpret data, draw conclusions and solve problems	• Apply quantitative techniques to solve variety of problems. • Perform statistical analysis to interpret information
MCA330	Open Source Lab– I Blender	Global	This course provides knowledge to use Blender in 3D graphic design	• 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	Global	This course provides a basic knowlwdge of the structure of graphs and the techniques used to analyze problems in 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	Global	To learn the basic principles for design, use and understand the hardware and software components of graphics systems, techniques for designing 2D, 3D pictures and to provide a complete and balanced view on the	• To list the basic concepts used in computer graphics. • To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.

			multimedia field covering almost all major domains.	• 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	Global	This course provides the basic concepts, principles, methods, implementation techniques and applications of data mining	• 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	Global	The course provides knowledge on the theory and tools that can be employed in order to perform syntax-directed translation of a high-level programming language into an executable code along with data flows. The concepts covered are Parsing, Scanning, Semantic Analysis, and Code Generation combined with the theory of computation conversions.	• 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	Global	This course provides basic understanding of previous attacks on cryptosystems with the aim of preventing future attacks and to provide security using various cryptographic tools	• 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	Global	This course will examine fundamental software testing and related program analysis techniques and emerging concepts such as test-case prioritization and	• List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing

			their impact on testing will be examined	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	Global	This course provides the basic principles of object orientation and OO analysis and design Using the Unified Process and the Unified Modelling Language (UML) as tools.	• 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	Global	This course provides the basis for ethical decision-making and the methodology for reaching ethical decisions concerning computing matters	• 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	Global	To know the role of client and server in the Network, and the information exchanging. This course is to design and develop Components of Client/ Server Applications and connectivity.	• 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	Global	This course provides knowledge on key mobile system and wireless communication. It also aims at developing applications using Android	• 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	Global	This course provides a basic overview and understanding of many key 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. • Write a server side program • Perform various MySQL database queries
MCA438	Lab – VII – Mobile Application Development	Global	This course provides knowledge of developing applications for mobiles using native and hybrid frameworks.	• 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	Global	This course is to understand the usage of PFP and MYSQL in dynamic web development.	• 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	Global	This course provides focus on the needs of automated testing tools. The testing tactics of a project are done by understanding the customer's requirements, test planning, test d esign scenarios, test cases, test execution, result analysis, defect tracking and	• 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

			reporting	
MCA441	Soft skills IV- Technical Aptitude	National	This course provides skills that are imperative for students to establish a stronger connect with the technical environment in which they operate. An understanding of these skills will enable students to manage the placement challenges more effectively	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive examinations
MCA442	Open Source Lab– II GIMP	Global	This course focuses how to Use GIMP for simple graphics needs without having to learn advanced image manipulation methods.	• 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	Global	This course provides comprehensive study of cloud concepts and capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Business Process as a Service (BPaaS).	• 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	Global	This course provides an introduction to the basic concepts, methodologies and algorithms of digital image processing focusing	• To review the fundamental concepts of a digital image processing system. • To examine various types of

			image enhancement, image analysis and object recognition	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	Global	This course provides familiarization to the important information technologies used in manipulating, storing and analyzing big data.	• 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	Global	This course provides the investigation of computer-related crimes with the goal of obtaining evidence to be presented in a court of law	• 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	Global	This course covers the basics, architectures, protocols and technologies for high-speed networks. It includes LANs, Protocols, TCP/IP Suite, Data Networks, high speed LANs, link level flow and error control, transport level traffic control, routing, MPLS switching and Network security.	• 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	Global	This course provides the principal constituents of soft computing that is fuzzy logic, neural network theory and probabilistic reasoning. The course explores the features that are employed in various associated techniques	• 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	Global	This course provides knowledge on the architectures, functions and performances of wireless sensor systems and platforms. It also describes and analyze the specific requirements for applications in	• Formulate the basic standardization of wireless networks. • Analyze the implementation of technologies related to WSN. • Identify and understand the

			wireless sensor networks regarding energy supply, memory, processing and transmission capacity	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	Global	This course provides knowledge in applying different techniques to monitor & control project and people	• 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 behavior of people working in teams and to explore the ways of Managing people in Software Environments.
MCA547E4	Service Oriented Architecture	Global	The course provides the SOA platform basics -building blocks, SOA platform layers, Service technology architecture and Vendor platforms	• 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	Global	This course is to provide the ability to design console based, GUI based and web based applications.	• 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		This course will cover the practical aspects of multi-tier application development using the .NET framework. The goal of this course is to introduce the students to the basics of distributed application development. We will introduce the students to Web Service	• Know about multi-tier application development. • Create user interactive web pages using ASP.Net. • Create simple data binding applications using ADO.Net connectivity.

			development and .NET remoting. Technologies covered include the Common Language Runtime (CLR), .NET framework classes, C#, ASP.NET, and ADO.NET.	• Performing Database operations for Windows Form and web applications. • Develop web services.
MCA550	Lab IX- J2EE Programming	Global	This course aims to introduce the students to some concepts of *advanced programming* and practice on reusing components	• 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	Global	This course provides introduction to .Net IDE Component Framework, Programming concepts in .Net Framework and Creating website using ASP.Net Controls.	• .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	Global	The course train the students to critically evaluate a set of research topics on a particular domain based on the interest of the student.	• 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	Global	This course provides the skills needed to find a job and also the skills needed to excel at the time of entering a career.	• Outline the roles played in workgroups and teams • Describe how good communication influences working relationship.
MCA554	Open Source Lab– III –	Global	This COURSE emphasizes the	• Starts with Java development with Maven in NetBeans IDE

	Netbeans		features of Netbeans environment. .	• Describe the complete Java development workflow, including testing

2016 – 2017

Course Code	Course Title	Nature of the Course (Local/ National/ Regional/ Global)	Course Description	Course Objectives
MCA101	Mathematical Foundation of Computer Science	National	This course provides the logical, analytical and mathematical concepts that are fundamental for 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	Global	This course provides the basic structure of digital computers and the organization of various units such as control unit, Arithmetic & Logical unit, Memory unit and I/O unit in a digital computer	• 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	Global	This course provides the basic structure of digital computers and the organization of various units such as control unit, Arithmetic & Logical unit, Memory unit and I/O unit in a digital computer	• 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	National	This Course provides programming knowledge using Visual C#. This course content includes program development and design, object-oriented programming, screen design, structured programming	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.

			techniques and event-driven programming using objects.	
MCA105	Programming in C	Global	This course provides the layout of a C program and venture into control statements, loops, functions and basic I/O. Development skills will be continued by learning more complex data types such as arrays, structures and pointers.	• 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	Global	This Course provides programming knowledge using Visual C#. This course content includes program development and design, object-oriented programming, screen design,	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.

			structured programming techniques and event-driven programming using objects.	
MCA107	Lab II- C Programming	Global	This course provides exposure to problem-solving through programming. It aims to train the students with the basic concepts of the C-programming language and its practical implementation	• 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	Global	This course provides focus on the fundamental tools and concepts of Linux and Unix OS. It gives practical exposure on topics such as LINUX environment, commands, file system, processes and utilities. Specific emphasis is given to the bash shell and user environment	• 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.

			with several flavours of UNIX/Linux using a version of Red Hat Linux.	
MCA109	Soft Skills I - Communicative English	National	This course provides skills of oral and written communication to work in different environments, develop emotional sensitivity and an awareness of how to work and negotiate with people.	• Display competence in oral and written communication. • Use current technology related to the communication.
MCA211	Resource Management Techniques		This course provides solution to problems in different environment that needs decision making using optimization 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	Global	This course provides knowledge on several fundamental algorithms and data structures and to implement them in C++ to be an effective designer, developer, or customer for new applications.	• 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	Global	This course provides the fundamental perception of Software Engineering which includes system requirements, finding the effective methods to analyze, design, code, test and implement the full application with appropriate tools	• 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	Global	This course provides an introduction to the design and creation of relational databases with an examination on the characteristics of PL/SQL and its usage to extend and automate SQL to administer the Oracle database.	• 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++	Global	This course provides knowledge on variable types, operators, control flow, functions, program structure, input and output, arrays, classes, and object-oriented concepts of programming.	• 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	Global	This course provides practical knowledge in PL/SQL	• Enhance Programming skills and

	RDBMS Lab		programming, utilizing the services provided by Oracle database in a stored procedure perspective. This also includes implementation of Subprograms, Triggers, and Cursors concepts in depth	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	Global	This course provides an introduction to the use of C++ programming language as an aid to solve mathematical and scientific problems.	• 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	Global	This course is to teach students the essentials of working in 3D using an array of features and tools. This course teaches new users the basics of creating,	• Model objects using a variety of techniques • Design and apply materials • Adjust basic lighting

			embellishing, and animating 3D scenes.	• Animate simple objects • Build and animate simple, effective environments
MCA219	Soft Skills II - Colloquium	National	This course make the students groom their personality and prove themselves as good Samaritans of the Society. This course consists of individual or in-group class presentations pertaining to the applications of concepts, Theories or issues in human development.	• 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	Global	This course is to introduce the student to the collection of programs and documents which constitute the system software of a computer platform.	• 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	Global	This course provides the basic concepts, design principles and underlying technologies of 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	Global	This course provides information on the combination of Internet with E-Commerce, options available for doing business on	• Gain a comprehensive understanding of the E-Commerce landscape, current and emerging technology and infrastructure underpinnings of the

			the Internet, features that helps to build E-Commerce web sites, marketing issues, payment options, security issues and customer service.	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	Global	The course provides the fundamentals of Distributed Operating system and facilitate the students to gain knowledge on distributed operating system concepts that includes	• To learn the fundamentals of Distributed Operating Systems. • To learn the mechanisms involved in memory management in Distributed OS

			architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols	• .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	Global	The learning objectives of this course are to: introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and	• 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.

			computability.	• 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	Global	This course provides the fundamentals of embedded system hardware and firmware design will be explored	• 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	Global	This course builds upon the basic concepts of C pointers and Python programming:.	• 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	Global	This course provides an	• Apply the basic Java constructs to

	in JAVA		exhaustive coverage of Core Java programming language features like OOPS and GUI programming.	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	Global	This course aims to train the student to use the pointer concepts of the C language and provides the basics of writing and running Python scripts to more advanced features such as file operations, regular expressions, working with OOPs concept and using the extensive functionality of Python modules.	• 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	Global	This course provides experiential learning in the implementation of Core 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.	Global	This course provides focus on hypertext markup language and cascading stylesheet implementation. It covers the foundation concepts of semantic coding, usability & accessibility. It includes code syntax,	• 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

			commenting, writing, testing and maintenance of HTML and CSS	
MCA329	Soft skills III – Quantitative Aptitude	National	This course provides gamut of skills which facilitate the students to enhance their employability quotient and do well in the professional space. It makes them think critically and apply basic mathematics skills to interpret data, draw conclusions and solve problems	• Apply quantitative techniques to solve variety of problems. • Perform statistical analysis to interpret information
MCA330	Open Source Lab– I Blender	Global	This course provides knowledge to use Blender in 3D graphic design	• 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	Global	This course provides a basic knowlwdge of the structure of	• Write precise & accurate mathematical

			graphs and the techniques used to analyze problems in graph theory.	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	Global	To learn the basic principles for design, use and understand the hardware and software components of graphics systems, techniques for designing 2D, 3D pictures and to provide a complete and balanced view on the multimedia field covering	• 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

			almost all major domains.	multimedia systems and compression. • To understand different standards of file format and multimedia Input/Output technologies.
MCA434E2	Data Mining & Data Warehousing	Global	This course provides the basic concepts, principles, methods, implementation techniques and applications of data mining	• 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	Global	The course provides knowledge on the theory and tools that can	• To analyze the basic concepts and applications of Compiler Design

			be employed in order to perform syntax-directed translation of a high-level programming language into an executable code along with data flows. The concepts covered are Parsing, Scanning, Semantic Analysis, and Code Generation combined with the theory of computation conversions.	• 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	Global	This course provides basic understanding of previous attacks on cryptosystems with the aim of preventing future attacks and to provide security using various cryptographic tools	• 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	Global	This course will examine fundamental software testing and related program analysis techniques and emerging concepts such as test-case prioritization and their impact on testing will be examined	• 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	Global	This course provides the basic principles of object orientation and OO analysis and design Using the Unified Process and the Unified Modeling Language (UML) as tools.	• 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	Global	This course provides the basis for ethical decision-making and the methodology for reaching ethical decisions concerning computing matters	• 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	Global	To know the role of client and server in the Network, and the information exchanging. This course is to design and develop	• Understand fundamental concepts of Client Server systems, system models of distributed systems, networks that distributed systems run on.

			Components of Client/ Server Applications and connectivity.	• 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	Global	This course provides knowledge on key mobile system and wireless communication. It also aims at developing applications using Android	• 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	Global	This course provides a basic overview and understanding of many key 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. • Write a server side program • Perform various MySQL database queries

MCA438	Lab – VII – Mobile Application Development	Global	This course provides knowledge of developing applications for mobiles using native and hybrid frameworks.	• 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	Global	This course is to understand the usage of PHP and MySQL in dynamic web development.	• 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	Global	This course provides focus on the needs of automated testing tools. The testing tactics of a project are done by understanding the customer's	• Finding defects in the programs while developing the software. • Able to write test cases and test scenarios. • Develop the scripts for finding the

			requirements, test planning, test design scenarios, test cases, test execution, result analysis, defect tracking and reporting	defects and preventing them. • Understand the automated testing tools available
MCA441	Soft skills IV- Technical Aptitude	National	This course provides skills that are imperative for students to establish a stronger connect with the technical environment in which they operate. An understanding of these skills will enable students to manage the placement challenges more effectively	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive examinations
MCA442	Open Source Lab– II GIMP		This course focuses how to Use GIMP for simple graphics needs without having to learn advanced image	• Demonstrate working with images. • Demonstrate working with selections, layers, and painting tools. • Demonstrate methods for photo

			manipulation methods.	retouching. • Demonstrate methods for making color corrections. • Demonstrate using masks and the quick mask mode
MCA545	Software project management	Global	This course provides knowledge in applying different techniques to monitor & control project and people	• 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 behavior of people working

				in teams and to explore the ways of Managing people in Software Environments.
MCA546E1	Cloud Computing	Global	This course provides comprehensive study of cloud concepts and capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Business Process as a Service (BPaaS).	• 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	Global	This course provides knowledge on the architectures, functions and performances of wireless sensor systems and platforms. It	• Formulate the basic standardization of wireless networks. • Analyze the implementation of technologies related to WSN.

			also describes and analyze the specific requirements for applications in wireless sensor networks regarding energy supply, memory, processing and transmission capacity	• 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	Global	This course provides an introduction to the various functions of human resource management, including compensation and benefits, staffing, recruitment and selection, training and development, health and safety.	• 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	Global	The course provides the SOA platform basics -building blocks, SOA platform layers, Service technology architecture and Vendor platforms	• 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	Global	This course provides the principal constituents of soft computing that is fuzzy logic, neural network theory and probabilistic reasoning. The course explores the features that are employed in various associated techniques	• 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	Global	This course provides the basis for ethical decision-making and the methodology for reaching ethical decisions concerning	• Predict the relationship between the law, ethics and computer technology. • Outline the philosophical and ethical debates with the ideas and the nature

			computing matters	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	Global	This course provides the fundamentals of embedded system hardware and firmware design will be explored	• 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	Global	The course provides knowledge on the fundamental concepts of distributed computer systems. Covers development techniques and runtime challenges, with a focus on reliability and system validation techniques.	• 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 fulfills 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		This course is to provide the	• Create dynamic web pages, using

	Programming using J2EE		ability to design console based, GUI based and web based applications.	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	Global	This course will cover the practical aspects of multi-tier application development using the .NET framework. The goal of this course is to introduce the students to the basics of distributed application development. We will introduce the students to Web Service development and .NET remoting. Technologies covered include the	• 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.

			Common Language Runtime (CLR), .NET framework classes, C#, ASP.NET, and ADO.NET.	• Develop web services.
MCA550	Lab XI- J2EE Programming	Global	This course aims to introduce the students to some concepts of *advanced programming* and practice on reusing components	• 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	Global	This course provides introduction to .Net IDE Component Framework, Programming concepts in .Net Framework and Creating website using ASP.Net Controls.	• 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	Global	The course train the students to critically evaluate a set of research topics on a particular	• Identify the domain to be analyzed • Prepare an in depth study on the recent trends in the chosen domain

	Study		domain based on the interest of the student.	• 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	Global	This course provides the skills needed to find a job and also the skills needed to excel at the time of entering a career.	• Outline the roles played in workgroups and teams • Describe how good communication influences working relationship.

2015 – 2016

Course Code	Course Title	Nature of the Course (Local/ National/ Regional/ Global)	Course Description	Course Objectives
MCA101	Mathematical Foundation of Computer Science	National	This course provides the logical, analytical and mathematical concepts that are fundamental for 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	Global	This course provides the basic structure of digital computers and the organization of various units such as control unit, Arithmetic &Logical unit, Memory unit and I/O unit in a digital computer	• 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	Global	This course provides the basic structure of digital computers and the organization of various units such as control unit, Arithmetic & Logical unit, Memory unit and I/O unit	• 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

			in a digital 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	National	This Course provides programming knowledge using Visual C#. This course content includes program development and design, object-oriented programming, screen design, structured programming techniques and event-driven programming using objects.	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.

MCA105	Programming in C	Global	This course provides the layout of a C program and venture into control statements, loops, functions and basic I/O. Development skills will be continued by learning more complex data types such as arrays, structures and pointers.	• 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	Global	This Course provides programming knowledge using Visual C#. This course content includes program development and design, object-oriented programming, screen design, structured programming techniques	• Develop GUI applications. • Design and Deploy application programs. • Design and implement applications using databases.

			and event-driven programming using objects.	
MCA107	Lab II- C Programming	Global	This course provides exposure to problem-solving through programming. It aims to train the students with the basic concepts of the C-programming language and its practical implementation	• 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	Global	This course provides focus on the fundamental tools and concepts of Linux and Unix OS. It gives practical exposure on topics such as LINUX environment,	• Use Linux utilities and develop shell scripts to perform tasks. • Effectively use Linux environment to accomplish software development tasks. • Monitor system performance and

			commands, file system, processes and utilities. Specific emphasis is given to the bash shell and user environment with several flavours of UNIX/Linux using a version of Red Hat Linux.	network activities.
MCA109	Soft Skills I - Communicative English	National	This course provides skills of oral and written communication to work in different environments, develop emotional sensitivity and an awareness of how to work and negotiate with people.	• Display competence in oral and written communication. • Use current technology related to the communication.
MCA211	Resource Management		This course provides solution to problems in	• Identify the applications of Operations Research and methods to solve

	Techniques		different environment that needs decision making using optimization techniques.	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	Global	This course provides knowledge on several fundamental algorithms and data structures and to implement them in C++ to be an effective designer, developer, or customer for new applications.	• 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	Global	This course provides the fundamental perception of Software Engineering which includes system requirements, finding the effective methods to analyze, design, code, test and implement the full application with appropriate tools	• 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	Global	This course provides an introduction to the design and creation of relational databases with an examination on the	• Design conceptual models of a database using ER model. • Outline the features of DBMS and Relational Database design. • Retrieve information from database by

			characteristics of PL/SQL and its usage to extend and automate SQL to administer the Oracle database.	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++	Global	This course provides knowledge on variable types, operators, control flow, functions, program structure, input and output, arrays, classes, and object-oriented concepts of programming.	• 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	Global	This course provides practical knowledge in	• Enhance Programming skills and techniques.

			PL/SQL programming, utilizing the services provided by Oracle database in a stored procedure perspective. This also includes implementation of Subprograms, Triggers, and Cursors concepts in depth	• 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	Global	This course provides an introduction to the use of C++ programming language as an aid to solve mathematical and scientific problems.	• 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-	Global	This course is to teach students the essentials of	• Model objects using a variety of techniques

	Multimedia Lab		working in 3D using an array of features and tools. This course teaches new users the basics of creating, embellishing, and animating 3D scenes.	• Design and apply materials • Adjust basic lighting • Animate simple objects • Build and animate simple, effective environments
MCA219	Soft Skills II - Colloquium	National	This course make the students groom their personality and prove themselves as good Samaritans of the Society. This course consists of individual or in-group class presentations pertaining to the applications of concepts, Theories or issues in human development.	• 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.

MCA220	Comprehensive Viva-II	Global		• 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.
MCA323	Resource Management Techniques	Global	This course provides solution to problems in different environment that needs decision making using optimization 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	Global	This course provides the basic concepts, design principles and underlying technologies of 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	Global	This course is to introduce the student to the collection of programs and documents which constitute the system software of a computer platform.	• 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	Global	The course provides the fundamentals of Distributed Operating system and facilitate the students to gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols	• 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	Global	This course provides information on the	• Gain a comprehensive understanding of the E-Commerce landscape, current

			combination of Internet with E-Commerce, options available for doing business on the Internet, features that helps to build E-Commerce web sites, marketing issues, payment options, security issues and customer service.	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	Global	This course provides the basic principles of object orientation and OO analysis and design Using the Unified Process and	• Describe the three pillars of object-orientation and explain the benefits of each. • Create use case documents that capture requirements for a software

			the Unified Modeling Language (UML) as tools.	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	Global	This course provides a basic overview and understanding of many key Web technologies without delving into 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.

			and discusses server technologies, Web and application servers, Hypertext Preprocessor (PHP) and content management systems.	• CO3 3: Write a server side program
MCA327	Programming in JAVA	Global	This course provides an exhaustive coverage of Core Java programming language features like OOPS and GUI 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	Lab – VII- Web Programming	Global	This lab is to develop an ability to design and	• Design and implement dynamic websites with good aesthetic sense of

			implement static and dynamic website	designing and latest technical know-how's. • Have a Good grounding of Web Application Terminologies, Internet Tools
MCA329	Lab – VIII- JAVA Programming	Global	This course provides experiential learning in the implementation of Core 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	Global	This course is to teach students the essentials of working in 3D using an	• Model objects using a variety of techniques • Design and apply materials

			array of features and tools. This course teaches new users the basics of creating, embellishing, and animating 3D scenes.	• Adjust basic lighting • Animate simple objects • Build and animate simple, effective environments
MCA331	Soft skills III – Quantitative Aptitude	National	This course provides gamut of skills which facilitate the students to enhance their employability quotient and do well in the professional space. It makes them think critically and apply basic mathematics skills to interpret data, draw conclusions and solve problems	• Apply quantitative techniques to solve variety of problems. • Perform statistical analysis to interpret information
MCA434	Software	Global	This course explores the	• Understand software testing and

	Testing and Quality Assurance		goals of quality assurance and quality control activities performed during the life cycle of a software product.	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	Global	This course provides the basic concepts, principles, methods, implementation techniques and applications of data mining	• 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	Global	This course provides a knowledge on various network protocols of TCP / IP networks and advanced Management of telecommunication network and inter technologies	• 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	Global	The course provides knowledge on the theory and tools that can be employed in order to perform syntax-directed translation of a high-level programming language into an executable code along with data flows. The concepts covered are Parsing, Scanning, Semantic Analysis, and Code Generation combined with the theory of computation conversions.	• 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	Global	This course provides an introduction to the basic	• To review the fundamental concepts of a digital image processing system.

			concepts, methodologies and algorithms of digital image processing focusing image enhancement, image analysis and object recognition	• 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	Global	To know the role of client and server in the Network, and the information exchanging. This course is to design and develop Components of Client/ Server Applications and connectivity.	• 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	Global	This course provides basic understanding of previous attacks on cryptosystems with the aim of preventing future attacks and to provide security using various cryptographic tools	• 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	Global	To learn the basic principles for design, use and understand the hardware and software components of graphics systems, techniques for designing 2D, 3D pictures and to provide a complete and balanced view on the multimedia field covering almost all major domains.	• 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	Global	The course focuses on providing programming	• Utilize framework and components in real time application creation.

	Technologies		ideas about components, architecture and CORBA components and COM objects	• 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	Global	This course provides knowledge on key mobile system and wireless communication. It also aims at developing applications using Android	• 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	Global	This course provides introduction to structured methodology utilizedinsoftware engineering to Web development projects and addresses the concepts, methods, technologies, and techniques of developing Web sites that collect, organize and expose information resources	• 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 –	Global	This course provides	• Install and configure Android

	Mobile Application Development		knowledge of developing applications for mobiles using native and hybrid frameworks.	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 & MYSQL	Global	This lab is to develop an ability to design and implement static and dynamic website	• 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
MCA441	Skill Based Lab IV- Software Testing Tools	Global	This course provides focus on the needs of automated testing tools. The testing tactics of a project are	• Finding defects in the programs while developing the software. • Able to write test cases and test scenarios.

	Lab		done by understanding the customer's requirements, test planning, test design scenarios, test cases, test execution, result analysis, defect tracking and reporting	• Develop the scripts for finding the defects and preventing them. • Understand the automated testing tools available
MCA442	Soft skills IV-Technical Aptitude	National	This course provides skills that are imperative for students to establish a stronger connect with the technical environment in which they operate. An understanding of these skills will enable students to manage the placement challenges more effectively	• Enhance the technical skills for employability. • Improve the proficiency of participation in competitive examinations
MCA545	Software	Global	This course provides	• Deliver successful software projects

	project management		knowledge in applying different techniques to monitor & control project and people	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 behavior of people working in teams and to explore the ways of Managing people in Software Environments.
MCA546E1	Cloud Computing	Global	This course provides comprehensive study of cloud concepts and	• Compare the strengths and limitations of cloud computing. • Identify the architecture,

			capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Business Process as a Service (BPaaS).	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	Global	This course provides knowledge on the architectures, functions and performances of wireless sensor systems and platforms. It also describes and analyze the specific requirements for applications in wireless sensor networks regarding	• 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

			energy supply, memory, processing and transmission capacity	Area.
MCA546E3	Human Resource Management	Global	This course provides an introduction to the various functions of human resource management, including compensation and benefits, staffing, recruitment and selection, training and development, health and safety.	• 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	Global	The course provides the SOA platform basics - building blocks, SOA platform layers, Service technology architecture and Vendor platforms	• 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	Global	This course provides the principal constituents of soft computing that is	• Explore the functional components of artificial neural networks. • Examine the principles of back

			fuzzy logic, neural network theory and probabilistic reasoning. The course explores the features that are employed in various associated techniques	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	Global	This course provides the basis for ethical decision-making and the methodology for reaching ethical decisions concerning computing matters	• 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	Global	This course provides the fundamentals of embedded system hardware and firmware design will be explored	• 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	Global	The course provides knowledge on the fundamental concepts of distributed computer systems. Covers	• List the principles of distributed systems and describe the problems and challenges associated with these principles. • Understand Distributed Computing

			development techniques and runtime challenges, with a focus on reliability and system validation techniques.	techniques, Synchronous and Processes. • Apply Shared Data access and Files concepts. • Design a distributed system that fulfills 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	Global	This course is to provide the ability to design console based, GUI based and web based applications.	• 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	Global	This course will cover the practical aspects of multi-tier application development using the .NET framework. The goal of this course is to introduce the students to the basics of distributed application development. We will introduce the students to Web Service development and .NET remoting. Technologies covered include the Common Language Runtime (CLR), .NET framework classes, C#,	• 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.

			ASP.NET, and ADO.NET.	
MCA550	Lab XI- J2EE Programming	Global	This course aims to introduce the students to some concepts of *advanced programming* and practice on reusing components	• 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	Global	This course provides introduction to .Net IDE Component Framework, Programming concepts in .Net Framework and Creating website using ASP.Net Controls.	• .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	Global	The course train the students to critically evaluate a set of research topics on a particular	• Identify the domain to be analyzed • Prepare an in depth study on the recent trends in the chosen domain

			domain based on the interest of the student.	• 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	Global	This course provides the skills needed to find a job and also the skills needed to excel at the time of entering a career.	• Outline the roles played in workgroups and teams • Describe how good communication influences working relationship.