

Program Specifications of the Post graduate program offered by the department

1. Name of the program: MCA(Master of Computer Applications)

2. Program Specifications

School of Studies: School of Mathematical and Computational Science

Department: CSIT

Program: MCA

Head of the Department: Dr. Pushpalata Pujari

Date of Last Approval in Board of Studies: 24:02:17

Next revision due: 2021

3. Mode of Study: Full time (Semester system): Class room teaching; experiential learning; Tutorials; experimental laboratory training; Project assignments; Major Project in final semester.

Back ground and purpose of the course: Science & Technology has emerged as the most important vehicle for the national development and social transformation. Solving the major challenges country is facing today needs skilled human resource well versed in the basic fields of Computer. A sound knowledge of Computer plays an important role in the years to come for managing the Science & technology driven developmental efforts as well as to provide and transfer this knowledge to the next generation. In our country, teaching/research in Computer is being carried out in a number of universities and other establishments. After nearly two decades of IT revolution and its booming economic impact on the country, there is a positive trend and appreciation for the role and importance of basic sciences for further technological advancement. There is a need for qualified and competent post graduate students with sound knowledge in Computer in general and specialized technology related to the above specializations in particular.

Learning outcome:

The Master of Computer Applications (MCA) programme provides the candidate with knowledge, general competence, technical and analytical skills on an advanced level, needed in industry, consultancy, education, research, or public administration. The hands on training through one full semester project give special expertise in software development and research areas.

Knowledge gained:

On completion of MCA degree, the post graduates will be able to apply the **knowledge** of technical, mathematical, logical and computing fundamentals to various real life applications for any given requirement. Design and develop applications to analyze and solve all computer science related problems.

Skills:

The students

- are inculcated with the background and experience required to model, analyze, and solve advanced problems in real world (Industrial work).
- Can combine and use knowledge from several disciplines.
- will have the ability to develop and renew scientific competence independently,
- are able to enter new problem areas that require an analytic and innovative approach.

General competence:

The candidate

- Understands the role of Computer in society and has the background to consider ethical problems.
- is able to gather, assess, and make use of new information.
- has the ability to successfully carry out advanced tasks and projects, both independently and in collaboration with others and also across disciplines.
- has an international perspective on her/his discipline.

MCA

(Master of Computer Applications)

PROGRAMME SPECIFIC OBJECTIVES:

- To develop strong student competencies in Computer and its applications in a technology-rich, interactive environment.
- To develop strong student skills in research, analysis and interpretation of complex information.
- To prepare the students to successfully compete for employment in Information Technology sector and Teaching to offer a wide range of experience in research methods, data analysis to meet the industrial needs.
- Apply knowledge and skill in the design and development of Software to cater to the needs of IT sector.
- Become professionally trained in the area of software application
- Demonstrate highest standards of Actuarial ethical conduct and Professional Actuarial behavior, critical, interpersonal and communication skills as well as a commitment to life-long learning.

Course Specific Objectives & Learning Outcomes		
Course Code	Course Name	Objective and Learning Outcomes
MCA-101	Introduction to Information Technology	<p>COURSE OBJECTIVE: The objective of this course work is to provide basic concept of computer and its application. This course is also designed to familiar with a number of utility software, programming languages, basic concept of networking and overview of latest IT trends and technology.</p> <p>COURSE OUTCOME: The student will be</p> <ul style="list-style-type: none"> • Able to apply knowledge of computers and utilities of number of software that is useful for students. • Able to analyze use of programming languages and solution of the problem using programming languages. <p>Able to analyze the application of networking and familiar with latest trends and technology.</p>
MCA-102	Computer Programming and Numerical Methods	<p>COURSE OBJECTIVE: The objective of this course is to Develop a greater understanding of the issues involved in programming language design and implementation. Basically this course provides the numerical methods of solving the Algebraic Equations, Simultaneous Algebraic Equation, interpolation, differentiation, and integration.</p> <p>COURSE OUTCOME: The students will be</p> <ul style="list-style-type: none"> • Able to understand and writing the overview of structured program using C language. • Able to understand and acquire fundamental concept of numerical methods. • Able to analyze mathematical and engineering problems by using numerical methods.
MCA-103	Discrete Mathematical Structures	<p>COURSE OBJECTIVE:</p> <ul style="list-style-type: none"> • The objective of this course simplify and evaluate basic logic statements including compound statements, implications, inverses, converses, and contra positives using truth tables and the properties of logic. It also express a logic sentence in terms of predicates, quantifiers, and logical connectives and determine the domain and range of a discrete or non-discrete function, graph functions, identify one-to-one functions, perform the composition of functions, and apply the properties of functions to application problems.

		<p>COURSE OUTCOME: The students will be</p> <ul style="list-style-type: none"> • Able to write an argument using logical notation and determine if the argument is or is not valid. • Able to understand the basic principles of sets and operations in sets. • Able to demonstrate an understanding of relations and functions and be able to determine their properties. • Able to demonstrate an understanding of Graph and application of graph theory.
MCA-104	Data Structure using C	<p>COURSE OBJECTIVE: The objective of this course is to understand the basic concepts of data structures and algorithms with C programming. This course describe the concept and application of stack, Queues, Trees and Graphs, It also explores the concepts about searching and sorting techniques.</p> <p>COURSE OUTCOME: The students will</p> <ul style="list-style-type: none"> • Be able to analyze algorithms and algorithm correctness. • Have the ability to describe and their application of stack, queue graph and tree operation. • Be able to use of searching and sorting techniques in different fields.
MCA-105	Computer Organization	<p>COURSE OBJECTIVE:</p> <ul style="list-style-type: none"> • The main objective of this course is to study the basic organization and architecture of digital computers (CPU, memory, I/O, software). It includes different digital logic circuits and understanding and utilization of digital computers. <p>COURSE OUTCOME: The student will</p> <ul style="list-style-type: none"> • Be able to perform computer arithmetic operations using different logic gates. • Have an ability to understand control unit operations. • Able to understand the uses of different combinational and sequential circuits • Able to understand the concept of types of memory.
MCA-106	LAB-I: Data Structure using C	<p>COURSE OBJECTIVE: The objective of this course is to understand the basic concepts of data structures and algorithms with C programming. This course implements the concept and application of stack, Queues, Trees and Graphs; It also explores the concepts about searching and sorting techniques.</p> <p>COURSE OUTCOME: The student will</p>

		<ul style="list-style-type: none"> • Be able to analyze algorithms and algorithm correctness. • Have an ability to describe and their application of stack, queue graph and tree operation. • Be able to use of searching and sorting techniques in different fields.
MCA-107	LAB-II: Computer Hardware and Digital Electronics	<p>COURSE OBJECTIVE:</p> <ul style="list-style-type: none"> • The main objective of this course is to study and verify the basic Computer Hardware and architecture of digital computer. It provides a clear idea of implementing different digital logic circuits and understanding and utilization of digital computers. <p>COURSE OUTCOME: The students will</p> <ul style="list-style-type: none"> • Be able to perform computer logic operations using different logic gates. • Have an ability to understand digital logic circuits. • Be able to understand the uses of different combinational and sequential circuits
MCA-201	Principles of Operating System	<p>COURSE OBJECTIVE:</p> <p>The main objective of this course is to learn the fundamentals of Operating Systems. This course explores the mechanisms of OS to handle processes and threads and their communication and also learn the mechanisms involved in memory management in contemporary OS. It also includes and explores the file and secondary storage management system.</p> <p>COURSE OUTCOME: The student will be</p> <ul style="list-style-type: none"> • Able to analyze the architecture of OS and basic architectural components involved in OS design. • Able to analyze and design the applications to run in parallel either using process or thread models of different OS. • Able to analyze the various device and resource management techniques. • Able to understand the Mutual exclusion, Deadlock detection. • Able to understand the file and secondary storage management system.
MCA-202	Object Oriented Programming with C++	<p>COURSE OBJECTIVE:</p> <p>The main objective of this course is to understand the basic concept and application of object oriented programming using C++. It includes understanding the concept and use of function, object and classes and how to learn concept of inheritance and polymorphism. This course also explores</p>

		<p>input- output, file handling and exception handling to solve the real time problem.</p> <p>COURSE OUTCOME: The students will</p> <ul style="list-style-type: none"> • Be Able to understand the features of C++ supporting object oriented programming. • Have an ability to understand the relative merits of C++ as an object oriented programming language • Be able to understand how to produce object-oriented software using C++ • Have an ability to understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism. • Be able to understand advanced features of C++ specifically stream I/O, templates and exception handling.
MCA-203	Theory of Computation	<p>COURSE OBJECTIVE: The objective of this course is to explore the mathematical foundations of computation including automata theory, the theory of formal languages and grammars,; the notions of algorithm, decidability, complexity, and computability. It also develops student's ability to understand and conduct mathematical proofs for computation and algorithms.</p> <p>COURSE OUTCOME: The students will be</p> <ul style="list-style-type: none"> • Able to understand the key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving. • Able to understand the models of computation, including formal languages, grammars and automata, and their connections. • Able to analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars. • Able to understand the concept of Turing machine and its application.
MCA-204 (A)	Computer Networks (Elective I)	<p>COURSE OBJECTIVE: The main objective of this course is to build an understanding of the fundamental concepts of computer networking. This course offers to students with the basic taxonomy and terminology of the computer networking area and preparing for entry advanced courses in computer networking.</p> <p>COURSE OUTCOMES:</p> <ul style="list-style-type: none"> • Enable to understand and explain Data Communications

		<p>System and its components.</p> <ul style="list-style-type: none"> • Enable to identify the different types of network topologies and protocols. • Enable to explore the layers of the OSI model and TCP/IP and explain the function(s) of each layer. • Enable to identify the different types of network devices and their functions within a network • Enable to identify the security issues like cryptography, authentication protocol and other related security policy.
MCA-204(B)	System Analysis and Design (Elective I)	<p>COURSE OBJECTIVE: The objective of this course work is to introduce analysts, designers to manage projects, analyze and document systems, design new systems and implement their plans. It introduces also a recent coverage of UML and cost benefit of design.</p> <p>COURSE OUTCOME: The student will be able</p> <ul style="list-style-type: none"> • Able to understand the principles and tools of systems analysis and design. • Able to understand the SDLC of system development in different context. • Able to understand the professional and ethical responsibilities system implementation and software documentation.
MCA-204(C)	Introduction to Microprocessor (Elective I)	<p>COURSE OBJECTIVE: The main objective of this course work is to introduce students with the architecture and operation of fundamental concept of microprocessors. It introduces the programming techniques and also introduces various interface chips and addressing modes.</p> <p>COURSE OUTCOMES: The student will be</p> <ul style="list-style-type: none"> • Able to assess and solve basic binary math operations using the microprocessor and also explain the microprocessor's internal architecture and its operation. • Able to apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor. . • Able to evaluate assembly language programs and download the machine code that will provide solutions real-world control problems.
MCA-205	Object Oriented	COURSE OBJECTIVE:

	Software Engineering (Elective II)	<p>The objectives of this course are to explore the fundamental concept of object oriented programming and analysis. It explores the object modeling notation, structural diagram, Behavioral Diagrams. It also explores the benefit of pattern analysis.</p> <p>COURSE OUTCOME: The student will be</p> <ul style="list-style-type: none"> • Able to interact with a client to elicit project requirements by developing and refining scenarios and use cases. • Able to extract an Object Model and Dynamic Model of system functionality and performance from the requirements. • Able design and implement structured, robust, maintainable object-oriented systems across multiple platforms and appropriate programming languages from the specifications developed.
MCA-205	Multimedia(Elective II)	<p>COURSE OBJECTIVE:</p> <p>The objective of this course work is to learn and understand technical aspect of Multimedia Systems and understand the standards available for different audio, video and text applications. It also explores the data compression techniques and terminology in optical storage media and retrieval technology.</p> <p>COURSE OUTCOMES The student will be</p> <ul style="list-style-type: none"> • To Develop and understanding of technical aspect of Multimedia Systems. • To Understand various file formats for audio, video and text media. • To Develop various Multimedia Systems applicable in real time.
MCA-205	Linux operating System and Shell Programming (Elective II)	<p>COURSE OBJECTIVE:</p> <p>The objective of this course is to understand and make effective use of linux utilities and shell scripting language to solve problems. It also implement in C some standard linux utilities like mv,cp,ls etc. and develop the skills the necessary for systems programming including file system.</p> <p>COURSE OUTCOMES: The student will be</p> <ul style="list-style-type: none"> • Able to understand the basic commands of linux operating system and can write shell scripts.

		<ul style="list-style-type: none"> • Able to create file systems and directories and operate them. • Able to work on file management system with file management commands.
MCA-206	OOP LAB (C++)	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To learn how to write inline functions for efficiency and performance. • To learn the syntax and semantics of the C++ programming language. • To learn how to design C++ classes for code reuse. • To learn how to implement copy constructors and class member functions. • To understand the concept of data abstraction and encapsulation. • To learn how to overload functions and operators in C++. • To learn how containment and inheritance promote code reuse in C++. • To learn how inheritance and virtual functions implement dynamic binding with polymorphism. • To learn how to design and implement generic classes with C++ templates. <p>Course Outcomes:</p> <p>Student must be able to</p> <ul style="list-style-type: none"> • Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects. • Understand dynamic memory management techniques using pointers, constructors, destructors. • Describe the concept of function overloading, operator overloading, virtual functions and polymorphism. • Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming. • Demonstrate the use of various OOPs concepts with the help of programs.
MCA-207	LAB based on Object Oriented Software Engineering.	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements • To elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project • To analyze and translate a specification into a design, and then realize that design practically, using an

		<p>appropriate software engineering methodology.</p> <ul style="list-style-type: none"> • To develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice • To use modern engineering tools necessary for software project management, time management and software reuse. <p>Course Outcomes Student must be able to</p> <ul style="list-style-type: none"> • Understand basic concepts of Software UML design and implementation • Perform software testing on various applications • Understand and apply various software metrics on software quality products
MCA-207	LAB based on Multimedia	<p>Objective of this course are</p> <ul style="list-style-type: none"> • To gain fundamental knowledge regarding technical concepts and practices in information technology (IT). • To identify and evaluate current and emerging technologies and assess their applicability. • To gain a broad background across fundamental areas of information technology along with a depth of understanding in a particular area of interest within the domain of information systems. <p>Course Outcomes The student will have</p> <ul style="list-style-type: none"> • An ability to use and apply current technical concepts and practices in the core information technologies. • An understanding of best practices and standards and their application.
MCA-207	Linux Operating System and Shell Programming	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To demonstrate the installation process of various operating systems. • To virtualizes by installing Virtual Machine software. • To Apply UNIX/LINUX operating system commands. • To explain different UNIX/LINUX shell scripts and execute various shell programs <p>Course Outcomes Student will be able to</p> <ul style="list-style-type: none"> • Demonstrate the installation process of various operating systems. • Virtualizes by installing Virtual Machine software. • Apply UNIX/LINUX operating system commands. • Understand different UNIX/LINUX shell scripts and

		execute various shell programs
MCA-301	Probability and Statistics	<p>COURSE OBJECTIVE: The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis used in varied applications like science, engineering. Students will learn the fundamental theory of distribution of random variables, the basic theory and techniques of parameter estimation and tests of hypotheses.</p> <p>COURSE OUTCOME: The students will be</p> <ul style="list-style-type: none"> • Able to understand the basic knowledge on fundamental probability concepts, including random variable, probability of an event, additive rules and conditional probability. • Able to understand the basic statistical concepts and measures. • Able to understand several well-known distributions, including Binomial, Negative Binomial, Pascal, Normal and Exponential Distribution. • Able to understand the concepts of various parameter estimation methods like estimation, Maximum Likelihood Estimator, Notion and Interval Estimation. Small Sample Tests, Large Sample Tests.
MCA-302	Artificial Intelligence	<p>COURSE OBJECTIVE: The main objective of this course work is to understanding the basic concept of AI and expert system. This course explores the basic concept of various searching techniques for problem solving approach. It also includes supervised and unsupervised learning for classification and pattern reorganization.</p> <p>COURSE OUTCOME: The student will be</p> <ul style="list-style-type: none"> • Able to analyze and understanding of the fundamental issues and challenges of AI and machine Expert System: like their applications, problem solving methods and complexity. • Able to understanding of the strengths and weaknesses of many popular searching techniques, supervised and unsupervised approaches.
MCA-303	Relational Data Base Management System	<p>COURSE OBJECTIVE: The objective of this course work is to understand and uses of the basic concept of database management system. This course explores how to update database content with SQL and transaction handling.</p>

		<p>COURSE OUTCOME:</p> <p>The students will be</p> <ul style="list-style-type: none"> • Able to Learn about database models. • Able to Learn how to write simple as well as complex queries for retrieving data from database • Able to learn how to update, insert and delete data. • Able to Learn about functions and procedure and gain understanding on different Views • Able to learn how to work with Triggers and design a database • Able to learn how to ensure integrity related to multiple an related database updates.
MCA-304 ELECTIVE- (A)	Advanced Java Programming	<p>Objective of this course is</p> <p>To provide the ability to design console based, GUI based and web based applications. Students will also be able to understand integrated development environment to create, debug and run multi-tier and enterprise-level applications</p> <p>Course Outcomes:</p> <p>Student will be able to</p> <ul style="list-style-type: none"> • Develop Swing-based GUI • Develop client/server applications and TCP/IP socket programming • Update and retrieve the data from the databases using SQL • Develop distributed applications using RMI • Develop component-based Java software using JavaBeans • Develop server side programs in the form of servlets.
MCA-304 ELECTIVE- (B)	System Software	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To provide basic knowledge of various software's like Assembler, Linker, Loaders and some tools which are require programming development like Editor. <p>Course Outcomes</p> <p>The student will be</p> <ul style="list-style-type: none"> • Able to understand theoretically a number of system software's.
MCA-304 ELECTIVE- (C)	Neural Network	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To develop the skills to gain a basic understanding of neural network. • To Introduce students to artificial neural networks and Learning rules to from an application perspective

		<p>Course Outcomes</p> <p>Student will be able</p> <ul style="list-style-type: none"> • To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations • To understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
MCA-305 ELECTIVE- IV	Web Technology	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To understand, analyze and apply the role languages like HTML, CSS, XML, JavaScript and protocols in the workings of web and web applications. • To understand about programming and know about the application of dynamic page functionality in web pages using CGI, JSP, and ASP. • To create and communicate between client and server and create a good, effective and dynamic website. <p>Course Outcomes</p> <p>Student will able be to</p> <ul style="list-style-type: none"> • Select and apply markup languages for processing, identifying, and presenting of information in web pages. • Use scripting languages to transfer data and add interactive components to web pages.
MCA -305 ELECTIVE V	Pattern Recognition	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To Summarize, analyze, and relate research in the pattern recognition area verbally and in writing. Apply performance evaluation methods for pattern recognition and Genetic Algorithms of research literature. <p>Course Outcomes</p> <p>After successful completion of this course, students should be able to:</p> <ul style="list-style-type: none"> • Understand Pattern Recognition concepts and range of problems that can be handled by machine learning. • Compare and parameterize different learning algorithms. • Apply the machine learning concepts in real life problems.
MCA-305 ELECTIVE (C)	VB.NET Programming	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To explore .NET Framework and describe some of the major enhancements to the new version of Visual Basic. • To describe the basic structure of a Visual Basic.NET 3.project and use main features of the integrated development environment (IDE)

		<ul style="list-style-type: none"> • To design applications using Microsoft Windows • To develop applications that use ADO. NET <p>Course Outcomes</p> <p>At the end of the course the student will</p> <ul style="list-style-type: none"> • Understand .NET Framework and describe some of the major enhancements to the new version of Visual Basic. • Describe the basic structure of a Visual Basic.NET project. • Create applications using Microsoft Windows • Create applications that use ADO. NET
MCA-306	RDBMS LAB	<p>Objective of this course are</p> <ul style="list-style-type: none"> • To implement Basic DDL, DML and DCL commands • To understand Data selection and operators used in queries and restrict data retrieval and control the display order • To write sub queries and understand their purpose • To use Aggregate and group functions to summarize data • To join multiple tables using different types of joins. • To understand the PL/SQL architecture and write PL/SQL code for procedures, triggers, cursors. <p>Course Outcomes</p> <ul style="list-style-type: none"> • The student will be exposed to a commercial RDBMS environment such as SQL server. • The student will learn SQL commands for data definition and manipulation. • The student understands conceptual through physical data base design and student takes up a case study and applies the design steps.
MCA-307 (A)	LAB based on Advanced JAVA Programming	<p>Objective of this course are</p> <ul style="list-style-type: none"> • To understand Object Oriented Programming concepts, class hierarchy, characteristics of Java, inheritance and polymorphism and become familiar with the relationship between classes and objects in a Java program. • To learn programming based on JAVA 7 and above. • To write efficient and effective applications in Java, Java's event handling model, graphical user interface (GUI), swing component set, understand the relationship between the AWT and Swing. • To have a better understanding of Java's event model and design. • To build simple Graphical User Interfaces (GUI)s, Networking, Java Database connectivity with JDBC™,

		<p>Servlets, JavaServer Pages (JSP).</p> <p>Course Outcomes After completion of the course</p> <ul style="list-style-type: none"> • Students will learn programming in Java. Java language elements and characteristics, including data types, operators, and control structures are discussed in order to make the students develop Java applications. • The course also intended for students who would like to learn how to develop internet based applications, graphical user interface (GUI), and graphics in both AWT and SWING. • Advanced Java topics discussed helps students writing programs for Java database connectivity with JDBC; Manipulating databases with JDBC; Programming for Internet, JavaServer pages.
MCA-307 (B)	LAB based on System Software	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To make students familiar with Lexical Analysis and Syntax Analysis phases of Compiler Design and implement programs on these phases using LEX & YACC tools and/or C/C++/Java. <p>Course Outcomes After completion of the course</p> <ul style="list-style-type: none"> • Student will be able to write moderate code for Lexical and syntax analysis. • Student will be able to implement a simple text editor with features like insertion / deletion of a character, word, and sentence.
MCA-307 (C)	LAB based on Neural Network	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To implement the basic concepts of Neural Networks, Genetic Algorithm and Fuzzy Logic and to get exposure to many real world control problems using MATLAB. <p>Course Outcomes</p> <ul style="list-style-type: none"> • After completion of the course student will be able to calculate output of simple neuron. • Able to create and build custom neural network. • Able to classify XOR problem with multilayer perceptron.
MCA-401	Design and Analysis of Algorithm	<p>Objective of this course</p> <ul style="list-style-type: none"> • This course aims to introduce the classic algorithms in various domains, and techniques for designing

		<p>efficient algorithms.</p> <ul style="list-style-type: none"> • Introducing students to the general tools and techniques for analyzing computer algorithms. • Equip the students with mathematical preliminaries required to analyses and design computer algorithms. <p>Course Outcomes: After successful completion of this course, students should be able to:</p> <ul style="list-style-type: none"> • Prove the correctness and analyze the running time of the basic algorithms for those classic problems in various domains. • Apply the algorithms and design techniques to solve problems. • Analyze the complexities of various problems in different domains.
MCA-402	Compiler Design	<p>Objective of this course is..</p> <ul style="list-style-type: none"> • To understanding the fundamental principles in compiler design • To make the student to understand the process involved in a compiler, create an overall view of various types of translators, linkers, loaders, and phases of a compiler. • To understand syntax analysis, various types of parsers especially the top down approach, awareness among students the various types of bottom up parsers, understand the syntax analysis and, intermediate code generation, type checking, the role of symbol table and its organization, Code generation, machine independent code optimization and instruction scheduling. <p>Course Outcomes: Student must be able</p> <ul style="list-style-type: none"> • To understand major concept areas of language translation and compiler design • To develop an awareness of the function and complexity of compilers. • To provide practical, hands on experience in compiler design • To Identify the similarities and differences among various parsing techniques and grammar transformation techniques
MCA-403	Optimization Techniques	<p>Objective of this course is</p> <ul style="list-style-type: none"> • The central objective of operations research is optimization, i.e., to do things best under the given

		<p>circumstances.</p> <ul style="list-style-type: none"> • Exploring general concept which has great many applications, inventory control, manpower and resource allocation, manufacturing of goods, production process control, risk management, sequencing and scheduling of tasks, telecommunications. <p>Course Outcomes: After successful completion of this course, students should be able to:</p> <ul style="list-style-type: none"> • Identify and develop operational research models from the verbal description of the real system. Understand the mathematical tools that are needed to solve optimization problems. Use mathematical software to solve the proposed models. • Develop a report that describes the model and the solving technique, analyses the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.
MCA-404 Elective (A)	E-Commerce	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To explore all aspects of E-Commerce. Topics include development of the Internet and E-Commerce, options available for doing business on the Internet, features of Web sites and the tools used to build an E-Commerce web site, marketing issues, payment options, security issues, and customer service. <p>Course Outcomes: Student must be able to</p> <ul style="list-style-type: none"> • Understand E-Commerce. Topics include development of the Internet and E-Commerce, options available for doing business on the Internet, features of Web sites and the tools used to build an E-Commerce web site, marketing issues, payment options, security issues, and customer service.
MCA-404 ELECTIVE (B)	Financial Accounting	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To explore organization's Financial accounts basic concepts, so that Students will demonstrate progressive cognitive domain development of knowledge, comprehension, and application of rational economic decision making using: accounting discipline language, methods of classification, standards and computational procedures in all courses <p>Course Outcomes:</p>

		<p>Student must be able to</p> <ul style="list-style-type: none"> Recognize commonly used financial statements, their components and how information from business transactions flows into these statements. Demonstrate knowledge of preparation of Financial Statements and or financial schedules in accordance with Generally Accepted Accounting Principles through analysis and synthesis of information as well.
MCA-404 ELECTIVE- (C)	Software Testing	<p>Objective of this course is</p> <ul style="list-style-type: none"> To study fundamental concepts in software testing. To discuss various software testing issues and solutions in software unit test, integration and system testing. To expose the advanced software testing topics, such as object-oriented software testing methods. <p>Course Outcomes: Student must be able to</p> <ul style="list-style-type: none"> Apply modern software testing processes in relation to software development and project management. Create test strategies and plans, design test cases, prioritize and execute them. Manage incidents and risks within a project.
MCA-405 ELECTIVE- (A)	Mobile Application Programming	<p>Objective of this course is</p> <ul style="list-style-type: none"> To introduce Android platform and its architecture To explain activity creation and Android UI designing. To be familiarized with Internet, Broadcast receivers and Internet services. To explore SQLite Database and content providers. To integrate multimedia, camera and Location based services in Android Application. <p>Course Outcomes: Student must be able to</p> <ul style="list-style-type: none"> Describe Android platform, Architecture and features. Design User Interface and develop activity for Android App. Use Internet, Broadcast receivers and Internet services in Android App.
MCA-405 ELCETIVE- (B)	C# and .NET Framework	<p>Objective of this course is</p> <ul style="list-style-type: none"> This course is designed to provide the knowledge of Dot Net Frameworks along with C#. <p>Course Outcomes</p> <ul style="list-style-type: none"> After completion of the course the student will be able to use the features of Dot Net Framework along with the features of C#. Student will be able to use C# to create Windows client

		applications, XML Web services, distributed components, client-server applications, database applications, and Develop applications based on the C# language and the .NET Framework.
MCA-406	LAB based on C# and .net Framework	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To understand the control structures in C#. • To become familiar with event handling. • To study the .NET features. <p>Course Outcomes</p> <p>After completion of the course student will be</p> <ul style="list-style-type: none"> • Able to write the programs in C#. • Able to write programs for database access. • Able to develop moderate web services web/window applications using.NET.
MCA-407	Minor Project	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To offer students a glimpse into real world problems and challenges that need IT based solutions. • To enable students to create very precise specifications of the IT solution to be designed. • To introduce students to the vast array of literature available of the various research challenges in the field of IT • To create awareness among the students of the characteristics of several research study. <p>Course Outcomes:</p> <p>After successfully completing course student will be able to</p> <ul style="list-style-type: none"> • Discover potential research areas in the field of IT • Conduct a survey of several available literature in the preferred field of study • Compare and contrast the several existing solutions for research challenge • Demonstrate an ability to work in teams and manage the conduct of the • Formulate and propose a plan for creating a solution for the research plan identified • Report and present the findings of the study conducted in the preferred domain
MCA-501	Soft Computing	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To familiarize with soft computing concepts. • To introduce the fuzzy logic concepts, fuzzy principles and relations, basics of ANN and Learning Algorithms., Ann as function approximation, Genetic Algorithm and its applications to soft computing, Hybrid system usage, application and optimization.

		<p>Course Outcomes: Students will able to:</p> <ul style="list-style-type: none"> • List the facts and outline the different process carried out in fuzzy logic, ANN and Genetic Algorithms. • Explain the concepts and meta-cognitive of soft computing. • Apply Soft computing techniques the solve character recognition, pattern Classification, regression and similar problems. • Evaluate various techniques of soft computing to defend the best working solutions.
MCA- 502	Computer Graphics and Multimedia	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them. • To learn the basic principles of 3-dimensional computer graphics. • To provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the Picture definition. • To provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections. <p>Course Outcomes: Students will able to:</p> <ul style="list-style-type: none"> • To describe the general software architecture of programs that use 3D computer graphics. • To discuss hardware system architecture for computer graphics. • To use a current 3D graphics API (e.g., OpenGL or DirectX). • To use the underlying algorithms, mathematical concepts, supporting computer graphics.
MCA-503	Data Mining and Data Warehousing	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To introduce the concept of data Mining as an important tool for enterprise data management and as a cutting edge technology for building competitive advantage. • To enable students to effectively identify sources of data and process it for data mining • To make students well versed in all data mining algorithms, methods of evaluation. • To impart knowledge of tools used for data mining • To provide knowledge on how to gather and analyze large sets of data to gain useful business understanding.

		<ul style="list-style-type: none"> • To impart skills that can enable students to approach business problems analytically by identifying opportunities to derive business <p>Course Outcomes: After successfully completing course student will be able to</p> <ul style="list-style-type: none"> • Demonstrate an understanding of the importance of data warehouse and mining the principles of business intelligence. • Organize and prepare the data needed for data mining using preprocessing techniques. • Perform exploratory analysis of the data to be used for mining. • Implement the appropriate data mining methods like classification, clustering or Frequent Pattern mining on large data sets. • Define and apply metrics to measure the performance of various data mining algorithms. • Apply BI to solve practical problems Analyze the problem domain, use the data collected in enterprise apply the appropriate data mining technique, interpret and visualize the results.
MCA 504 ELECTIVE – (A)	Big Data Analytics	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To provide an overview of an exciting growing field of Big Data analytics. • To discuss the challenges traditional data mining algorithms face when analyzing Big Data. • To introduce the tools required to manage and analyze big data like Hadoop, NoSql Map Reduce. • To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability. • To introduce to the students several <p>Course Outcomes: After successfully completing course student will be able to</p> <ul style="list-style-type: none"> • Explain the motivation for big data systems and identify the main sources of Big Data in the real world. • Demonstrate an ability to use frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics. • Implement several Data Intensive tasks using the Map Reduce Paradigm • Apply several newer algorithms for Clustering Classifying and finding associations in Big Data • Design algorithms to analyze Big data like streams, Web

		<p>Graphs and Social Media data.</p> <ul style="list-style-type: none"> • Design and implement successful Recommendation engines for enterprises.
MCA -504 ELECTIVE- (B)	Advanced Operating System	<p>Course Objectives:</p> <p>The aim of this module is to study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems); Hardware and software features that support these systems.</p> <p>Course Outcomes:</p> <p>After successfully completing course student will be able to</p> <ul style="list-style-type: none"> • Outline the potential benefits of distributed systems • Summarize the major security issues associated with distributed systems along with the range of techniques available for increasing system security. • Apply standard design principles in the construction of these systems Select appropriate approaches for building a range of distributed systems, including some that employ middleware.
MCA- 504 ELECTIVE- (C)	Parallel Processing	<p>Course Objectives:</p> <ul style="list-style-type: none"> • To develop structural intuition of how the hardware and the software work, starting from simple systems to complex shared resource architectures. • Get a broad understanding of parallel computer architecture and different models for parallel computing • To understand concepts related to memory consistency models, cache coherence, interconnection networks and latency tolerating techniques. • To know about current practical implementations of parallel architectures. • To learn how to design parallel programs and how to evaluate their execution. <p>Course Outcomes:</p> <p>After successfully completing course student will</p> <ul style="list-style-type: none"> • Have an understanding of parallel algorithms, analysis and architectures. • Be able to reason about ways to parallelize a problem. • Design and analyze the algorithms that execute efficiently on parallel computers.
MCA -505 ELECTIVE- (A)	Management Information System	<p>Course Objectives:</p> <p>The students will be able to</p> <ul style="list-style-type: none"> • Understand the importance of determining information system requirements for all management levels by

		<p>describing the differences between various types of information systems</p> <ul style="list-style-type: none"> • Understand how information systems are developed • Apply critical-thinking skills in identifying information systems problems and investigate existing literature about hardware and software solutions to problems. <p>Course Outcome: At the completion of the course student will be able to -</p> <ul style="list-style-type: none"> • Describe the advances in networking, data communications and the Internet and how they affect the way business is conducted. • Identify which information technology tools are used to solve various business problems. • Display proficiency solving business problems using modern productivity tools (e.g., spreadsheet, database) or creating custom programs
MCA-505 ELECTIVE- (B)	Network Security	<p>Course Objectives:</p> <ul style="list-style-type: none"> • The main goal of this course is to enable the students to develop the necessary skills for developing robust & high performance scalable network applications. • To learn about raw sockets and socket programming. • To understand simple network management protocols and basics of TCP & UDP sockets. • To understand the principles and practices of cryptography and network security • To understand the practical applications that have been implemented and are in use to provide network Security <p>Course Outcome: After successful completion of the course, students will be</p> <ul style="list-style-type: none"> • Familiar with protocols, network interfaces, and Design/performance issues in local area networks and wide area networks. • Familiar with basics of Socket and Socket programming. • Familiar with contemporary issues in networking technologies. • Familiar with network tools and network programming. • Familiar with client server programming, Conventional encryption algorithms for confidentiality and their design principles, Public key encryption algorithms and their design principles • Able to use of message authentication codes, hash functions, digital signature and public key certificates
MCA-505 ELECTIVE-	Image Processing	<p>Course Objectives: To learn</p> <ul style="list-style-type: none"> • Fundamental concepts of a digital image processing

(C)		<p>system.</p> <ul style="list-style-type: none"> • Concepts of image enhancement techniques, Various Image Transforms. Compression techniques and Morphological concepts. • Various segmentation techniques, and object descriptors. • Color models and various applications of image processing <p>Course Outcome: After successful completion of the course, students will be able to</p> <ul style="list-style-type: none"> • Remember the fundamental concepts of image processing. • Explain different Image enhancement techniques • Understand and review image transforms • Analyze the basic algorithms used for image processing & image compression with morphological image processing. • Contrast Image Segmentation and Representation • Design & Synthesize Color image processing and its real world applications
MCA-506	LAB based on MATLAB	<p>Objective of this course is</p> <ul style="list-style-type: none"> • Understanding the MATLAB environment • Being able to do simple calculations using MATLAB • Being able to carry out simple numerical computations and analyses using MATLAB <p>Course Outcomes After completion of the course student will be able to</p> <ul style="list-style-type: none"> • Understand the main features of the MATLAB development environment • Use the MATLAB GUI effectively • Design simple algorithms to solve problems • Write simple programs in MATLAB to solve scientific and mathematical problems
MCA-507	Minor Project	<p>Objective of this course is</p> <ul style="list-style-type: none"> • To offer students a glimpse into real world problems and challenges that need IT based solutions. • To enable students to create very precise specifications of the IT solution to be designed. • To introduce students to the vast array of literature available of the various research challenges in the field of IT • To create awareness among the students of the characteristics of several research study. <p>Course Outcomes:</p>

		<p>After successfully completing course student will</p> <ul style="list-style-type: none"> • Discover potential research areas in the field of IT • Conduct a survey of several available literature in the preferred field of study • Compare and contrast the several existing solutions for research challenge • Demonstrate an ability to work in teams and manage the conduct of the • Formulate and propose a plan for creating a solution for the research plan identified • Report and present the findings of the study conducted in the preferred domain
MCA- 601	MAJOR PROJECT	<p>Course Objectives:</p> <ul style="list-style-type: none"> • To prepare students to excel in computer applications to succeed in industry/ technical profession. • To provide students with solid foundation in mathematical and computing fundamentals and techniques required to solve related problems and also to pursue higher studies and research. • To train students with good computing breadth so as to comprehend, analyze, design and create computing solutions for the real life problems. <p>Course Outcomes:</p> <p>After successfully completing course student will be able to</p> <ul style="list-style-type: none"> • Discover potential research areas in the field of IT. • Conduct a survey of several available literatures in the preferred field of study. • Compare and contrast the several existing solutions for research challenge. • Demonstrate an ability to work in teams and manage the conduct. • Formulate and propose a plan for creating a solution for the research plan identified. • Report and present the findings of the study conducted in the preferred domain.