Department of Computer Science & Technology
Course Outcome
Programme Name: Master of Computer Application

Name of the Course	Course Code	*Course Outcomes*
SEMESTER-I		
Introduction to Computer and Programming	MCA-1.1	Course outcome of MCA-1.1 (Introduction to Computer and Programming): CO1: Students will be able to understand basic concepts of computers and its working principle. CO2: Students will be able to understand algorithms and its definition. CO3: Will be able to learn about the syntax of writing programming languages. CO4: They will be able to write programs in C language. CO5: They will be able to develop basic skills such as problem solving and abstract reasoning through computer programming.
Digital Systems & Computer Organization	MCA-1.2	Course outcome of MCA-1.2 (Digital Systems & Computer Organization): CO1: Will be able to understand the theory and architecture of central processing unit. CO2: Understand the functionality of central processing unit. CO3: Understand the I/O and memory organization. CO4: Explain the number systems, binary addition and subtraction, 2's complement representation and operations with this representation. CO5: Examine the structure of number systems and perform the conversion among different number systems. CO6: Illustrate reduction of logical expressions using boolean algebra, karnaugh-map and tabulation method and implement the functions using logic gates. CO7: Understand combinational circuits. CO8: Design and analyze synchronous and asynchronous sequential circuits using flip-flops. CO9: Implement combinational logic circuits using programmable logic devices.
Mathematical Foundation of Computer Science	MCA-1.3	Course outcome of MCA-1.3: Mathematical Foundation of computer Science)

		CO1: Get ideas about sets and perform operations and algebra on set. Determine different properties of relations, identify equivalence and partial order relations. Identify function and their properties. Get idea about Graph Theory. CO2: Analyze the given propositions and finding results using mathematical logic operators. CO3: Understand and apply the concepts of graphs and trees. Analyze whether given graphs are isomorphic and different algorithms to find the shortest path.
Operating Systems	MCA-1.4	Course outcome of MCA-1.4 (Operating Systems): CO1: Understand fundamental operating system architectures, processes, threads, files, semaphores, Inter Process Communication, shared memory regions, etc. CO2: Analyze algorithms like Process scheduling and memory management algorithms. CO3: Categorize the operating system's resource management techniques, deadlock management techniques. CO4: Able to understand paging of memory, page replacement algorithms, file systems. CO5: Understand the working of secondary storage devices.
Probability and Statistics	MCA-1.5	Course outcome of MCA-1.5 (Probability and Statistics): CO1: Know the use of measures of central tendency and dispersion for analysis of data. CO2: Apply the concept of probability and random variables, which will help in learning Bayesian classifiers. CO3: Know about the random variables and to solve problems under normal distribution. CO4: Apply the concept of statistical measures to correlation and regression.
Laboratory-I	MCA-1.6	Course outcome of MCA-1.6 (LAB-I): CO1: Will be able to write programs using C programming language.

SEMESTER-II		
Data Structure and Algorithms	MCA-2.1	Course Outcome of MCA-2.1 (Data Structure and Algorithms): CO1: Will be able to learn data structures like; array, stacks, queues, linked lists and trees. CO2: Will be able to write program for data structures. CO3: Will be able learn insertion, deletion, searching, sorting and merging of data in a data structure. CO4: Understand the complexity of algorithms. CO5: Understand the traversals in a tree.
System Software	MCA-2.2	Course Outcome of MCA-2.2 (Compiler Design) CO1: Describe and analyze the lexical, syntactic, and semantic structures of sophisticated language aspects. CO2: For a compiler to perform language translation, separate the lexical, syntactic, and semantic analyses into useful steps. CO3: Without using automatic generators, create a scanner, parser, and semantic analyzer. CO4: Create machine code for a novel computer from the completely processed source code of a novel language. CO5: Describe methods for optimizing intermediate and machine code. CO6: Create the frameworks and infrastructure needed to compile sophisticated language features. CO7: To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger. CO8: Describe the various concepts of assemblers and macroprocessors. CO9: To understand the various phases of compiler and compare its working with assembler. CO10: To understand how linker and loader create an executable program from an object module created by assembler and compiler. CO11: To know various editors and debugging techniques.
Object Oriented Programming	MCA-2.3	Course Outcome of MCA-2.3

and Design with Java		CO1: Will be able to understand top-down and bottom-up approach. CO2: Describe the object-oriented programming approach. CO3: Apply the concepts of object-oriented programming. CO4: Able to write code in Java and other object oriented programming languages. CO5: Explain object oriented analysis and design concepts and various Unified Modeling Language diagrams. CO6: Illustrate structural diagrams, behavior diagrams. CO7: Describe about domain models and conceptual classes. CO8: Compare and contrast various testing techniques. CO9: Develop projects using UML diagrams.
Computer Networks	MCA-2.4	Course Outcome of MCA-2.4(Computer Networks): CO1: Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies. CO2: Understand various layers in computer networks. CO3: Have a basic knowledge of the use of cryptography and network security. CO4: Specify and identify deficiencies in existing protocols, such that new and better protocols may be designed. CO5: Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure.
Computer Oriented Numerical Methods	MCA-2.5	Course Outcome of MCA-2.5(Computer Oriented Numerical Methods): CO1: Find the solution of non-linear algebraic and transcendental equations by numerical methods. CO2: Solve the system of linear homogeneous as well as non homogeneous equations and analyze the consistency of the system of linear

		equations.
		CO3: Predict the interpolated values using difference formulae.
		CO4: Find the trend information from discrete data set through numerical differentiation.
Laboratory-II	MCA-2.6	Course Outcome of MCA-2.6(LAB-II): CO1: Will be able to write programs using Java programming.

SEMESTER-III

Database Management Systems	MCA-3.1	Course Outcome of MCA-3.1 (DBMS): CO1: Understand and evaluate the role of database management systems in information technology applications within organizations. CO2: Will be able to understand entities and their relations. CO3: Explain functional dependency, Functional Decomposition, Normalisation techniques. CO4: Will be able to use Structured Query Language (SQL). CO5: Draw Entity-Relationship diagrams to represent database application scenarios.
Software Engineering	MCA-3.2	Course Outcome of MCA-3.2 (SE): CO1: Ability to apply software engineering principles and techniques, develop, maintain and evaluate large-scale software systems. CO2: To produce efficient, reliable, robust and cost-effective software solutions. CO3: Ability to perform independent research and analysis. CO4: To communicate and coordinate competently by listening, discussing, speaking, reading and writing English for technical and general purposes. CO5: Ability to work as an effective member or lead the software engineering or development team. CO6: To manage time, processes and resources effectively by prioritizing demands to achieve

		personal and team goals. Identify and analyzes the common threats in each domain. CO7: Ability to understand and meet ethical standards and legal responsibilities.
System Administration	MCA-3.3	Course Outcome of MCA-3.4 (System Administration): CO1: Will be able to understand file processing. CO2: Will be able to understand process management, I/O management, queue management. CO3: Will be able to understand networking, backup, storage management, system start up and shut down. CO4: Will be able to install and configure Linux operating system. CO5: Will be able to operate on Linux environment.
Computer Based Optimisation Techniques	MCA-3.4	Course Outcome of MCA-3.4 (CBOT): CO1: Formulate and solve problems as networks and graphs. CO2: Develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems. CO3: Construct linear integer programming models and discuss the solution techniques. CO4: Formulate pure, mixed, and binary integer programming models. CO5: Solve the integer programming models using branch-and-bound method. CO5: Set up decision models and use some solution methods for nonlinear optimization problems. CO6: Solve multi-level decision problems using dynamic programming method. CO7: Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems. CO8: Can be able to use classical techniques and numerical methods for optimization.

		CO9: Describe the basics of different evolutionary algorithms. CO10: Apply different techniques to solve various optimization problems.
Formal Languages and Automata Theory	MCA-3.5	Course Outcome of MCA-3.5 (FLAT): CO1: Understand the basic concepts of formal languages, automata and grammar types, as well as the use of formal languages and reduction in normal forms CO2: Demonstrate the relation between regular expressions, automata, languages and grammar with formal mathematical methods CO3: Design push down automata, cellular automata and turing machines performing tasks of moderate complexity CO4: Analyze the syntax and formal properties, parsing of various grammars such as LL(k) and LR(k) CO5: Describe the rewriting systems and derivation languages
Laboratory-III	MCA-3.6	Course Outcome of MCA-3.6 (LAB-III): CO1: Develop programming skills in system administration and DBMS using SQL
SEMESTER-IV		
Management Information System	MCA-4.1	Course Outcome of MCA-4.1(MIS): CO1: Will be able to understand how MIS can lead an organization to achieve business competitive advantages through informed decision making. CO2: Analyze and synthesize business information and systems to facilitate evaluation of strategic alternatives.

		CO3: Effectively communicate strategic alternatives to facilitate decision making.
Data Mining and Warehousing	MCA-4.2	Course Outcome of MCA-4.2(DMW): CO1: Understand the functionality of various data mining and data warehousing component. CO2: Recognize the strengths and limitations of various data mining and data warehousing models. CO3: Explain the analyzing techniques of various data. CO4: Describe different methodologies used in data mining and data ware housing. CO5: Compare different approaches of data ware housing and data mining with various technologies.
Web Programming Technologies	MCA-4.3	Course Outcome of MCA-4.3 (Web Programming Technologies): CO1: Will be able to design and develop web pages. CO2: Will be able to write HTML and JavaScript codes. CO3: Will be able to connect the webpage to a database. CO4: Can learn SQL queries.
Elective I (Image Processing)	MCA-4.4	Course Outcome of MCA-4.4: (Image Processing): CO1: Will be able to learn about various image transformations along with their properties. CO2: Will be able to develop image processing applications. CO3: Will be able to understand the technology of computer vision. CO4: Learn different image enhancement techniques.

Elective II (Distributed System)	MCA-4.5	Course Outcome of MCA-4.5: (Distributed System): CO1: Students will be able to recognize the concepts of distributed systems. CO2: Learn about file systems. CO3: Understand operating system architecture. CO4: Learn about Process concepts, states, synchronization. CO5: Understand about security techniques, cryptographic algorithms, and digital signatures.
Project Work	MCA-4.6	Course Outcome of MCA-4.6 (Project work): CO1: Students will work practically in an organization. CO2: Develop a project based upon particular topic. CO3: Students will learn about the industrial works and the importance of software in an organization.