CODE	Subject	Course	Course outcomes Descriptions
MCA101	Problem Solving and Programming Using C	C101.1	Algorithm, Flowchart, Structured Programming Approach, Structure of a C Program, Compiling, Linking and Executing Programs
		C102.2	Character Set, Key Words, Identifiers, Data Types, Variables and
		C103.3	Constants, Operators, Expressions, Type Conversions, Statements, Managing Console Input and
		C104.4	Strings: Concept of Strings, String Handling Functions, Array of Strings. Pointers: Pointer Variable and its Importance, Dereferencing, Pointer Arithmetic and Scale Factor
		C105.5	Structures, Unions and Enumerations: Declaration and Initialization of Structures, Structure as Function Parameters, Structure Pointers, Unions, Enumerations
		C101.6	File Input and Output: Defining, Opening a File and Closing a File, Input/output Operations in Files, Random Access to Files, Error Handling
MCA102	Computer Organization and Architecture	C102.1	Basic Processing: Instruction code, Instruction set, Instruction sequencing, Instruction Cycle & Execution Cycle, Instruction format, Addressing modes, Micro instruction
		C102.2	Memory Hierarchy, RAM, ROM, Cache memory organization, Mapping techniques, Virtual memory, Memory Interleaving, Secondary Storage, Flash drives
		C102.3	Input/output: Accessing I/O devices, I/O mapped I/O, Programmed I/O, Memory Mapped I/O, Interrupt Driven I/O, Standard I/O interfaces, Synchronous and Asynchronous Data
		C102.4	Introduction to Parallel processing: Flynn's Classification, Pipelining, Super Scalar processors, Array processing, vector processing
		C102.5	8085 Microprocessor and Assembly level Programming using 8085 microprocessor

		C102.6	Digital Electronics: Boolean algebra, Digital Logic, Truth Tables, K map, Number system, Flip - Flop
CODE	**Subject**	**Course**	**Course outcomes Descriptions**
MCA1O3	Business Information System	C103.1	Introduction to Business Information System: What is information and what is Business. Why information System, perspectives of information system
		C103.2	Information System in the enterprise: Major types of information system, systems from a functional perspective, integrating functions and business processes
		C103.3	Information systems, organizations, management and strategy: Organizations and information systems, how information system impact organizations and business firms
		C103.4	IT infrastructure and Platforms: IT infrastructure, infrastructure component, contemporary hardware platform trend, contemporary software platform trends
		C103.5	database approach to data management, Telecommunications, network and the internet, contemporary networking infrastructure, Internet, social media
		C103.6	Pivot, Macros. Animated presentations, small scale database design and reporting.
MCA104	Computer Oriented Numerical Methods	C104.1	Computing Arithmetic, Significant Digits and Numerical Instability, Root finding methods-Bisection, Newton Raphson, Secant and RegulaFalsi, methods for multiple roots
		C104.2	System of Linear Algebraic Equations and Eigenvalue problems-Gauss Elimination, LU Decomposition- Jacobi-Gauss-Seidel and SOR methods
		C104.3	Differentiation and Integration-Richardson's extrapolation, Gauss Quadrature methods,ordinary differential equations-Initial and Boundary Value Problems
		C104.4	introduction to numerical solutions of Partial Differential Equations.
		C104.5	Interpolation and Approximation spline approximation- Linear, quadratic and Cubic,

		C104.6	Flowchart and Algorithms and programming in C of different numeric method
MCA105	Engineering Economics	C105. 1	Introduction to Economics: definition, scope and nature of economics, consumption laws, demand & supply analysis, elasticity of demand, indifference curve analysis
		C105.2	Production : factors of production, production function, law of variable proportion, laws of return to scale, elasticity of factor-substitution, optimal combination of factor-inputs
		C105.3	Cost of Production: types of costs, economic costs: fixed cost and variable costs, Average and Marginal costs, short-run and long-run cost functions.
		C105.4	Market Structure: pure competition, perfect competition, imperfect market, monopoly and oligopoly. Indian Banking System, Functions and Roles of Commercial Banks
		C105.5	Foundations of Engineering Economics, Time value of money and interest formulae, Nominal and effective rate of interest, Present, Annual and Future worth analysis
		C105.6	Define the terms Moral, Ethics, Ethical dilemma, Emotional intelligence, Personal and Professional Ethics
MCA106	Business Communication	C106.1	Introduction to Business Communication: Meaning, importance, the process of communication, principles of communication, verbal and non-verbal communication
		C106.2	Functional Grammar: Verbs, Tense, Voices, Negation and interrogation, conditionals, concord, phrasal verbs, direct and indirect speech, Elimination of common errors.
		C106.3	Paragraph Writing, Business Letters, Job Application Letters, Resume Reports – Types, Format, Choice of Vocabulary, Coherence
		C106.4	Cohesion Proposals: Purpose, Characteristics, Types, Structure

		C106.5	Difference between Professional and General communication
		C106.6	Oral Presentations, Interviews, Group discussion, Soft Skills, Business Etiquette

MCA (1st Year)
2nd Semester

CODE	Subject	Course	Course outcomes Descriptions
MCA201	Data Strucure using C	C201.1	Understand basic data structures such as arrays, linked lists, stacks, queues, graphs, trees and heaps ,time complexity of each algorithm
		C201.2	Types, operation and application of Trees
		C201.3	Apply algorithms for solving problems like sorting, searching, insertion, deletion and retrieval of data
		C201.4	Describe hashing, hash function, concepts of collision and its resolution methods
		C201.5	Apply minimum cost spanning tree concept to solve a variety of problems
		C201.6	External sorting, Implementation using programming in C.
MCA202	Object Oriented Programming using C ++	C202.1	Get a brief overview of Object Oriented Programming concepts
		C202.2	Solve the problems in a systematic way using class and method paradigms
		C202.3	Implement different types of inheritance efficiently and also study friend functions, operator overloading and virtual functions
		C202.4	Understand the concepts of dynamic memory management using new and delete operators and study about the exception handling mechanism
		C202.5	Study about template functions and Standard Template Library (STL), Object-Oriented Design and Programming using C++.

		C202.6	Introduction Templates, Function Templates Parameterizing Vectors, STL, Containers, Iterators, FunctionAdapters, String Library
CODE	**Subject**	**Course**	**Course outcomes Descriptions**
MCA2O3	Operating systems	C203.1	Describe the types and the role of operating system and explain the different structures of operating system
		C203.2	Discuss different memory management techniques.
		C203.3	Propose solutions for achieving process synchronization.
		C203.4	State the conditions that lead to deadlock and apply deadlock prevention, detection, avoidance algorithms
		C203.5	Explain process management and compare the performance of various process scheduling algorithms
		C203.6	basics of Shell programming. Case Study- UNIX, LINUX, and Windows NT
MCA204	Principles and Practice of Management	C204.1	Idea about Nature and functions of Management and it's theory.
		C204.2	Brief idea about Planning Nature and Purpose of Planningand Principles of Planning,
		C204.3	Concept on Training and Development, Performance appraisal
		C204.4	Human Aspects of Control, Control as a Feedback System, Feed Forward Control, Preventive Control, Profit and Loss Control, Control Through Return on Investment.
		C204.5	The Challenges Created by IT as a Control Tool. Decision Making Process, Individual Decision Making Models
		C204.6	Management and leadership Approaches to leadership and styles.
MCA205	Green IT	C205. 1	Scope and importance of environmental studies, e-waste management and their management
		C205.2	Basic Green Concepts, Green and IT, IT Ecosystem, Standards and Metrics, Efficiency factors, Carbon reduction options
		C205.3	Greening the data center, foundation for Green data management, formalizing best practices for Green IT,.

		C205.4	understanding virtualization, building virtual infrastructure, enabling virtual, using energy efficient machines,
		C205.5	usage of renewable energy, safe disposal policy
		C205.6	evaluating green gadgetry, powering gadgets intelligently
MCA206	Mathematical Computing	C206.1	Basic Definitions - Venn Diagrams and set operations
		C206.2	Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem.
		C206.3	Propositions and logical operators
		C206.4	BFS and DFS, Minimum cost spanning trees
		C206.5	Symbolic and numerical computation
		C206.6	Solving recurrence relations. Stability of numerical computations

MCA (2nd Year)
3rd Semester

CODE	Subject	Course	Course outcomes Descriptions
MCA301	Design Analysis and Algorithms	C301.1	Study different types of asymptotic notations that are used to analyze the running time of different algorithms and solve recurrences
		C301.2	Analyze and derive the running time for different searching and sorting algorithms, study about AVL trees and their construction, Red-Black trees, Overview of Divide and Conquer paradigm with examples
		C301.3	Solve a variety of problems using different algorithm design paradigms like Dynamic Programming, Greedy Method, construction of Minimum Spanning Tree, study of Shortest Path problem and Maximum Network Flow problem
		C301.4	Study of different String Matching algorithms, Backtracking method, example problems and their backtracking solution using State Space Search Tree method.
		C301.5	Study of Branch and Bound technique, example problems and their solution using State Space Search Tree method, study of P,

			NP and NP-Complete problems, Approximation algorithms and example problems.
		C301.6	Traveling Salesman problem
MCA302	Theory of Computation	C302.1	Introduction to FA as well as types and minimization technique.
		C302.2	Context free grammars and pushdown automata. closure properties of deterministic context free languages
		C302.3	Turing machines and variation of Turing machine model, Turing computability
		C302.4	Church Turing hypothesis. Recursive and recursively enumerable sets.. UniversalTuring machine and undecidable problems
		C302.5	Time complexity class P, class NP, NP completeness
		C302.6	Cantor and Gödel numbering. Ackermann's function
CODE	**Subject**	**Course**	**Course outcomes Descriptions**
MCA3O3	Computer Networks	C303.1	describe communication and layered network architectures and to explain conventional computer system interfacing standards
		C303.2	design basic network systems using routing methods and analyze data communication technology
		C303.3	describe the operation of a packet based sliding window protocol, Encryption and Decryption methods
		C303.4	Congestion control ,Congestionavoidance – QoS
		C303.5	describe the operation of application layer using SMTP, TELNET, DNS, and FTP etc
		C303.6	describe the operation of a packet based sliding window protocol, Encryption and Decryption methods.
MCA304	Database Management Systems	C304.1	Able to handle with different Data Base languages and various data models for Data Base.
		C304.2	Able to draw ER model and write queries mathematically and design data base

		C304.3	Able to find anomalies and normalize data
		C304.4	Able to write the queries using both sql and pl/sql.
		C304.5	Deal with online transactions, control Concurrency and understand types of Data Base failures and Recovery.
		C304.6	Basics of SQL, DDL,DML,DCL, structure
MCA305	Quantitative Techniques (OR & SM)	C305. 1	Concepts, genesis, Art of modeling, components of model, Types of OR models, effect of data availability on modeling
		C305.2	Concepts, Formulation of model, Graphical solution, Maximization / Minimization – Simplex Algorithm,
		C305.3	Concepts, formulations of models, Solution procedures, Optimality checks, Balanced/Unbalanced.
		C305.4	Project planning and control by PERT/CPM network, Probability assessment in PERT network
		C305.5	Development of software for the techniques and exposure to Project Management
		C305.6	Concepts relating to Queuing systems, types of queuing system
MCA306	Advance OS	C306.1	Introduction to Architectures of Distributed Systems
		C306.2	Distributed Deadlock Detection -Introduction - deadlock handling strategies indistributed systems – issues in deadlock detection and resolution
		C306.3	Distributed shared memory-Architecture– algorithms for implementing DSM – memorycoherence and protocols – design issues
		C306.4	Data security –cryptography
		C306.5	optimistic algorithms – concurrency control algorithms, data replication.

		C306.6	Operating System - structures of multiprocessor operating system, operating system design issues

MCA (2nd Year)
4th Semester

CODE	Subject	Course	Course outcomes Descriptions
MCA401	Programming with Java	C401.1	understand the use of OOPs concepts and solve real world problems using OOP techniques
		C401.2	Able to understand the use of abstraction
		C401.3	Able to understand the use of Packages and Interface in java
		C401.4	Able to develop and understand exception handling, multithreaded applications with synchronization.
		C401.5	Study of Branch and Bound technique, example problems and their solution using State Space Search Tree method, study of P, NP and NP-Complete problems, Approximation algorithms and example problems.
		C401.6	Able to design GUI based applications and develops applets for web applications
MCA402	Computer Graphics and Multimedia	C402.1	An Introduction Graphics System : Computer Graphics and Its Types, Application of computer graphics
		C402.2	Output Primitives and Attributes of Output Primitives : Output Primitive Points and Lines, Line Drawing Algorithms, Circle Generating Algorithms
		C402.3	Basic Transformations, Matrix Representation and Homogeneous Coordinates, Composite Transformations,Reflection and Shearing.
		C402.4	Introduction to Multimedia : Classification of Multimedia, Multimedia Software, Components of Multimedia
		C402.5	Classification of Animation. Authoring Process and Tools
		C402.6	Use of MatLab in graphics application, Features of MatLab, Generalize application by using MatLab

CODE	**Subject**	**Course**	**Course outcomes Descriptions**
MCA4O3	Software Engineering	C403.1	describe communication and layered network architectures and to explain conventional computer system interfacing standards
		C403.2	design basic network systems using routing methods and analyze data communication technology
		C403.3	describe the operation of a packet based sliding window protocol, Encryption and Decryption methods
		C403.4	Congestion control ,Congestionavoidance – QoS
		C403.5	describe the operation of application layer using SMTP, TELNET, DNS, and FTP etc
		C403.6	describe the operation of a packet based sliding window protocol, Encryption and Decryption methods.
MCA404	Compiler Design and Language Processor	C404.1	Able to handle with different Data Base languages and various data models for Data Base. Specify and analyse the lexical, syntactic and semantic structures of advanced language features.
		C404.2	Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation
		C404.3	Design a parser, and semantic analyser without the aid of automatic generators
		C404.4	Code optimization and instruction selection practices
		C404.5	Describe techniques for intermediate code and machine code optimisation.
		C404.6	Problems in code generation
MCA405	Personality and Soft Skill Development	C405. 1	The student will be able to understand basic concepts of communication skills that will help them to transform their communication abilities
		C405.2	The student will be able to write letters, reports, memos, minutes so as to deal with the everyday managerial needs.

		C405.3	The student will be able to communicate effectively and impactfully by using verbal and non-verbal communication styles.
		C405.4	The student will be able to deal with communication barriers in a cross cultural environment.
		C405.5	The student will be able to exhibit good communication skills required in meetings, group discussions, interviews and presentations.
		C405.6	The student will feel confident by projecting a positive image before others.
MCA406	ERP and E-commerce	C406.1	What is E-Commerce, Architectural framework Network Infrastructure for E-Commerce Network Infrastructure for E-Commerce
		C406.2	Introduction to Mobile Commerce, Mobile Computing Application
		C406.3	World Wide Web & Security, Encryption
		C406.4	Overview of Electronics payments, Digital Token based Electronics payment System
		C406.5	Net Commerce. Introduction to supply Chain Management
		C406.6	issues in Customer Relationship Management

MCA (3rd Year)
5th Semester

CODE	Subject	Course	Course outcomes Descriptions
MCA501	Artificial Intelligence & Expert System	C501.1	Graduates will be able to assess critically the techniques presented and to apply them to real world problems. Get a introductory concepts and problem solving techniques in Artificial Intelligence
		C501.2	Graduates will get to understand the major concepts of Intelligent agents, Reasoning & Logic prepositional Logic.
		C501.3	Students will be able to understand concept of planning in Artificial intelligence

		C501.4	Student will be able to understand the Learning in Artificial Neural Networks and various neural network models.
		C501.5	Graduates will be able aware of knowledge representation and Natural language processing in Artificial intelligence.
		C501.6	Learning in Problem Solving, Explanation based Learning. Expert Systems and Design of Expert systems
MCA502	Object Oriented Analysis & Design with UML	C502.1	Introduction: Object orientation & Object oriented development, Modeling Concepts: Modeling as a design technique
		C502.2	Analysis and Design: Process overview
		C502.3	Implementation Modeling,.
		C502.4	Management of Object-Oriented Software projects
		C502.5	The intent of object-oriented metrics, the distinguishing characteristics and metrics for the object-oriented design model
		C502.6	metrics for object-oriented projects
CODE	**Subject**	**Course**	**Course outcomes Descriptions**
MCA5O3	Internet Technology & Enterprise Java	C503.1	Internetworking concept and architectural model
		C503.2	Concept of Swing Package , Java EE 6 API, Web Applications, Java Servlet Technology
		C503.3	Concept of JDBC ,JDBC drivers ,connecting to database
		C503.4	Architecture & Anatomy of JSP Page, JSP life cycle, JSP with MVC
		C403.5	Introduction to JavaServer Faces (JSF) Technology, Introduction to Facelets,
		C503.6	Enterprise JavaBeans Technology, Transactions and Resource Connections
MCA504	Accounting Information System	C504.1	The subject introduces and familiarizes with the application of accounting principles and concepts in a computerized environment
		C504.2	

			Students would know about the use of technology in accounting and developing an accounting system for a business with an objective of preparing computerized financial statements and reports
		C504.3	Advantages of computerized accounting system over conventional accounting practices.
		C504.4	Financial Statements and its preparation
		C504.5	Balance Sheet, Adjustment Entries(simple numerical problems to be taught), Cash Flow Statement
		C504.6	Director's Reports, Preparation of Income Statement and Balance Sheet of Non- Profit Making organisations