2 Yrs Master in Computer Application (MCA)

First Semester							
Theory							
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit	University Marks	Internal Evaluation
1	BS	MCA01001	Discrete Mathematics	3-0-0	3	100	50
2	PC	MCA01002	Computer System Architecture	3-0-0	3	100	50
3	PC	MCA01003	C and Data Structure	3-0-0	3	100	50
4	PC	MCA01004	Operating System	3-0-0	3	100	50
5	PC	MCA01005	Database Engineering	3-0-0	3	100	50
				Total Credit (Theory)	**15**		
				Total Marks		**500**	**250**
Practical							
1	PC	MCA01006	Data Structure Using C Lab	0-0-3	2		100
2	PC	MCA01007	Operating System Lab	0-0-3	2		100
3	PC	MCA01008	Database Engineering Lab	0-0-3	2		100
				Total Credit (Practical)	**6**		
				Total Semester Credit	**21**		

Discrete Mathematics

Course Name	Statements
CO1	Apply the knowledge of matrix algebra for solving system of linear equations and compute the inverse of matrices.
CO2	To develop the essential tool of matrices to compute eigen values and eigen vectors required for matrix diagonalization process.
CO3	Illustrate the concept of vector differential calculus and vector integral calculus to understand the solenoidal, irrotational vectors and exhibit the inter dependence of line, surface and volume integrals respectively.
CO4	Know the use of periodic functions and Fourier series, Fourier integral, Fourier transform to analyse circuit and system communication.

Computer System Architecture

Course Name	Statements
CO1	Understand the principles of computer architecture including CPU organization, memory hierarchy and the relationship between hardware and software.
CO2	Implement the knowledge of computer organization to design digital circuits and basic CPU architectures.
CO3	Analyse computer system performance and efficiency by considering design choices and architectural features.
CO4	Evaluate suitability of computer architectures for specific applications and assess security implications.

C and Data Structure

Course Name	Statements
CO1	Understand the fundamental concepts of C programming, including variables, data types, control structures (if-else statements, loops), functions, arrays and pointers.
CO2	Implement algorithms for solving arithmetic and logical problems and implement these using C programming.
CO3	Design and implement efficient data structures for specific scenarios, analyzing their space and time complexities to ensure optimal performance.
CO4	Evaluate and compare the effectiveness of different data structure implementations in solving real-world problems, considering factors like efficiency, scalability and adaptability.

Operating System

Course Name	Statements
CO1	Understand the principles and services rendered by operating systems such as, system calls, virtual machines and multithreading.
CO2	Provide knowledge on basic system utilities including synchronization and memory management systems.
CO3	Understand the concept of various file-system design and implementation issues including protection and security.
CO4	Analyze the effectiveness of different design and configurations for specific computing environments, considering factors such as real-time requirements and scalability.

Database Engineering

Course Name	Statements
CO1	Understand the theoretical foundations of database systems such as relational algebra, normalization and conceptual data modelling.
CO2	Apply database design principles to develop efficient database schemas including entity-relationship modelling, normalization techniques and indexing strategies.
CO3	Analyze the performance of database systems through query optimization, indexing techniques and transaction management strategies.
CO4	Evaluate the appropriateness of different database architectures by considering factors such as scalability, availability and data integrity.

Data Structure Using C Lab

Course Name	Statements
CO1	Understand the fundamental concepts of C programming, including data types, control structures (if-else, loops), functions, arrays and pointers.
CO2	Utilize C programming constructs to solve simple to moderately complex problems, emphasizing logical thinking and algorithmic design.
CO3	Design and implement more advanced data structures such as trees (binary search trees), heaps and graphs, analyzing their time complexity in various applications.
CO4	Evaluate the efficiency and effectiveness of different data structure by implementations in solving real-world problems by considering factors like computational complexity, memory usage and scalability.

Database Engineering Lab

Course Name	Statements
CO1	Understand the concepts of database systems, including data models, database design, normalization and the architecture of a database management system.
CO2	Utilize SQL for creating, querying, updating and managing relational databases and gain familiarity with NoSQL databases for handling unstructured or semi-structured data.
CO3	Design and implement efficient database schemas based on requirements, applying normalization rules to ensure data integrity and avoid redundancy.
CO4	Use tools and techniques for database administration, performance tuning and security by proposing optimizations where ever necessary.

Operating System Lab

Course Name	Statements
CO1	Ability to develop application programs using system calls in Unix
CO2	Ability to implement inter-process communication between two processes
CO3	Ability to design and solve synchronization problems
CO4	Ability to simulate and implement operating system concepts such as scheduling, deadlock management, file management, and memory management

Second Semester							
Theory							
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit	University Marks	Internal Evaluation
1	PC	MCA02001	Computer Networks	3-0-0	3	100	50
2	PC	MCA02002	Analysis and Design of Algorithms	3-0-0	3	100	50
3	PC	MCA02003	Object Oriented Programming Using Java	3-0-0	3	100	50
4	PC	MCA02004	Object Oriented Analysis & Design	3-0-0	3	100	50
5	PC	MCA02005	Internet and Web Programming	3-0-0	3	100	50
Total Credit (Theory)					**15**		
Total Marks						**500**	**250**
Practical							
1	PC	MCA02006	Java and Python Programming Lab	0-0-3	2		100
2	PC	MCA02007	Computer Networks Lab	0-0-3	2		100
3	PC	MCA02008	Algorithm Design Lab	0-0-3	2		100
Total Credit (Practical)					**6**		
Total Semester Credit					**21**		
Total Marks							**300**

Computer Networks

Course Name	Statements
CO1	Understand the fundamental principles and architecture of computer networks, including protocols and models (OSI, TCP/IP).
CO2	Analyze various types of network topologies, transmission media, and communication techniques
CO3	Develop skills in configuring and troubleshooting network devices, addressing, and routing
CO4	Evaluate network security principles, protocols, and tools for maintaining safe and efficient communication

Analysis and Design of Algorithms

Course Name	Statements
CO1	Understand and apply core algorithmic techniques such as divide-and-conquer, dynamic programming, and greedy methods.
CO2	Analyze the time and space complexity of algorithms using Big-O, Big-Ω, and Big-Θ notations
CO3	Design efficient algorithms to solve computational problems and optimize resource usage
CO4	Evaluate and compare different algorithms for solving problems based on correctness, efficiency, and scalability

Object Oriented Programming Using Java

Course Name	Statements
CO1	Understand the principles of object-oriented programming (OOP) including classes, objects, inheritance, polymorphism, and encapsulation.
CO2	Develop Java programs that demonstrate effective use of OOP concepts for solving real-world problems
CO3	Apply exception handling, file I/O, and collections to build robust and efficient Java applications
CO4	Design and implement interactive software using Java, incorporating graphical user interfaces (GUIs) and event-driven programming

Object Oriented Analysis & Design

Course Name	Statements
CO1	Understand the fundamental principles of object-oriented analysis and design (OOAD) and apply them to real-world systems.
CO2	Use UML (Unified Modeling Language) to model and document system requirements, architecture, and design
CO3	Analyze system requirements and translate them into well-defined objects, classes, and relationships
CO4	Design scalable, maintainable, and reusable software solutions using object-oriented design patterns and principles

Computer Networks Lab

Java And Python Programming Lab

Course Name	

Internet and Web Programming

Course Name
CO1
CO2
CO3
CO4

Course Name	Statements
CO1	Implement and experiment with different algorithmic techniques such as divide-and-conquer, dynamic programming, and greedy algorithms.
CO2	Analyze the time and space complexity of algorithms through hands-on coding and performance testing
CO3	Develop problem-solving skills by solving real-world computational problems using appropriate algorithms
CO4	Gain experience in optimizing and refining algorithms for efficiency and scalability in different scenarios

Third Semester							
Theory							
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit	University Marks	Internal Evaluation
1	PC	MCA03001	Software Engineering	3-0-0	3	100	50
2	PC	MCA03002	Compiler Design	3-0-0	3	100	50
3	NPTEL-MOOC	MCA03003 (NM-)	Elective-I (To be opted from NPTEL MOOC Pool)		3	-	-
4	NPTEL-MOOC	MCA03004 (NM-)	Elective-II (To be opted from NPTEL MOOC Pool)		3	-	-
5	NPTEL-MOOC	MCA03005 (NM-)	Elective-III (To be opted from NPTEL MOOC Pool)		3	-	-
Total Credit (Theory)					**15**		
Total Marks						**200**	**100**
Practical							
1	PC	MCA03006	Software Engineering Lab	0-0-3	2		100
2	PC	MCA03007	Seminar and Technical Writing	0-0-3	2		100
3	PC	MCA03008	Web Programming Lab	0-0-3	2		100
Total Credit (Practical)					**6**		
Total Semester Credit					**21**		
Total Marks							**300**

Software Engineering

Course Name	Statements
CO1	Understand the fundamental concepts of software development models such as waterfall, agile and scrum.
CO2	Provide knowledge about requirements engineering including, functional and non-functional requirements, software requirement specifications, IEEE 830 guidelines, decision tables and trees.
CO3	Analyse different software design processes along with the testing techniques to evaluate software quality attributes such as reliability, maintainability and usability using appropriate metrics and evaluation techniques.
CO4	Apply software engineering skills in real-world problem solving using reverse engineering, SOA and SaaS.

Compiler Design

Course Name	Statements
CO1	Provide knowledge on the fundamental concepts of compilers, including the phases of compilation, lexical analysis, syntax analysis and semantic analysis.
CO2	Utilize compiler algorithms for parsing, symbol table management and basic error handling in simple compiler design projects.
CO3	Design, implement and analyze key components of a compiler, such as syntax trees, intermediate code generation and optimization techniques.
CO4	Evaluate and optimize compilers by assessing their performance in terms of speed, memory usage and error detection capabilities.

NPTEL MOOC Pool(ForElective-I, Elective-II and Elective-III)

(Student must choose a Course of 8 weeks or more duration and must submit the relevant certificate from NPTEL to the University through the NPTEL Local Chapter before completion of the 4th Semester for the required credit transfer. No University examinations will be conducted for these subjects. Faculty mentors are to be assigned for guiding and monitoring these students through the corresponding NPTEL local chapters)

Subject Code	Subject Name
NM-1	Artificial Intelligence
NM-2	Soft Computing
NM-3	Computer Network security
NM-4	Information System Design
NM-5	Real-time System
NM-6	Mobile Computing
NM-7	Introduction to Data Science
NM-8	Machine Learning
NM-9	Internet-of-Things
NM-10	Big-Data Analytics
NM-11	Cyber Law and Security
NM-12	Intellectual Property Rights
NM-13	Embedded System
NM-14	Management Information System
NM-15	Digital Image Processing
NM-16	Data Mining
NM-17	Advanced Computer Networks
NM-18	Distributed Operating System
NM-19	Cloud Computing
NM-20	Simulation and Modelling
NM-21	Wireless Sensor Networks
NM-22	Software Project management
NM-23	Advance Database Management Systems
NM-24	Data Analytics
NM-25	Advanced Computer Architecture
NM-26	Intelligence Data Analysis
NM-27	Deep Learning
NM-28	E-Commerce and ERP
NM-29	Computer Graphics and Multimedia
NM-30	Computer Based Optimization techniques

Software Engineering Lab

Course Name	Statements
CO1	Understand the concepts of various software development life cycles (e.g., waterfall, agile, scrum) and the roles and responsibilities within a software development team.
CO2	Utilize software engineering tools and techniques for requirements analysis, design, implementation, testing and maintenance of software projects.
CO3	Design, implement and analyze software projects, applying best practices in software architecture, design patterns and user interface design, considering both functional and non-functional requirements.
CO4	Use metrics and evaluation techniques to assess software quality, project progress and team dynamics.

Seminar and Technical Writing

Course Name	Statements
CO1	Develop effective communication skills by preparing and delivering technical presentations on selected topics.
CO2	Enhance writing abilities through the creation of well-researched, structured, and clear technical reports and papers
CO3	Learn how to critically analyze technical content and present findings in a concise and professional manner
CO4	Gain proficiency in using academic resources, citations, and formatting styles for technical documentation and research

Web Programming Lab

Course Name	Statements
CO1	Gain hands-on experience in creating static and dynamic web pages using HTML, CSS, and JavaScript.
CO2	Develop and implement interactive web applications using client-side and server-side technologies like PHP, Node.js, or Python
CO3	Integrate databases with web applications to perform operations such as data retrieval, insertion, and updates
CO4	Apply web development best practices to build responsive, user-friendly, and secure web applications

Fourth Semester							
Theory							
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit	University Marks	Internal Evaluation
Practical							
1	PC	MCA04001	Comprehensive Viva-Voice	0-0-2	2		100
2	PC	MCA04002	Internship/ Major Project	0-0-8	15		500
Total Credit (Practical)					**17**		
Total Semester Credit					**17**		
Total Marks							**600**

Comprehensive Viva-Voice

Course Name	Statements
CO1	Demonstrate a thorough understanding of key concepts and principles across various courses in the curriculum.
CO2	Effectively communicate technical knowledge and problem-solving approaches to diverse questions and scenarios
CO3	Showcase the ability to integrate and apply theoretical knowledge to practical situations
CO4	Build confidence in articulating complex topics and answering questions in a clear, concise, and professional manner

Internship/ Major Project

Course Name	Statements
CO1	Apply theoretical knowledge to real-world problems through the development and implementation of a project or solution.
CO2	Enhance practical skills in project management, teamwork, and technical communication while working on industry-relevant tasks
CO3	Demonstrate proficiency in using appropriate tools, technologies, and frameworks to design, develop, and deploy a functional system or application
CO4	Evaluate and document project outcomes, including challenges faced, solutions implemented, and future improvements, to demonstrate professional competence and growth