Course Outcomes (COs)

Department of MCA

Programme Name: Master of Computer Applications

CONTENTS

Course Outcome for Master of Computer Application

Course Name	Mathematical Foundation for Computer Applications
Course Code	22MCA11
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA11.1	Apply the fundamentals of set theory and matrices for the given problem
22MCA11.2	Apply the types of distribution; evaluate the mean and variance for the given case study/problem.
22MCA11.3	Solve the given problem by applying the Mathematical logic concepts.
22MCA11.4	Identify and list the different applications of discrete mathematical concepts in computer science

Course Name	OPERATING SYSTEM CONCEPTS
Course Code	22MCA12
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA12.1	Analyse the basic Operating System Structure and concept of Process Management
22MCA12.2	Analyse the given Synchronization/ Deadlock problem to solve and arrive at valid conclusions
22MCA12.3	Analyse OS management techniques and identify the possible modifications for the given problem context
22MCA12.4	Ability to simulate and implement operating system concepts such as scheduling, Deadlock management, file management, memory management and design and solve synchronization problems.

Course Name	Data Structures with Algorithms
Course Code	22MCA13
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA13.1	Explore different data structures its operations
22MCA13.2	Demonstrate the concept of recursion and Queue
22MCA13.3	Apply the concept of Linked list, Trees and Graphs in problem solving
22MCA13.4	Implement all data structures in a high-level language for problem solving

Course Name	**Computer Networks**
Course Code	**22MCA14**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA14.1	Recognize computer networks
22MCA14.2	List computer network topologies
22MCA14.3	List required hardware to constitute computer network.
22MCA14.4	Explain each computer network topology physically or logically

Course Name	**Design and Analysis of Algorithm**
Course Code	**22MCA15**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA15.1	Describe the basic algorithm design strategies and use them for devising new solutions to various problems
22MCA15.2	Analyse algorithms for time/space complexity
22MCA15.3	Differentiate between deterministic and probabilistic algorithms and use the probabilistic algorithms in appropriate scenarios
22MCA15.4	Apply appropriate method to solve a given problem.

Course Name	**Data Structures with Algorithms Laboratory**
Course Code	**22MCAL16**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCAL16.1	Implement the techniques for evaluating the given expression
22MCAL16.2	Implement sorting / searching techniques, and validate input/output for the given problem.
22MCAL16.3	Implement data structures (namely Stacks, Queues, Circular Queues, Linked Lists, and Trees), its operations and algorithms
22MCAL16.4	Implement the algorithm to find whether the given graph is connected or not and conclude on the performance of the technique implemented

Course Name	**Computer Networks Laboratory**
Course Code	**22MCA17**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA17.1	Understand the working principle of various communication protocols.
22MCA17.2	Understand the network simulator environment
22MCA17.3	Visualize a network topology and observe its performance.
22MCA17.4	Analyze the traffic flow and the contents of protocol frames.

Course Name	**Research Methodology and IPR**
Course Code	**22RMI18**
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA11.1	Identify appropriate research methods and effectively outline the research steps for a given problem.
18MCA11.2	Able to describe the significance of literature reviews in research, perform literature searches proficiently, construct theoretical and conceptual frameworks, and compose comprehensive reviews
18MCA11.3	Able to critically examine data collection methods from diverse sources, distinguish between primary and secondary data, evaluate research and sampling designs, as well as apply appropriate measurement and scaling techniques.
18MCA11.4	Apply some concepts/section of Copy Right Act /Patent Act /Cyber Law/ Trademark to the given case and develop –conclusions

Course Name	**Database Management System**
Course Code	**22MCA21**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA21.1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS
22MCA21.2	Use Structured Query Language (SQL) for database manipulation and also demonstrate the basic of query evaluation
22MCA21.3	Design and build simple database systems and relate the concept of transaction, concurrency control and recovery in database
22MCA21.4	Develop application using tuple and domain relation expression from queries as well as develop an application to interact with databases, relational algebra expression.

Course Name	**Object Oriented Programming Using Java**
Course Code	**22MCA22**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA22.1	Analyse the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP.
22MCA22.2	Demonstrate the ability to design and develop java programs, analyse, and interpret object-oriented data and document results.
22MCA22.3	Apply object-oriented concepts using Java to develop programs.
22MCA22.4	Develop user friendly applications using Console based I/O GUI/ File concepts.

Course Name	**Software Engineering**
Course Code	**22MCA23**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA23.1	Design a software system, component or process to meet desired needs within realistic constraints
22MCA23.2	Assess professional and ethical responsibility AND Function on multi-disciplinary teams
22MCA23.3	Use the techniques, skills, and modern engineering tools necessary for engineering practice
22MCA23.4	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Course Name	**WEB TECHNOLOGIES**
Course Code	**22MCA24**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA24.1	Creating the small web page using xhtml5.
22MCA24.2	Use different tags of html to create web page.
22MCA24.3	Use of CSS and JavaScript.
22MCA24.4	Developing the dynamic document using JavaScript

Course Name	**ENTERPRISE RESOURCE PLANNING**
Course Code	**22MCA253**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA253.1	Analyse the essentials of supply chain management in ERP
22MCA253.2	Analyse the implementation of ERP in the context of business of the different organization
22MCA253.3	Analyse and apply ERP for different business modules for the given problem and case study.
22MCA253.4	Analyse the design of ERP with future E-commerce and internet.

Course Name	**Mobile Application Development**
Course Code	**22MCA263**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCA263.1	Describe the requirements for mobile applications. Explain the challenges in mobile application design and development
22MCA263.2	Develop design for mobile applications for specific requirements
22MCA263.3	Implement the design using Android SDK, Objective C and iOS
22MCA263.4	Deploy mobile applications in Android and iPone marketplace for distribution

Course Name	**DBMS Laboratory**
Course Code	**22MCAL27**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCAL27.1	Create database objects. Design entity-relationship diagrams to solve given database applications.
22MCAL27.2	Implement a database schema for a given problem. Formulate SQL queries in Oracle for the given problem.
22MCAL27.3	Apply normalization techniques to improve the database design for the given problem.
22MCAL27.4	Build database and verify for its appropriate normalization for any given problem

Course Name	**Java Programming Laboratory**
Course Code	**22MCAL28**
Course outcomes (COs): At the end of the course the student will be able to:	
22MCAL28.1	Demonstrate the fundamental data types and constructs of Java Programming by writing executable/interpretable programs.
22MCAL28.2	Illustrate the object oriented principles with the help of java programs.
22MCAL28.3	Develop reusable and efficient applications using inheritance concepts of java.
22MCAL28.4	Learn the object oriented concepts and its implementation in Java.

Course Outcomes of First -Year Courses

Course Name	Data Structures with Algorithms
Course Code	20MCA11
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA11.1	Explore different data structures, its operations
20MCA11.2	Demonstrate the concept of recursion and Queue
20MCA11.3	Apply the concept of Linked list, Trees and Graphs in problem solving
20MCA11.4	Implement all data structures in a high-level language for problem solving

Course Name	Operating System with Unix
Course Code	20MCA12
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA12.1	Understanding the basic concepts of Process Management in Operating system and Unix.
20MCA12.2	Apply the features for the given Unix and operating system problems.
20MCA12.3	Design the user interactive commands and techniques.
20MCA12.4	Demonstrate the usage of different deadlock problems, commands, variable, and AWK filtering to the given problem

Course Name	Computer Networks
Course Code	20MCA13
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA13.1	Recognize computer networks
20MCA13.2	List computer network topologies.
20MCA13.3	List required hardware to constitute computer network.
20MCA13.4	Explain each computer network topology physically or logically.

Course Name	Mathematical Foundation for Computer Applications
Course Code	20MCA14
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA14.1	Apply the fundamentals of set theory and matrices for the given problem
20MCA14.2	Apply the types of distribution, evaluate the mean and variance for the given case study/problem.
20MCA14.3	Solve the given problem by applying the Mathematical logic concepts.
20MCA14.4	Identify and list the different applications of discrete mathematical concepts in computer science

Course Name	Research Methodology & IPR
Course Code	20MCA15
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA15**.1**	To identify appropriate research methods and effectively outline the research steps for a given problem.
20MCA15.2	Able to describe the significance of literature reviews in research, perform literature searches proficiently, construct theoretical and conceptual frameworks, and compose comprehensive reviews
20MCA15.3	Able to critically examine data collection methods from diverse sources, distinguish between primary and secondary data, evaluate research and sampling designs, as well as apply appropriate measurement and scaling techniques.
20MCA15.4	Apply some concepts/section of Copy Right Act /Patent Act /Cyber Law/ Trademark to the given case and develop –conclusions

Course Name	Data Structures with Algorithms Lab
Course Code	20MCA16
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA16.1	Implement the techniques for evaluating the given expression.
20MCA16.2	: Implement sorting / searching techniques, and validate input/output for the given problem.
20MCA16.3	Implement data structures (namely Stacks, Queues, Circular Queues, Linked Lists, and Trees), its operations and algorithms.
20MCA16.4	Implement the algorithm to find whether the given graph is connected or not and conclude on the performance of the technique implemented.

Course Name	Unix Programming Lab
Course Code	20MCA17
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA17.1	Demonstrate the working of basic commands of Unix environment including file processing
20MCA17.2	Apply Regular expression to perform pattern matching using utilities like grep,sed and awk.
20MCA17.3	Demonstrate the usage of different shell commands, variable and AWK filtering to the given problem.
20MCA17.4	Develop shell scripts for developing the simple applications to the given problem

Course Name	Computer Networks Lab
Course Code	20MCA18
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA18.1	To understand the working principle of various communication protocols
20MCA18.2	To understand the network simulator environment
20MCA18.3	visualize a network topology and observe its performance.
20MCA18.4	To analyze the traffic flow and the contents of protocol frames

Course Name	Basics of Programming & CO
Course Code	20MCA19 -BC
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA19 -BC.1	Demonstrate the key concepts introduced in C programming by writing and executing the programs , concepts of structures and pointers for the given application/problem.
20MCA19 -BC.2	Implement the single/multi-dimensional array for the given problem.
20MCA19 -BC.3	Demonstrate the application of logic gates in solving some societal/industrial problems.
20MCA19 -BC.4	Analyse how memory organization, operations, instruction sequencing and interrupts are useful in executing the given program.

Course Name	Database Management System
Course Code	20MCA21
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA21.1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS
20MCA21.2	Use Structured Query Language (SQL) for database manipulation and also demonstrate the basic of query evaluation
20MCA21.3	Design and build simple database systems and relate the concept of transaction, concurrency control and recovery in database
20MCA21.4	Develop application using tuple and domain relation expression from queries as well as develop an application to interact with databases, relational algebra expression.

Course Name	Object Oriented Programming with Java
Course Code	20MCA22
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA22.1	Understand the basics Object Oriented programming with Java.
20MCA22.2	Apply the concepts of Object-Oriented programming to develop reusable components.
20MCA22.3	Design the usage of methods, classes, Packages, Interfaces, Exceptions, Enumerations and Multithreading in building given applications.
20MCA22.4	Implement the Object-Oriented concepts to develop java programs for a given scenario
Course Name	Web Technologies
Course Code	20MCA23
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA23.1	Creating the small web page using xhtml5.
20MCA23.2	Use different tags of html to create web page.
20MCA23.3	Use of CSS and JavaScript.
20MCA23.4	Developing the dynamic document using JavaScript

Course Name	Software Engineering
Course Code	20MCA24
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA24.1	Understand the basics Object Oriented features, it's modelling, Design and Software engineering development.
20MCA24.2	Apply the concepts of Object-Oriented and Software engineering by using the tool
20MCA24.3	Design the usage of software engineering process and modelling techniques
20MCA24.4	Analyse and Implement the Object-Oriented concepts using the software engineering process using the design method.

Course Name	Enterprise Resource Planning
Course Code	20MCA253
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA253.1	Analyse the essentials of supply chain management in ERP
20MCA253.2	Analyse the implementation of ERP in the context of business of the different organization
20MCA253.3	Analyse and apply ERP for different business modules for the given problem and case study.
20MCA253.4	Analyse the design of ERP with future E-commerce and internet

Course Name	Mobile Application Development
Course Code	20MCA263
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA263.1	Describe the requirements for mobile applications. Explain the challenges in mobile application design and development
20MCA263.2	Develop design for mobile applications for specific requirements
20MCA263.3	Implement the design using Android SDK, Objective C and iOS
20MCA263.4	Deploy mobile applications in Android and iPone marketplace for distribution

Course Name	DBMS Lab
Course Code	20MCA27
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA27.1	Create database objects. Design entity-relationship diagrams to solve given database applications.
20MCA27.2	Implement a database schema for a given problem. Formulate SQL queries in Oracle for the given problem.
20MCA27.3	Apply normalization techniques to improve the database design for the given problem.
20MCA27.4	Build database and verify for its appropriate normalization for any given problem

Course Name	Java Programming Lab.
Course Code	20MCA28
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA28.1	Demonstrate the fundamental data types and constructs of Java Programming by writing executable/interpretable programs.
20MCA28.2	Illustrate the object-oriented principles with the help of java programs.
20MCA28.3	Develop applications using inheritance and multi-threading concepts of java.
20MCA28.4	Apply and Write java programs to demonstrate the concepts of interfaces, inner classes and I/O streams.

Course Name	Web Technologies Lab with Mini-project
Course Code	20MCA29
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA27.1	Apply the concept and usages web-based programming techniques.
20MCA27.2	Learning and Developing XHTML documents using JavaScript and CSS.
20MCA27.3	To be familiar in the use of CGI and Perl programs for different types of server-side applications.
20MCA27.4	Design and implement user interactive dynamic web-based applications.

Course Outcomes of Second-Year Courses

Course Name	Data Analytics using Python
Course Code	20MCA31
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA31**.1**	Demonstrate basic data analytics principles and techniques
20MCA31.2	Apply control structures to the given problems
20MCA31.3	Apply the concepts of inheritance and overloading for a given problem.
20MCA31.4	Demonstrate the concepts of learning and decision trees for a given problem

Course Name	IOT
Course Code	20MCA32
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA32**.1**	Understand the basics IOT Architecture and design along with functional/compute stack and data management for a given problem
20MCA32.2	Apply the concepts of IOT Architecture and data analytics to develop for the given business case.
20MCA32.3	Analyse and Design the usage application protocol, transport layer methods in building given business case.
20MCA32.4	Analyse the architecture and Implement the IOT business case concepts and develop for a given scenario or the given problem using modern tools.

Course Name	Advances in Java
Course Code	20MCA33
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA33**.1**	Apply the concept of Servlet and its life cycle to create web application and JSP tags and its services to web application.
20MCA33.2	Create packages and interfaces in the web application context
20MCA33.3	Build Database connection for the web applications.
20MCA33.4	Develop enterprise applications using Java Beans concepts for the given problem

Course Name	Cloud Computing
Course Code	20MCA342
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA342**.1**	Demonstrate the System & software models and mechanisms that support cloud computing
20MCA342.2	Classify various cloud services and their providers
20MCA342.3	Compare various Cloud deployment models and enabling technologies.
20MCA342.4	Differentiate various types of Computing Environments

Course Name	Software Project Management
Course Code	20MCA354
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA354**.1**	Apply the practices and methods for successful software project management
20MCA354.2	Identify techniques for requirements, policies and decision making for effective resource management.
20MCA354.3	Illustrate the evaluation techniques for estimating cost, benefits, schedule and risk.
20MCA354.4	: Devise a framework for software project management plan for activities, risk, monitoring and control and managing people

Course Name	Data Analytics Lab with Mini-project
Course Code	20MCA36
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA36**.1**	Develop python program to perform search/sort on a given data set.
20MCA36.2	Demonstrate object oriented principles
20MCA36.3	Demonstrate data visualization using Numpy for a given problem and regression model for a given problem
20MCA36.4	Deign and develop an application for the given problem

Course Name	IoT Lab with Mini Project
Course Code	20MCA37
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA37**.1**	Demonstrate the IoT architecture design for a given problem
20MCA37.2	Apply IOT techniques for a given problem
20MCA37.3	Analyse the application protocol, transport layer methods for the given business case.
20MCA37.4	Design and develop an application for the given problem for the societal/industrial problems

Course Name	Advances in Java Lab
Course Code	20MCA38
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA38**.1**	Apply the concept of Servlet and its life cycle to create web application. And JSP tags and its services to web application
20MCA38.2	Create packages and interfaces in the web application context.
20MCA38.3	Build Database connection for the web applications.
20MCA38.4	Develop application programs using beans concept
Course Name	**Advances in Web Technologies**
Course Code	20MCA41
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA41**.1**	Build the Web Applications using JQuery, PHP, XML for the given problem
20MCA41.2	Design the Web Pages using AJAX for the given problem
20MCA41.3	Analyze the advances in Web2.0 and demonstrate its usage for the problem considered and web services and demonstrate its usage for the problem considered
20MCA41.4	Design responsive web applications using Bootstrap for the given problem

Course Name	Programming using C#
Course Code	20MCA42
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA42.1	Analyse C# and client-server concepts using .NetFrameWork Components
20MCA42.2	Apply delegates ,event and exception handling to in corporate with ASP, WinForm, ADO.NET.
20MCA42.3	Analyze the use of .Net Components depending on the problem statement
20MCA42.4	Implement& develop a web based and Console based application with Database connectivity ,web based application with Database connectivity

Course Name	Industry Internship
Course Code	20MCA43
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA43.1	Analyse the real-time industry/research work environment with emphasis on organizational structure/job process.
20MCA43.2	Apply the different departments and functions / tools /technology
20MCA43.3	Develop applications using modern tools and technologies
20MCA43.4	Demonstrate self-learning capabilities with an effective report and detailed presentation.

Course Name	Project work Phase 2
Course Code	20MCA44
Course outcomes (COs): At the end of the course the student will be able to:	
20MCA44.1	Identify a suitable problem making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities.
20MCA44.2	Work as an individual and team to segregate work and execute/implement projects using appropriate tools.
20MCA44.3	Develop skills to disseminate technical and general information by means of oral aswell as written presentation and professional skills.
20MCA44.4	To conduct testing of application using appropriate techniques and tools.

2018 Scheme(PG)

Course Outcomes of First-Year Courses

Course Name	OBJECT ORIENTED PROGRAMMING WITH C++
Course Code	18MCA11
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA11.1	Understand the basics of object-oriented programming concepts and design a solution to a problem using class types, function operations.
18MCA11.2	Apply the code reusability and extensibility functionalities using object oriented features.
18MCA11.3	Analyze the file handling mechanisms and explore the Performance analysis of I/O Streams.
18MCA11.4	Implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems.

Course Name	UNIX AND SHELL PROGRAMMING
Course Code	18MCA12
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA12.1	Understanding the basic concepts of Process Management in Operating system and Unix.
18MCA12.2	Apply the features for the given Unix and operating system problems.
18MCA12.3	Design the user interactive commands and techniques
18MCA12.4	Demonstrate the usage of different deadlock problems, commands, variable, and AWK filtering to the given problem

Course Name	WEB TECHNOLOGIES
Course Code	18MCA13
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA13.1	**Creating the small web page using xhtml5.**
18MCA13.2	**Use different tags of html to create web page.**
18MCA13.3	**Use of CSS and JavaScript.**
18MCA13.4	**Developing the dynamic document using JavaScript**

Course Name	SAFTWARE ENGINEERING
Course Code	18MCA14
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA14.1	Design a software system, component or process to meet desired needs within realistic constraints
18MCA14.2	Assess professional and ethical responsibility
18MCA14.3	Function on multi-disciplinary teams
18MCA14.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice and Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.

Course Name	COMPUTER ORGANIZATION
Course Code	18MCA15
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA15.1	Explain the basic organization of a computer system
18MCA15.2	Experimenting the functioning of different sub systems, such as processor, input/output, and memory.
18MCA15.3	Analyse the different arithmetic and logical units.
18MCA15.4	Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.

Course Name	C++ PROGRAMING LAB
Course Code	18MCA16
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA16.1	Understand the basics of object-oriented programming concepts and design a solution to a problem using class types, function operations.
18MCA16.2	Apply the code reusability and extensibility functionalities using object oriented features.
18MCA16.3	Analyze the file handling mechanisms and explore the Performance analysis of I/O Streams.
18MCA16.4	Implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems.

Course Name	UNIX AND SHELL PROGRAMMING LAB
Course Code	18MCA17
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA17.1	Demonstrate the working of basic commands of Unix environment including file processing
18MCA17.2	Apply Regular expression to perform pattern matching using utilities like grep,sed and awk.
18MCA17.3	Demonstrate the usage of different shell commands, variable and AWK filtering to the given problem.
18MCA17.4	Develop shell scripts for developing the simple applications to the given problem.

Course Name	WEB TECHNOLOGIES LAB
Course Code	18MCA18
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA18.1	Apply the concept and usages web-based programming techniques.
18MCA18.2	Learning and Developing XHTML documents using JavaScript and CSS.
18MCA18.3	To be familiar in the use of CGI and Perl programs for different types of server-side applications.
18MCA18.4	Design and implement user interactive dynamic web-based applications.

Course Name	PROGAMMING USING JAVA
Course Code	18MCA21
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA21.1	Understand the basics Object Oriented programming with Java.
18MCA21.2	Apply the concepts of Object-Oriented programming to develop reusable components.
18MCA21.3	Design the usage of methods, classes, Packages, Interfaces, Exceptions, Enumerations, Wrappers and Multithreading in building given applications.
18MCA21.4	Implement the Object-Oriented concepts to develop java programs for a given scenario or distributed applications to the given problem.

Course Name	DATA STRUCTURE USING C++
Course Code	18MCA22
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA22.1	Explore different data structures, its operations
18MCA22.2	Demonstrate the concept of recursion and Queue.
18MCA22.3	Apply the concept of Linked list, Trees and Graphs in problem solving
18MCA22.4	Implement all data structures in a high-level language for problem solving

Course Name	DICRET MATHEMATICAL STRUCTURES AND STATISTICS
Course Code	18MCA23
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA23.1	Apply the fundamentals of set theory and matrices for the given problem
18MCA23.2	Apply the types of distribution, evaluate the mean and variance for the given case study/problem.
18MCA23.3	Solve the given problem by applying the Mathematical logic concepts.
18MCA23.4	Identify and list the different applications of discrete mathematical concepts in computer science.

Course Name	COMPUTER NETWORKS
Course Code	18MCA24
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA24.1	Recognize computer networks
18MCA24.2	List computer network topologies
18MCA24.3	List required hardware to constitute computer network.
18MCA24.4	Explain each computer network topology physically or logically

Course Name	OPERATING SYSTEM
Course Code	18MCA25
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA25.1	Analyse the basic Operating System Structure and concept of Process Management
18MCA25.2	Analyse the given Synchronization/ Deadlock problem to solve and arrive at valid conclusions
18MCA25.3	Analyse OS management techniques and identify the possible modifications for the given problem context
18MCA25.4	Ability to simulate and implement operating system concepts such as scheduling, Deadlock management, file management, memory management and design and solve synchronization problems.

Course Name	JAVA PROGRAMMING LAB
Course Code	18MCA26
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA26.1	Demonstrate the fundamental data types and constructs of Java Programming by writing executable/interpretable programs.
18MCA26.2	Illustrate the object-oriented principles with the help of java programs.
18MCA26.3	Develop applications using inheritance and multi-threading concepts of java.
18MCA26.4	Apply and Write java programs to demonstrate the concepts of interfaces, inner classes and I/O streams.

Course Name	DATA STRUCTURES LAB
Course Code	18MCA27
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA27.1	Implement the techniques for evaluating the given expression.
18MCA27.2	Implement sorting / searching techniques, and validate input/output for the given problem
18MCA27.3	Implement data structures (namely Stacks, Queues, Circular Queues, Linked Lists, and Trees), its operations and algorithms.
18MCA27.4	Implement the algorithm to find whether the given graph is connected or not and conclude on the performance of the technique implemented

Course Name	COMPUTER NETWORK LAB
Course Code	18MCA28
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA28.1	To understand the working principle of various communication protocols
18MCA28.2	To understand the network simulator environment
18MCA28.3	visualize a network topology and observe its performance.
18MCA28.4	To analyze the traffic flow and the contents of protocol frames.

Course Outcomes of Second-Year Courses

Course Name	DATABASE MANAGEMENT SYSTEM
Course Code	18MCA31
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA31.1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.
18MCA31.2	Use Structured Query Language (SQL) for database manipulation and also demonstrate the basic of query evaluation.
18MCA31.3	Design and build simple database systems and relate the concept of transaction, concurrency control and recovery in database
18MCA31.4	Develop application using tuple and domain relation expression from queries as well as develop an application to interact with databases, relational algebra expression.

Course Name	PROGRAMMING USING PYTHON
Course Code	18MCA32
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA32.1	Explain programming features of python and other data structures lists, tuples and dictionaries.
18MCA32.2	Apply various features of python to solve problems
18MCA32.3	Interpret the concepts of Object-Oriented Programming as used in Python.
18MCA32.4	Explore the need for scraping websites and working with PDF, JSON and other file formats

Course Name	DESIGN AND ANALYSIS OF ALGORITHMS
Course Code	18MCA33
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA33.1	Analyze the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm
18MCA33.2	Apply Master Theorem to compute time efficiency of recursive algorithms and compare efficiency of algorithms.
18MCA33.3	Solve various problems using appropriate design techniques and compare efficiency of algorithms.
18MCA33.4	Experiment with various design techniques to solve problems.

Course Name	SYSTEM SOFTWARE
Course Code	18MCA34
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA34.1	Understand the system software concepts assemblers and loaders
18MCA34.2	Develop top down, bottom up parsers and shift reduce parsers and opcode generation
18MCA34.3	Develop System programs using lex and yacc tools
18MCA34.4	generate ssd,sst intermediate code generation and machine code generation

Course Name	SOFTWARE TESTING
Course Code	18MCA351
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA351.1	Understand Various test processes and continuous quality improvement
18MCA351.2	Solve the given problem in any programming language
18MCA351.3	Apply various testing techniques for the given problem, build basic documentation for the software artifact
18MCA351.4	Build necessary test cases for any given problem

Course Name	DBMS LAB
Course Code	18MCA36
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA36.1	Create database objects. Design entity-relationship diagrams to solve given database applications.
18MCA36.2	Implement a database schema for a given problem. Formulate SQL queries in Oracle for the given problem
18MCA36.3	Apply normalization techniques to improve the database design for the given problem.
18MCA36.4	Build database and verify for its appropriate normalization for any given problem

Course Name	PYTHON PROGRAMMING LAB
Course Code	18MCA37
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA37.1	Explain programming features of python and other data structures lists, tuples and dictionaries.
18MCA37.2	Apply various features of python to solve problems
18MCA37.3	Interpret the concepts of Object-Oriented Programming as used in Python.
18MCA37.4	Explore the need for scraping websites and working with PDF, JSON and other file formats

Course Name	ALGORITHMS LAB
Course Code	18MCA38
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA38.1	Explain various computational problem solving techniques
18MCA38.2	Apply appropriate method to solve a given problem.
18MCA38.3	Describe various methods of algorithm analysis.
18MCA38.4	Estimate the performance of various algorithms

Course Name	ADVANCED JAVA PROGRAMMING
Course Code	18MCA41
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA41.1	Apply the concept of Servlet and its life cycle to create web application and JSP tags and its services to web application.
18MCA41.2	Create packages and interfaces in the web application context.
18MCA41.3	Build Database connection for the web applications.
18MCA41.4	Develop enterprise applications using Java Beans concepts for the given problem

Course Name	ADVANCED WEB PROGRAMMING
Course Code	18MCA42
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA42.1	Acquire knowledge of building the Web Applications using PHP, Ruby, Bootstrap. AJAX and XML.
18MCA42.2	Design the Asynchronous Web Applications using AJAX.
18MCA42.3	Understand the terminology of building Web Applications using MVC architecture.
18MCA42.4	Design responsive web applications using Bootstrap.

Course Name	**OBJECT ORIENTED MODELING AND DESIGN**
Course Code	**18MCA43**
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA43.1	Acquire knowledge of Basic UML Concepts and terminologies Life Cycle of Object oriented Development Modeling Concepts
18MCA43.2	Identify the basic principles of Software modeling and apply them in real world applications
18MCA43.3	Produce conceptual models for solving operational problems in software and IT environment using UML
18MCA43.4	Analyze the development of Object Oriented Software models in terms of Static behaviour Dynamic behaviour

Course Name	CLOUD MPUTING
Course Code	18MCA444
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA444.1	Demonstrate the System & software models and mechanisms that support cloud computing
18MCA444.2	Classify various cloud services and their providers
18MCA444.3	Compare various Cloud deployment models and enabling technologies.
18MCA444.4	Differentiate various types of Computing Environments

Course Name	ENTERPRISE RESOURCE PLANNING (ERP)
Course Code	18MCA451
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA451.1	Analyze the essentials of supply chain management in ERP.
18MCA451.2	Analyze the implementation of ERP in the context of business of the different organization
18MCA451.3	Analyze and apply ERP for different business modules for the given problem and case study.
18MCA451.4	Analyze the design of ERP with future E-commerce and internet

Course Name	PROFESSIONAL COMMUNICATION & REPORT WRITING
Course Code	18MCA46
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA46.1	Understand the professional communication at work place.
18MCA46.2	Acquire the knowledge technical writing and business reporting
18MCA46.3	Develop the leadership qualities.
18MCA46.4	Understand and implement ethical behavior at work place.

Course Name	ADVANCED JAVA PROGRAMMING LAB
Course Code	18MCA47
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA47.1	Designing HTML pages to demonstrate Java Servlets, JSP, Bean and EJB programs.
18MCA47.2	Implementing Dynamic HTML using Servlet and demonstration of service methods, auto web page refresh, Session tracking using cookie and Http Session in Servlet.
18MCA47.3	Learn the fundamental of connecting to the database.
18MCA47.4	Demonstrate JSP (page attributes, action tags and all basic tags) and types of EJB application.

Course Name	ADVANCED WEB PROGRAMMING LAB
Course Code	18MCA48
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA48.1	Understand, analyze and apply the role of server side scripting languages.
18MCA48.2	Build web application using PHP, Ruby, Bootstrap, XML and store values in MYSQL
18MCA48.3	Develop the web application using PHP, Ruby, XML, Ajax
18MCA48.4	Build MVC based web applications using Ruby and Rails.

Course Name	OBJECT ORIENTED MODELING AND DESIGN LAB
Course Code	18MCA49
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA49.1	Understand the fundamental principles of Object-Oriented analysis, design, development and programming
18MCA49.2	Demonstrate and represent the UML model elements, to enable visual representation of the system being developed
18MCA49.3	Implement object oriented design model with the help of modern tool, Rational software Architect
18MCA49.4	Analyze and differentiate the static and dynamic behavior of the system for achieving the intended functionalities of the system COS: Evaluate Various design patterns for applicability.

Course Outcomes of Third-Year Courses

Course Name	PROGRAMMING USING C# .NET
Course Code	18MCA51
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA51.1	Understand C# and client-server concepts using Net Frame Work Components.
18MCA51.2	Apply delegates, event and exception handling to incorporate with ASP. Win Form, ADO.NET
18MCA51.3	Analyze the use of Net Components depending on the problem
18MCA51.4	Implement & develop a web based and Console based Statement application with Database connectivity

Course Name	MOBILE APPLICATIONS
Course Code	18MCA52
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA52.1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
18MCA52.2	Develop applications using software development kits (SDKS), frameworks and toolkits and frameworks
18MCA52.3	Design and develop open source software based mobile applications
18MCA52.4	Build and deploy competent mobile development solutions

Course Name	MACHINE LEARNING
Course Code	18MCA53
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA53**.1**	Develop an appreciation for what is involved in learning models from data.
18MCA53.2	Differentiate supervised, unsupervised and reinforcement learning.
18MCA53.3	Apply neural networks, Bayes classifier and k nearest neighbor, for real world problems.
18MCA53.4	Perform statistical analysis of machine learning techniques.

Course Name	INTERNET OF THINRS
Course Code	18MCA542
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA542.1	Understand constraints and opportunities of wireless and mobile networks for Internet of Things
18MCA542.2	Develop critical thinking skills. And Analyze the societal impact of loT security events.
18MCA542.3	Analyze, design or develop parts of an Internet of Things solution and map it toward selected business model(s)
18MCA542.4	Evaluate ethical and potential security issues related to the Internet of Things.

Course Name	SOFTWARE ARCHITECTURE
Course Code	18MCA553
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA553.1	Acquire knowledge of working principles, characteristics and basic applications of architectural patterns.
18MCA553.2	Modeling the quality attributes.
18MCA553.3	Understanding the techniques of requirements gathering.
18MCA553.4	Understand the different types of design patterns

Course Name	C# .NET LABORATORY
Course Code	18MCA56
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA56.1	Understand C# and client-server concepts using .Net Frame Work Components
18MCA56.2	CO2: Apply delegates, event and exception handling to incorporate with ASP. Win Form, ADO.NET
18MCA56.3	Analyze the use of Net Components depending on the problem statement
18MCA56.4	Implement & develop a web based and Console based application with Database connectivity

Course Name	MOBILE APPLICATIONS LABORATORY
Course Code	18MCA57
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA57.1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
18MCA57.2	Develop applications using software development kits (SDKs), frameworks and toolkits
18MCA57.3	Establish various methods to integrate database and server-side technologies CO4: Design and develop open source software based mobile applications
18MCA57.4	Build and deploy competent mobile development solutions:

Course Name	MINI PROJECT
Course Code	18MCA58
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA58.1	Acquire practical knowledge within the chosen area of technology for project development
18MCA58.2	Identify a suitable problem making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities
18MCA58.3	Ability to segregate work and execute/implement projects using appropriate tools.
18MCA58.4	Develop skills to disseminate technical and general information by means of oral as well as written presentation skills.

Course Name	INTERNSHIP
Course Code	18MCA61
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA61.1	Identify a suitable problem making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities.
18MCA61.2	industrial environment exposure
18MCA61.3	Ability to segregate work and execute/implement projects using appropriate tools
18MCA61.4	Develop skills to disseminate technical and general information by means of oral as well as written presentation and professional skills.

Course Name	SEMINAR
Course Code	18MCA62
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA62.1	Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach
18MCA62.2	Develop the Presentation Skills
18MCA62.3	Acquire the knowledge of Argumentative Skills and Critical Thinking
18MCA62.4	Develop Questioning and Discussion Skills

Course Name	MAJOR PROJECT
Course Code	18MCA63
Course outcomes (COs): At the end of the course the student will be able to:	
18MCA62.1	Contribute as an individual or in a team in development of technical projects
18MCA62.2	Develop effective communication skills for presentation of project related activities
18MCA62.3	Acquire the knowledge of Critical Thinking with group work
18MCA62.4	Develop skills to disseminate technical and general information by means of oral as well as written presentation and professional skills.