



Cambridge Institute of Technology

Department of MCA

Course outcomes of 2020 scheme

Course Code	Course Name	Course Outcomes-On completion of this course the students will be able to
FIRST SEMESTER		
20MCA11	DATA STRUCTURES WITH ALGORITHMS	<p>CO1: Demonstrate different data structures, its operations using C programming.</p> <p>CO2: Analyse the performance of Stack, Queue, Lists, Trees, Hashing, Searching and Sorting techniques.</p> <p>CO3: Implement some applications of data structures in a high-level language such as C/C++</p> <p>CO4: Design and apply appropriate data structures for solving computing problems.</p> <p>CO5: Compute the efficiency of algorithms in terms of asymptotic notations for the given problem.</p>
20MCA12	OPERATING SYSTEM WITH UNIX	<p>CO1: Analyse the basic Operating System Structure and concept of Process Management</p> <p>CO2: Analyse the given Synchronization/ Deadlock problem to solve and arrive at valid conclusions. CO3: Analyse OS management techniques and identify the possible modifications for the given problem context.</p> <p>CO4: Demonstrate the working of basic commands of Unix environment including file processing</p> <p>CO5: : Demonstrate the usage of different shell commands, variable and AWK filtering to the given problem</p>
20MCA13	COMPUTER NETWORKS	<p>CO1: Apply the basic concepts of networking and to analyse different parameters such as bandwidth, delay, throughput of the networks for the given problem.</p> <p>CO2: Apply different techniques to ensure the reliable and secured communication in wired and wireless communication</p> <p>CO3: Analyse the networking concepts of TCP/IP for wired and wireless components</p> <p>CO4: Identify the issues of Transport layer to analyse the congestion control mechanism</p>

		CO5: Design network topology with different protocols and analyse the performance using NS2.
20MCA14	MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS	CO1: Apply the fundamentals of set theory and matrices for the given problem. CO2: Apply the types of distribution, evaluate the mean and variance for the given case study/ problem. CO3: solve the given problem by applying the Mathematical logic concepts CO4: Model the given problem by applying the concepts of graph theory. CO5: Design strategy using gaming theory concepts for the given problem. CO6: Identify and list the different applications of discrete mathematical concepts in computer science.
20MCA15	RESEARCH METHODOLOGY & IPR	CO1: Identify the suitable research methods and articulate the research steps in a proper sequence for the given problem. CO2: Carry out literature survey, define the problem statement and suggest suitable solution for the given problem and present in the format of the research paper (IEEE). CO3: Analyse the problem and conduct experimental design with the samplings. CO4: Perform the data collection from various sources segregate the primary and secondary data CO5: Apply some concepts/section of Copy Right Act /Patent Act /Cyber Law/ Trademark to the given case and develop –conclusions
20MCA16	DATA STRUCTURES WITH ALGORITHMS LAB	CO1: Implement sorting / searching techniques, and validate input/output for the given problem. CO2: Implement data structures (namely Stacks, Queues, Circular Queues, Linked Lists, and Trees), its operations and algorithms. CO3: Implement the algorithm to find whether the given graph is connected or not and conclude on the performance of the technique implemented. CO4: Design and apply appropriate data structures for solving computing problems CO5: Implement the techniques for evaluating the given expression.
20MCA17	UNIX PROGRAMMING LAB	CO1: Demonstrate the working of basic commands of Unix environment including file processing CO2: Apply Regular expression to perform pattern matching using utilities like grep, sed and awk. CO3: Implement unix commands/ system calls to demonstrate process management CO4: Demonstrate the usage of different shell commands, variable and AWK filtering to the given problem. CO5: Develop shell scripts for developing the simple applications to the given problem.

20MCA18	COMPUTER NETWORKS LAB	<p>CO1:Apply the basic concepts of networking and to analyse different parameters such as bandwidth, delay, throughput of the networks for the given problem.</p> <p>CO2:Apply different techniques to ensure the reliable and secured communication in wired and wireless communication</p> <p>CO3:Analyse the networking concepts of TCP/IP for wired and wireless components</p> <p>CO4:Identify the issues of Transport layer to analyse the congestion control mechanism</p> <p>CO5:Design network topology with different protocols and analyse the performance using NS2</p>
20MCA19	BASICS OF PROGRAMMING & COMPUTER ORGANISATION	<p>CO1: Demonstrate the key concepts introduced in C programming by writing and executing the programs.</p> <p>CO2: Demonstrate the concepts of structures and pointers for the given application/problem.</p> <p>CO3: Implement the single/multi-dimensional array for the given problem.</p> <p>CO4: Demonstrate the application of logic gates in solving some societal/industrial problems.</p> <p>CO5: Analyse how memory organization, operations, instruction sequencing and interrupts are useful in executing the given program.</p>
SECOND SEMESTER		
20MCA21	DATABASE MANAGEMENT SYSTEM	<p>CO1: Apply the basic concepts of database management in designing the database for the given problem.</p> <p>CO2: Design entity-relationship diagrams to the given problem to develop database application with appropriate fields and validations.</p> <p>CO3: Implement a database schema for the given problem domain.</p> <p>CO4: Formulate and execute SQL queries to the given problem.</p> <p>CO5: Apply normalization techniques to improve the database design to the given problem.</p>
20MCA22	OBJECT ORIENTED PROGRAMMING WITH JAVA	<p>CO1: Demonstrate the basic programming constructs of Java and OOP concepts to develop Java programs for a given scenario.</p> <p>CO2: Illustrate the concepts of generalization and run time polymorphism applications to develop reusable components.</p> <p>CO3: Demonstrate the usage of Packages, Interfaces, Exceptions and Multithreading in building given applications.</p> <p>CO4: Apply Enumerations, Wrappers, Auto boxing, Collection framework and I/O operations for effective coding to the given problem.</p>

		CO5: Implement the concepts of Applets, and networking using Java network classes for developing the distributed applications to the given problem.
20MCA23	WEB TECHNOLOGIES	CO1: Apply the features JQuery for the given web based problem. CO2: Demonstrate the development of XHTML documents using JavaScript and CSS. CO3: Illustrate the use of CGI and Perl programs for different types of server side applications. CO4: Design and implement user interactive dynamic web based applications. CO5: Demonstrate applications of Angular JS and JQuery for the given problem
20MCA24	SOFTWARE ENGINEERING	CO1: Identify and define different requirements for the given problem and present in the IEEE format. CO2: Use modern tool to create dynamic diagrams to represent the design for the given problem. CO3: Draw class diagram, analyse the different types of association that exists as per the given problem and represent them using UML notations. CO4: Analyse the given system to identify actors, use cases to design use case diagrams for the given problem using RSA/open source tool. CO5: Design the static/dynamic models to meet application requirements of the given system and generate code (skeleton) using the modern tool.
20MCA251	CYBER SECURITY	CO1: Apply IT ACT (Cyber law) to the given case/problem and infer from the given case and analyze the gap if exists. CO2: Analyze the working of cyber security principles in designing the system. CO3: Analyze the given problem (cybercrime, vulnerability, threat), develop a strategy (physical, logical or administrative controls) to mitigate the problem and articulate consequences on Society and National Economy. CO4: Examine relevant network defence / web application tool to solve given cyber security problem and evaluate its suitability. CO5: Evaluate provisions available in Indian cyber law to handle infringement of intellectual property rights that happens on the cyber platform. Module
20MCA252	DATAMINING WITH BUSINESS INTELLIGENCE	CO1: Analyse the concept of data warehouse, Business Intelligence and OLAP CO2: Demonstrate data pre-processing techniques and application of association rule mining algorithms

		<p>CO3: Apply various classification algorithms and evaluation of classifiers for the given problem</p> <p>CO4: Analyse data mining for various business intelligence applications for the given problem</p> <p>CO5: Apply classification and regression techniques for the given problem.</p>
20MCA253	ENTERPRISE RESOURCE PLANNING	<p>CO1: Analyse the essentials of supply chain management in ERP.</p> <p>CO2: Analyse the implementation of ERP in the context of business of the different organization.</p> <p>CO3: Analyse and apply ERP for different business modules for the given problem.</p> <p>CO4: Analyse the given case study of ERP marketing.</p> <p>CO5: Analyse the design of ERP with future E-commerce and internet.</p>
20MCA254	USER INTERFACE DESIGN	<p>CO1: Analyse the new technologies that provide interactive devices and interfaces.</p> <p>CO2: Apply the guidelines to develop the UID and evaluate for the given problem.</p> <p>CO3: Apply the development methodologies with an analysis of the social impact and legal issues Understand Direct Manipulation and Virtual Environment</p> <p>CO4: Discuss the command, natural languages and issues in design for maintaining QoS</p> <p>CO5: Demonstrate techniques for information search and visualization for the given problem.</p>
20MCA255	OPTIMIZATION TECHNIQUES	<p>CO2: Formulate the problem using linear programming technique.</p> <p>CO3: Analyze the optimal solution for the given problem by applying Transportation problems.</p> <p>CO4: Analyze the strategies with different players through game theory approach.</p> <p>CO5: Analyze the sequence of jobs to be executed by machines for the given problem.</p>
20MCA261	CRYPTOGRAPHY AND NETWORK	<p>CO1: Apply encryption techniques for the given problem and analyse the results. CO2:</p>

	SECURITY	<p>Design the Cipher technique and analyse the functioning of Cipher for the given problem.</p> <p>CO3: Implement the Public and Private key based cryptography algorithms and investigate the results of algorithm based on output.</p> <p>CO4: Design and implement the cryptographic algorithms using programming languages/ tools for the given problem/context.</p> <p>CO5: Design the security planning for the given case study for data classification, access control and propose technical solution, and submit the detailed report with plagiarism check</p>
20MCA262	ARTIFICIAL INTELLIGENCE	<p>CO1: Identify problems that are amenable to solution by AI methods.</p> <p>CO2: Identify appropriate AI methods to solve a given problem.</p> <p>CO3: Formalize a given problem in the language/framework of different AI methods.</p> <p>CO4: Implement basic AI algorithms for the given problem.</p> <p>CO5: Design and carry out an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports</p>
20MCA263	MOBILE APPLICATION DEVELOPMENT	<p>CO1: Develop effective user interfaces that leverage evolving mobile devices</p> <p>CO2: Develop applications using software development kits (SDKs), frameworks and toolkits.</p> <p>CO3: Implement suitable methods to integrate database and server-side technologies</p> <p>CO4: Design and develop open source software based mobile application to the given problem.</p> <p>CO5: Build and deploy competent mobile application to solve the societal/industrial problems</p>
20MCA264	DISTRIBUTED OPERATING SYSTEM	<p>CO1: Analyse design issues and different message passing techniques in DOS, distributed systems</p> <p>CO2: Analyse RPC implementation and its performance in DOS</p> <p>CO3: Analyse the major security issues associated with distributed systems and evaluate techniques available for increasing system security</p> <p>CO3: Apply the concepts of distributed shared memory and resource management for the given problem/ case study.</p> <p>CO4: Analyse distributed file systems and evaluate the performance in terms of fault tolerance, file replication as major factors</p> <p>CO5: Apply modification to the existing algorithms to improve the performance of DOS.</p>

20MCA265	NATURAL LANGUAGE PROCESSING	<p>CO1: Apply parsing technique to the given problem and verify the output and give valid conclusions</p> <p>CO1: Illustrate the approaches to syntax and semantics in NLP.</p> <p>CO3: Formulate solutions for a range of natural language components using existing algorithms, techniques and frameworks, including part-of-speech tagging, language modelling, parsing and semantic role labelling.</p> <p>CO4. Evaluate NLP solutions of the given problem and arrive at valid</p>
20MCA27	DBMS LAB	<p>CO1: Design entity-relationship diagrams to solve given database applications</p> <p>CO2: Implement a database schema for a given problem.</p> <p>CO3: Formulate SQL queries in Oracle for the given problem.</p> <p>CO4: Apply normalization techniques to improve the database design for the given problem.</p> <p>CO5: Build database and verify for its appropriate normalization for any given problem</p>
20MCA28	JAVA PROGRAMMING LAB.	<p>CO1: Demonstrate the fundamental data types and constructs of Java Programming by writing executable/interpretable programs.</p> <p>CO2: Illustrate the object oriented principles with the help of java programs.</p> <p>CO3: Develop reusable and efficient applications using inheritance and multi-threading concepts of java.</p> <p>CO4: Apply client-side programming and networking concepts to develop distributed applications. CO5: Write java programs to demonstrate the concepts of interfaces, inner classes and I/O streams.</p>
20MCA29	WEB TECHNOLOGIES LAB WITH MINI-PROJECT	<p>CO1: Apply the concept and usages web based programming techniques.</p> <p>CO2: Learning and Developing XHTML documents using JavaScript and CSS.</p> <p>CO3: To be familiar in the use of CGI and Perl programs for different types of server side applications. CO4: Design and implement user interactive dynamic web based applications. CO5: Evaluate the given web application and enhance it using latest web technologies.</p>
THIRD SEMESTER		
20MCA31	DATA ANALYTICS USING PYTHON	<p>CO1: Demonstrate basic data analytics principles and techniques</p> <p>CO2: Apply control structures to the given problems</p> <p>CO3: Apply the concepts of inheritance and overloading for a given problem.</p>

		<p>CO4: Demonstrate the concepts of learning and decision trees for a given problem.</p> <p>CO5: Demonstrate the concepts of neural networks and genetic algorithms for a given problem.</p>
20MCA32	IOT	<p>CO1: Analyse the IoT architecture and design along with functional/compute stack and data management.</p> <p>CO2: Apply IOT architecture for a given problem</p> <p>CO3: Analyse the application protocol, transport layer methods for the given business case.</p> <p>CO4: Analyse the application of data analytics for IOT for a given</p> <p>CO5: Analyse the architecture and develop programming using modern tools for the given use case.</p>
20MCA33	ADVANCES IN JAVA	<p>CO1: Apply the concept of Servlet and its life cycle to create web application.</p> <p>CO2: Apply JSP tags and its services to web application.</p> <p>CO3: Create packages and interfaces in the web application context.</p> <p>CO4: Build Database connection for the web applications.</p> <p>CO5: Develop enterprise applications using Java Beans concepts for the given problem.</p>
20MCA341	BLOCK CHAIN TECHNOLOGY	<p>CO1: Demonstrate the basics of Block chain concepts using modern tools/technologies. CO2: Analyze the role of block chain applications in different domains including cybersecurity. CO3: Evaluate the usage of Block chain implementation/features for the given problem. CO4: Exemplify the usage of bitcoins and its impact on the economy. CO5: Analyze the application of specific block chain architecture for a given problem</p>
20MCA342	CLOUD COMPUTING	<p>CO1: Demonstrate the system & software models and mechanisms that support cloud computing CO2: Classify various cloud services and their providers</p> <p>CO3: Compare various cloud deployment models</p> <p>CO4: Differentiate various types of computing environments</p> <p>CO5: Identify enabling technologies of cloud computing</p>

20MCA343	DIGITAL MARKETING	CO1: Demonstrate the key concepts related to e-marketing for the given case. CO2: Demonstrate the use of different electronic media for designing marketing activities. CO3: Analyze the role of search engine in improving digital marketing CO4: Analyze role of social media marketing for the given problem CO5: Analyze technical solutions to overcome social media threats
20MCA344	SOFTWARE TESTING	CO1: Acquire knowledge of basic principles and knowledge of software testing and debugging and test cases. CO2: Will be able to understand the perceptions on testing like levels of testing, generalized pseudo code and with related examples. CO3: To study the various types of testing. CO4: Differentiate between functional testing and structural testing. CO5: Analyze the performance of fault based testing, planning and Monitoring the process
20MCA345	NOSQL	CO1: Demonstrate the concepts of unstructured data CO2: Analyse and Manage the Data using CRUD operations CO3: Develop the applications using NoSQL CO4: Realize the concept of Map Reduce its applicability in the real world application development CO5: Analyze the framework of NOSQL
20MCA351	DEEP LEARNING	CO1: Demonstrate the basics of deep learning for a given context. CO2: Implement various deep learning models for the given problem CO3: Realign high dimensional data using reduction techniques for the given problem CO4: Analyze optimization and generalization techniques of deep learning for the given problem. CO5: Evaluate the given deep learning application and enhance by applying latest techniques.

20MCA352	BIG DATA ANALYTICS	<p>CO1: Identify the business problem for a given context and frame the objectives to solve it through data analytics tools.</p> <p>CO2: Apply various algorithms for handling large volumes of data.</p> <p>CO3: Illustrate the architecture of HDFS and explain functioning of HDFS clusters.</p> <p>CO4: Analyse the usage of Map-Reduce techniques for solving big data problems.</p> <p>CO5: Conduct experiment with various datasets for analysis / visualization and arrive at valid conclusions.</p>
20MCA353	WIRELESS AD HOC NETWORKS	<p>CO1: Analyze the issues of ad-hoc wireless network</p> <p>CO2 : Evaluate the existing network and improve its quality of service</p> <p>CO3 : Choose appropriate protocol for various applications and design the architecture</p> <p>CO4: Examine security measures present at different levels and identify the possible improvements for the latest version of the ad hoc network IEEE standard</p> <p>CO5 : Analyze energy consumption and management in ad-hoc wireless networks</p>
20MCA354	SOFTWARE PROJECT MANAGEMENT	<p>CO1:Apply thepracticesandmethodsforsuccessfulsoftwareprojectmanagement</p> <p>CO2:Identifytechniquesforrequirements,policiesanddecisionmakingforeffectiveresource management</p> <p>CO3:Illustratetheevaluationtechniquesforestimatingcost,benefits,scheduleandrisk</p> <p>CO4:Deviseaframeworkforsoftwareprojectmanagementplanforactivities,risk,monitoring andcontrol</p> <p>CO5:Design Framework To Manage People</p>
20MCA355	SOFTWARE DEFINED NETWORKS	<p>CO1: Apply the fundamentals of Software Defined Networks for the given problem</p> <p>CO2: Illustrate the basics of Software Defined Networks Operations and Data flow</p> <p>CO3: Apply different Software Defined Network Operations and Data Flow</p> <p>CO4: Analyse alternative definitions of Software Defined Networks</p> <p>CO5: Apply different Software Defined Network Operations in real world problem</p>
20MCA36	DATA ANALYTICS LAB WITH MINI-PROJECT	<p>CO1:..Develop python program to perform search/sort on a given data set</p> <p>CO2:Demonstrate object oriented principles</p> <p>CO3: Demonstrate data visualization using Numpy for a given problem</p> <p>CO4:..Demonstrate regression model for a given problem</p> <p>CO5:Deign and develop an application for the given problem</p>

20MCA37	IOT LAB WITH MINI PROJECT	CO1: Demonstrate theIoT architecture design for a given problem CO2: Apply IOT techniques for a given problem CO3: Analyse the application protocol, transport layer methods for the given business case. CO4: .Design and develop an application for the given problem for the societal/industrial problems CO5: Develop python program by applying suitable feature for the given problem and verify the output
20MCA38	ADVANCES IN JAVA LAB	CO1: Apply the concept of Servlet and its life cycle to create web application. CO2: Apply JSP tags and its services to web application. CO3: Create packages and interfaces in the web application context. CO4: Build Database connection for the web applications. CO5: Develop application programs using beans concept.
FOURTH SEMESTER		
20MCA41	ADVANCES IN WEB TECHNOLOGIES	CO1: Build the Web Applications using JQuery, PHP, XML for the given problem CO2: Design the Web Pages using AJAX for the given problem. CO3: Analyse the advances in Web2.0 and demonstrate its usage for the problem considered. CO4 Analyse the web services and demonstrate its usage for the problem considered. CO5: Design responsive web applications using Bootstrap for the given problem.
20MCA42	PROGRAMMING USING C#	CO1:Analyse C# and client-server concept using .NetFrameWork Components. CO2:Apply Delegates,eventandexceptionhandlingtoincorporatewithASP, WinForm, ADO.NET. CO3:Analyze These.NetComponents depending on the problem statement. CO4:Implement&developawebbasedandConsolebasedapplicationwithDatabase connectivity CO5: Implement & develop a web based application with Database connectivity
20MCA43	INDUSTRY INTERNSHIP (4 WEEKS IN VACATION OF 3 RD SEM)	CO1: Analyse the real-time industry/research work environment with emphasis on organizational structure/job process/different departments and functions / tools /technology. CO2: Develop applications using modern tools and technologies. CO3: Demonstrate self-learning capabilities with an effective report and detailed presentation.
20MCA44	PROJECT WORK PHASE 2 (DURING 4TH SEMESTER- MIN. OF 4 MONTHS)	CO1: 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. CO2: Work as an individual and team to segregate work and execute/implement projects using appropriate tools. CO3: Develop skills to disseminate technical and general information by means of oral as well as written presentation and professional skills.

		CO4: To conduct testing of application using appropriate techniques and tools. CO5: To enhance interpersonal skills and group cohesion among the peers during the project work.
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