Dr. AMBEDKAR INSTITUTE OF TECHNOLOGY, BENGALURU-56

(An Autonomous Institution, Affiliated to VTU, Belagavi, Approved by AICTE, New Delhi)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS(MCA)

The following documents enclosed are verified and approved.

HOD-MCA 5/4/22

Dr. Chandrakanth G Pujari

Master of Computer Applications

COURSE OUTCOMES

I SEMESTER		
18MCA11	**OOPS using C++**	**CO1: Acquire knowledge on C++ programming concepts.** **CO2: Analyze the different concepts of C++.** **CO3: Design and Develop the solution to a problem using Object Oriented Programming Concepts.** **CO4: Apply the learning into real world problems independently**
18MCA12	**Linux Programming**	**CO1: Understand and experience the UNIX environment, File system and hierarchy.** **CO2: Understand File system and Demonstrate commands to extract, interpret data for further processing.** **CO3: Understand Filters and Regular Expressions.** **CO4: Analyze the usage of different shell commands, variables and AWK filtering.** **CO5: Interpret and manipulate process attributes and System administrations**
18MCA13	**Web Technologies**	**CO1: Understand the fundamentals of web and outline the features.** **CO2: Design a web page with media components using 3TML5 and CSS.** **CO3: Develop XML documents and display using CSS.** **CO4: Design and develop dynamic and interactive web pages using JavaScript and jQuery**

18MCA14	**Discrete Mathematical Structures**	**CO1:** Use the logical notation to define and reason about proofs and disproof's. **CO2:** Apply fundamental mathematical concepts such as sets, relations, and functions. **CO3:** Calculate numbers of possible outcomes of elementary combinatorial processes such as permutations and combinations. **CO4:** Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction
18MCA15	**Computer Organization and Architecture**	**CO1:** Understand and apply the concepts in the design of a logic system. **CO2:.** Understand the Basics of Computer system organization. **CO3:** Analyse and implement the addressing modes and instruction set. **CO4:** Acquire knowledge on I/O interfaces and memory hierarchy
18MCAL16	**OOPS Lab**	**CO1:** Apply and implement major programming and object oriented concepts like function overloading, operator overloading, Encapsulations, and inheritance, message passing to solve real- world problems. **CO2:** Use major C++ features such as Virtual functions, Templates for data type independent designs and File I/O to deal with large data sets. **CO3:** Analyze, design and develop solutions to real-world problems applying OOP Concepts of C++.
18MCAL17	**Linux Lab**	**CO1:** Understand the Unix programming environment.
		CO2: Be fluent in the use of Vi editor. **CO3:** Be able to design and implement shell scripts to manage users with different types of Permission and file based applications. **CO4:** Be fluent to write Awk scripts.
18MCAL18	**Web Technologies Lab**	**CO1:** Design and implement user interactive dynamic web based applications using X3TML5,CSS, JAVA SCRIPT,XML & jquery
II SEMESTER		

18MCA21	Java Programming	CO1: Demonstrate the basic object oriented concepts & apply them to create java applications. CO2: Apply inheritance and interface concepts to design java applications. CO3: Design java applications with multithreading concepts and demonstrate the error handling concepts. CO4: Design client server applications.
18MCA22	Data Structures using C++	CO1: Apply the concepts of ADT and its implementation for different types of data structures like Stack, Queue, and List. CO2. Demonstrate the implementation of Stack, Queue and List for real world applications. CO3. Demonstrate the usage and implementation of Tree and Binary Search Tree. CO4. Describe and Demonstrate the concepts, algorithms and applications of AVL tree, 3eaps and different operations on Multiway Trees and graphs.
18MCA23	Analysis and Design of Algorithms	CO1: Analyse time and space complexity of recursive and non- recursive algorithms. CO2: Analyze algorithms and solve real time problems using various algorithm design techniques. CO3: Design and analyse algorithms to solve the optimization problems. CO4: Design and analyze algorithms associated with space–time tradeoffs with the limitations of Algorithm power.
18MCA24	Database Management System	CO1: Students are demonstrated on the fundamentals of data models and develop an ER diagram and relational database model for a given scenario CO2: Students understand to query the database CO3: Students apply the rules of normalization to Inference the database design in the real world entities, multiple transactions, concurrency control techniques and recovery.
		CO1: Describe the elements and various functionalities of the operating system to a basic level CO2:Illustate various memory allocation

18MCA25	**Operating System**	strategies and implement virtual memory techniques for effective memory management **CO3: Apply methods for process scheduling, process synchronization, and deadlock handling**
		CO4: Analyze the physical and logical structure of the storage media, illustrate various algorithms for storage management
18MCAL26	**Java Programming Lab**	**CO1: Understand Java programming language fundamentals and runtime environment. Gain knowledge and skill necessary to write java programs. Learn the object oriented concepts and its implementation in Java implement the multithreading and client side programming**
18MCAL27	**Data Structures Lab**	**CO1: Design, Develop and Implement various applications of data structures.**
18MCAL28	**DBMS lab**	**CO1: Design an ER diagram and implement a database schema for a given problem domain and query the tables.**
III SEMESTER		
18MCA31	**Network Architecture & Management**	**CO1: Understand the network protocols and its services.** **CO2: Analyze the architecture of wired and wireless network variants** **CO3: Demonstrate the working architecture of emerging networks** **CO4: Analyze and Apply methodologies to build a secured network**
18MCA32	**Python Programming**	**CO1: Understand the Fundamentals of Python programming** **CO2: Demonstrate various features of python programming for building Applications.** **CO3: Apply python programming for designing the applications efficiently.** **CO4: Design and Develop applications to be deployed in real world scenarios**
18MCA33	**Advanced Software**	**CO1: Understand the Software Development Life cycle and Professional ethics** **CO2: Demonstrate the Requirements Engineering Process** **CO3: Design and develop Software Models to develop robust software products** **CO4: Illustrate the Software Implementation**

	Engineering	Standards and Techniques CO5:Evaluate Software testing, Software Quality and Software Maintenance to develop a quality software
18MCA34	Data Science using R	CO1: Understand role and process of Data Science. CO2: Applying statistical procedures used by practicing engineers using R. CO3: Analyse and illustrate modelling methods for machine learning. CO4: Visualize effective presentations with graphical analysis using R.
18MCAL36	Network Architecture Lab	CO1: Design networks to implement network topologies, routing techniques and analyze the network performance under various networking conditions
18MCAL37	Python programming Lab	CO1: Design and develop an applications using Python Programing.
18MCAL38	Data Science using R Lab	CO1: Apply different statistical, machine learning algorithms and visualize using R.
18MCA351	Software Testing and Practices	CO1: Analyze the process of Software Testing Life Cycle and types of Testing. CO2: Demonstrate Manual Testing and Automation in Testing CO3: Design Test Cases for User Interface Testing CO4: Design Test Cases for Application Programming Interface (API) Testing and Data base Testing
18MCA352	Advanced DBMS	CO1: Understand the significance of different databases CO2: Design and develop queries for CRUD operations CO3: Design and develop queries using Aggregation Framework and Pipeline to access MongoDB CO4: Develop P3P/Python/Mongo programs for CRUD operations and Aggregation functions
18MCA353	Artificial Intelligence	CO1: Understand of Artificial intelligence concepts. CO2: Apply different Search strategies in problem solving CO3: Discover knowledge and perform

		reasoning. **CO4: Derive planning strategies and machine learning techniques**
	IV SEMESTER	
18MCA41	**Enterprise Applications-1**	**CO1: Understand Concept of enterprise applications programming.** **CO2: Analyze the methodologies and constraints of implementation.** **CO3: Apply the enterprise programming methodologies to design applications.** **CO4: Design and Develop applications to be deployed in real world scenarios**
18MCA42	**Advanced Web Technologies**	CO1: Design web applications using **Responsive designs.** **CO2: Design and develop web applications using P3P and MYSQL.** **CO3: Design Single page web applications using AngularJs and Node JS.** **CO4: Design asynchronous web applications using Ajax.**
18MCA43	**Analytical Skills And Building Professional Development**	**CO1:Demonstrate number system and probability** **CO2: Apply time , work and data interpretation to solve real world problem** **CO3: Apply logical, analytical reasoning and verbal analogies** **CO4: Apply Motivation principles & demonstrate communication skills**
18MCA46	**Research Methodology**	**CO1: Student will be able to describe a range of quantitative and qualitative research designs and identify the advantages and disadvantages associated with these designs.** **CO2: Students will be able to choose appropriate quantitative or qualitative method to collect data.** **CO3: Students will be able to analyze and test the given data using appropriate methods.** **CO4: Students will be able to design an appropriate mixed-method research study to answer a research question and able to write the research report.**
18MCAL47	**Enterprise Applications Lab**	**CO1: Design and Develop real time**

		applications using
18MCAL48	**Advanced Web Technologies Lab**	**CO1: Design a single page web application and develop asynchronous web application using P3P, Ajax with MYSQL database.**
18MCAM49	**Mini Project using Android**	**CO1: Design and develop various android mobile applications**
18MCA441	**Information Security**	**CO1.Describe knowledge on the Information Security and cyber security, cybercrime and forensics.** **CO2: Understand a tools and methods used in cybercrime and know about the tools and techniques for the forensics.** **CO3: Ability to apply strict policies and procedures with meticulous record keeping.** **CO4: Derive the digital forensics**
18MCA442	**Data Mining & Business Intelligence**	**CO 1: Understand the basic concepts of Business Intelligent and Decision Support system, Data Warehousing and OLAP & Data cube implementation.** **CO 2: Illustrate Data Mining Challenges, applications & Pre-processing techniques.** **CO 3: Analyse algorithms for Associations Analysis.** **CO 4: Demonstrate different Classification techniques.**
18MCA443	**Object oriented Modelling & Design**	**CO1: Demonstrate the ability to apply the knowledge of object oriented concepts for designing system models.** **CO2: Design and implement object oriented models using UML appropriate notations.** **CO3: Apply the concept of domain and application analysis for designing Domain and application models, Build class models using forward and reverse engineering.** **CO4: Implement patterns for constructing software designs of real world problems**
18MCA451	**Software Quality & Performance**	**CO1: Recognize the system performance, common mistakes in performance evaluation.** **CO2: Demonstrate the Evaluation techniques, Performancemetrics, performance requirement** **CO3: Analyze the work load and**

	Evaluation	**characterization.** **CO4: Evaluate the fundamentals of system simulation and model verification.**
18MCA452	**Software Architecture**	**CO1: To acquire the knowledge of the context and importance of software architecture and quality maintenance** **CO2: To apply the knowledge of various architectural tactics in multiple scenarios to enhance software quality** **CO3: To comprehend an architectural style as patterns** **CO4: To analyse and apply architectural style in multiple contexts**
18MCA453	**Enterprise Resource Planning**	**CO1: Identify the evolution of ERP and various benefits** **CO2: Demonstrate ERP Products and Enterprise solutions** **CO3: Implement ERP package to a Business Enterprise** **CO4: Analyze ERP Modules for Business Enterprises**
V SEMESTER		
18MCA51	**Machine Learning Using Python**	**CO1: Understand the concepts related to Machine Learning techniques.**
		CO2: Demonstrate Pre-processing techniques and perform exploratory data analysis related to a scenario.
		CO3: Identify and apply the appropriate techniques to process the data and solve the applications using machine learning techniques
		CO4: Apply data analytics principles and techniques of Machine learning to solve real time problems.
18MCA52	**Big Data Analytics**	**CO1: Explain the fundamentals of big data analytical techniques and usage of hadoop tools.**
		CO2: Analyse 3adoop ecosystem and Map Reduce concept to solve big data problems.
		CO3: Design a Map-Reduce model to process the data using tools for a use case.
		CO4: Evaluate the performance of data analytics and visualize the results.

18MCA53	Cloud Computing	CO1: Explain the fundamental principles of cloud computing and its related Concepts.
		CO2: Analyze Prominent Cloud computing technologies available in the marketplace.
		CO3: Apply suitable applications to leverage the strength of cloud computing.
		CO4: Develop the applications of cloud Computing that can harness the power of cloud computing.
		CO5: Explain the fundamental principles of cloud computing and its related Concepts.
18MCAL56	Machine Learning Lab	CO1: Implement exploratory data analysis, data visualization and different machine Learning Techniques to solve real world problems in Python.
18MCAL57	Big Data Analytics Lab	CO1: Apply 3adoop, MapReduce, 3DFS and YARN develop big data applications and Explore the working of Pig & 3ive and analyse the results.
18MCAL58	Cloud Computing Lab	CO1: Demonstrate Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS).
18MCAI59	Industry Internship (6 weeks)	CO1: Apply domain knowledge in proposing solution for IT problem CO2: Develop/implement the design with appropriate techniques and tools to deliver the solution. CO3: Work in independently or in collaborative environment CO4: Develop communications skills, make presentations and prepare technical document
18MCA541	Enterprise Application-2	CO1: Distinguish the features of C# and client-server concepts using .Net Framework Components. CO2:Demonstrate delegates, events and exception handling with ASP, Win Form, ADO.NET. CO3:Develop Graphical User Interface for various applications CO4:Develop Web based and Console based applications with database connectivity
		CO1: Demonstrate basic concepts of react, node, express and mongodb techologies

Code	Subject	Course Outcomes
18MCA542	**Full Stack Development with MERN**	**CO2: Design front end application using React and Redux libraries.** **CO3: Develop interactive web applications on server side with NOSQL databases.** **CO4: Build responsive web application communicating with RES API and managing data with NOSQL databases**
18MCA543	**DevOps**	**CO1: Understand Devops.** **CO2: Analyze Architecture .** **CO3: Apply how to build the code.** **CO4: Deploy the code.**
18MCA551	**Web Services**	**CO1: To Design Web & Web Services** **CO2: To Design the schema for the given XML documents in both DTD and XML Schema languages** **CO3: To Building a Web Service, SOAP, Deploying and Publishing Web Service** **CO4: Analyze Web Services Architecture, UDDI Registry.**
18MCA552	**Internet of Things**	**CO1: Study the evolution of IoT towards global context** **CO2: Understand the architecture of IoT and the underlying technology** **CO3: Analyze the implications of IoT with real time applications** **CO4: Apply the state of the art architecture of IoT to be deployed in real time world**
18MCA553	**Block Chain Technology**	**CO1: Understand the structure and underlying technology of blockchain** **CO2: Analyze the application scenarios of blockchain** **CO3: Apply the blockchain technology to build a blockchain system**
VI SEMESTER	
18MCAS61	**Technical Seminar**	**CO1: Students will present a seminar on any new technology or any research topic**
18MCAP62	**Project Work**	**CO1: Students had to apply the software engineering principles to design and build a project**