



**TECNIA INSTITUTE OF ADVANCED STUDIES**

**GRADE "A" INSTITUTE**

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## Department of Information, Communication & Technology

Ref.No.: TIAS/DICT/MCA/2023-24/009

Dated: 17.07.2023

Programme: Master of Computer Applications

### Core Theory Courses

Course Code	Course	Course Objectives	Course Outcomes
MCA 101	Discrete Mathematics	Familiarization of basic mathematical structures and combinatory	Choose appropriate discrete structures and combinatory for basic problems.
		Understanding and ability to apply mathematical logic and Boolean Algebra	Interpret and illustrate the basics of Group Theory.
		Understanding and application of number theory and elementary Graph Theory	Examine and infer mathematical logic and Boolean Algebra
		Application and construction of graphs in providing solutions of Computer Science problems	Evaluate applications of number theory.
		Choose appropriate discrete structures and combinatory for basic problems.	Implement and create models for computer science problems by understanding the concepts of Graph Theory
MCA 103	Computer Networks	Understand basics, topologies and working mechanism of wired and wireless computer networks.	Explain the functions of each layer in the OSI reference model and TCP/IP protocol suite while illustrating the process of data encoding and multiplexing.
		Analyze the features and operations of protocols of OSI reference model & TCP/IP protocol suite.	Utilize the fundamentals of data communication and networking to identify the topologies and connecting devices of networks.

		Design, calculate, and apply routing mechanisms for IPv4 & IPv6	Identify and discuss the underlying concepts of IPv4 & IPv6 protocols, along with their characteristics and functionality.
		Identify the networking requirements for an organization and select & propose appropriate architecture & technologies.	Discover the appropriate MAC layer/ data link layer protocols for the given network.
		Work on Network addressing, design and implementation.	Evaluate and implement routing algorithms and multicasting.
			Adapt transport and application layer protocols along with concepts of mobility and security in networks.
MCA-105	Operating Systems with Linux	Understand the basic component of Operating Systems and their interactions.	Explain the structure and functions of Operating Systems along with their components, types and working.
		Select the policies for Process Management, Memory Management and Deadlock Management.	Make use of appropriate Linux commands for Memory Management, File Management and Directory Management.
		Understand the basics of File, Device and Disk Storage Management.	Analyze the performance of different Scheduling algorithms along with the policies for Concurrency and Deadlock management.
			Elaborate the System Calls for Process management and File Management.
MCA-107	Database Management Systems	Develop a broad understanding of database concepts and database management system software, data models, schemas and instances, data constraints, relational algebra and calculus.	Explain the various database components, models, DBMS architecture and Database Security.
		Acquire Knowledge to model an application's data requirements using conceptual modeling tools like ER diagrams and design	Apply relational database theory to construct relational algebra expression, tuple and domain relation expression for SQL queries.

		database schemas based on the conceptual model.	
		Be able to write SQL and PL/SQL commands to create and manipulate database objects.	Construct advance SQL queries on data and apply Procedure abilities through PL/SQL.
		Be able to discuss importance of normalization and improve the database design by applying various normal forms.	Examine the use of normalization and functional dependency for database design.
		Get in depth knowledge of concurrency control mechanisms, transaction management techniques and database security.	Appraise the concepts of Transaction, Concurrency control and Recovery in databases.
MCA-109	Object-oriented Programming and Java	Learn how to implement Object Oriented concepts through Java.	Illustrate the Object-Oriented paradigm, Java language constructs and JVM internal architecture.
		Identify and apply the Java thread model to program Java applications.	Apply the concepts of exception handling, multithreading, and collection framework.
		Understand the basics of the Collection Framework.	Analyze the use of event handling and JFC based toolkit in creating GUI-based computing solutions.
		Understand and apply the basics of Java 8 Constructs	Design database enabled client-server applications using JDBC, RMI, I/O operations, network programming and relevant concepts.
		Implement JDBC, RMI and related concepts.	Elaborate the functional programming concepts introduced in Java 8 and beyond.
MCA-102	Data and File Structures	Familiarization of fundamentals of data and file structures and their operations like, insertion, deletion, searching and sorting	Recall different type of data structures.

		Understanding and implementation of data structures like arrays, linked lists, stacks, queues, trees, graphs and files	Explain the fundamentals of an Abstract Data Type (ADT)
		Identification of a suitable data structure to model data used in real world applications	Apply linear and nonlinear data structures to solve real time problems.
			Appraise and determine the correct data structure for any given real-world problem.
			Create innovative solutions for real world.
MCA-104	Object Oriented Software Engineering	To understand the iterative implementation of software projects.	Illustrate system modeling and architecture using UML
		To analyze projects using use case modeling tools.	Apply suitable iterative process model
		To develop solutions for real life cases using design models and patterns.	Analyze requirements with use cases.
		To understand and implement project design requirements for user interface, data layer and system controls.	Appraise analysis and design artifacts
		To apply modern case tools to develop solutions.	Create domain models for analysis phase
			Design object solutions with patterns and architectural layers
MCA-106	Python Programming	Master the fundamentals of writing Python scripts	Demonstrate knowledge of basic programming constructs in python.
		Understand decision-making and functions in python	Illustrate string handling methods and user defined functions in python.
		Interpret Object-oriented programming features in python	Illustrate string handling methods and user defined functions in python.
		Gain knowledge of data structures in python	Illustrate string handling methods and

			user defined functions in python.
		Explore GUI programming and database operations in python	Evaluate and visualize the data using appropriate python libraries.
			Develop python applications with database connectivity operations.
MCA-201	Design and Analysis of Algorithms	Understand the important concepts of algorithms design and their analysis.	Demonstrate P and NP complexity classes of the problem.
		Analyze the efficiency of alternative algorithmic solutions to the problem.	Apply the concepts of asymptotic notations to analyze the complexities of various algorithms.
		Understand different algorithm paradigms like Divide and Conquer, Greedy, Dynamic, Backtracking and Branch and Bound.	Analyze and evaluate the searching, sorting and tree-based algorithms.
		Identify the appropriate data structures, algorithm design techniques and assess their impact on the performance of programs.	Design efficient solutions using various algorithms for given problems.
			Develop innovative solutions for real-world problems using different paradigms.
MCA-203	Artificial Intelligence and Machine Learning	Develop expertise in AI principles and approaches	Define the meaning of Intelligence and recall various models for knowledge representation and reasoning within an AI problem domain.
		Develop basic understanding of the building blocks of AI as presented in terms of intelligent agents: Search, Knowledge representation, inference, logic and learning.	Summarize varied learning algorithms and model selection.
		Understanding nature of problems solved with ML.	Apply the concept of learning trends and patterns from data to build an appreciation for what is involved in learning from data.
			Analyze and apply a variety of learning algorithms to data.
			Appraise AI algorithms and assess their performance. Follow standards and ethical practices.
Develop a strong foundation for a wide variety of state of			

			the art Machine Learning algorithms.
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