

**REGENT EDUCATION AND RESEARCH FOUNDATION GROUP
OF INSTITUTIONS**

Department of Masters of Computer Applications (2021-2022)

Program Code	Program Name	Course Code	Course Name	Course outcome	
				CO Sl. No.	CO's
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-101	Programming Concept with Python	MCAN-101.1	Learn, understand and comprehend the concept of programming.
				MCAN-101.2	Design algorithm to solve simple programming problem.
				MCAN-101.3	Understand and remember syntax and semantics of Python.
				MCAN-101.4	Create application using secondary storage.
				MCAN-101.5	Understand and apply library for data analysis.
				MCAN-101.6	Apply Python to implement different solutions for the same problem and analyze why one solution is better than the other.
				MCAN-101.7	To write program for real life problem.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-102	Relational Database Management System	MCAN-102.1	Identify the need for a database over the file system.
				MCAN-102.2	Understand and implement the process of data insertion, retrieval, and manipulation.
				MCAN-102.3	Understand and analyze the functional dependencies among attributes of the entity set and normalization between the relations.
				MCAN-102.4	Implement SQL concept for a database transaction.

				MCAN-102.5	Understand and Implement the Transaction control and concurrency control management.
				MCAN-102.6	Evaluate the relational tables, PL/SQL programs, triggers, database files, indexing of RDBMS.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-103	Computer Organization and Architecture	MCAN-103.1	Describe the merits and pitfalls in computer performance measurements and analyze the impact of instruction set architecture on cost-performance of computer design.
				MCAN-103.2	Explain Digital Logic Circuits, Data Representation, Register and Processor level Design and Instruction Set architecture.
				MCAN-103.3	Solve problems related to computer arithmetic and Determine which hardware blocks and control lines are used for specific instructions.
				MCAN-103.4	Design a pipeline for consistent execution of instructions with minimum hazards.
				MCAN-103.5	Explain memory organization, I/O organization and its impact on computer cost/performance.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-104	Discrete Mathematics	MCAN-104.1	Interpret the problems that can be formulated in terms of graphs and trees.

				MCAN-104.2	Explain network phenomena by using the concepts of connectivity, independent sets, cliques, matching, graph coloring etc.
				MCAN-104.3	Achieve the ability to think and reason abstract mathematical definitions and ideas relating to integers through concepts of well-ordering principle, division algorithm, greatest common divisors and congruence.
				MCAN-104.4	Apply counting techniques and the crucial concept of recurrence to comprehend the combinatorial aspects of algorithms.
				MCAN-104.5	Analyze the logical fundamentals of basic computational concepts.
				MCAN-104.6	Compare the notions of converse, contrapositive, inverse etc. in order to consolidate the comprehension of the logical subtleties involved in computational mathematics.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-E105A	Environment and Ecology	MCAN-E105A.1	Be able to understand the natural environment and its relationships with human activities.
				MCAN-E105A.2	Be able to apply the fundamental knowledge of science and engineering to assess environmental and health risk.

				MCAN-E105A.3	Be able to understand environmental laws and regulations to develop guidelines and procedures for health and safety issues.
				MCAN-E105A.4	Be able to solve scientific problem-solving to air, water, noise and land pollutions.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-190	Soft Skill and Interpersonal Communication	MCAN-190.1	Effectively communicate through verbal/oral communication and improve the listening skills.
				MCAN-190.2	Able to be self-confident with positive vibes.
				MCAN-190.3	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
				MCAN-190.4	Become more effective individual through goal/target setting, self-motivation and practicing creative thinking.
				MCAN-190.5	Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Interpersonal relationships, conflict management.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-191	Python Programming Lab	MCAN-191.1	To write simple programs relating to different logical problems.
				MCAN-191.2	To be able to interpret, understand and debug syntax errors reported by the compiler.

				MCAN-191.3	Understand and implement the native data types (Python in this course).
				MCAN-191.4	To implement conditional branching, iteration.
				MCAN-191.5	To decompose a problem into functions.
				MCAN-191.6	To be able to create, read from and write into simple text files.
				MCAN-191.7	To understand the basic concept of OOPs.
				MCAN-191.8	To understand and implement Python NumpyArray operations.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-192	Relational Database Management System Lab	MCAN-192.1	Learn to use Entity Relationship Diagram (ERD) model as a blueprint to develop the corresponding relational model in a RDBMS system like Oracle DBMS.
				MCAN-192.2	Apply DDL component of Structured query language (SQL) to create a relational database from scratch through implementation of various constraints in Oracle RDBMS system.
				MCAN-192.3	Apply DML component of Structured query language (SQL) for storing and modification of data in Oracle RDBMS system.
				MCAN-192.4	Apply DQL component of Structured query language (SQL) to construct complex

					queries for efficient retrieval of data from existing database as per the user requirement specifications.
				MCAN-192.5	Conceptualize and apply various P/L SQL concepts like cursor, trigger in creating database programs.
				MCAN-192.6	Develop a fully-fledged database backend system using SQL and P/L SQL programming to establish overall integrity of the database system.
				MCAN-192.7	Implement PL/SQL function, Procedure and Package and Apply Exception.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-201	Data Structure with Python	MCAN-201.1	Understand the concept of abstract data type such as stack, queue, linked list, and trees.
				MCAN-201.2	Chose appropriate data structure to design algorithm to solve the problem.
				MCAN-201.3	Analyze the algorithms in the context of efficiency.
				MCAN-201.4	Apply the knowledge of stack and queue to design algorithm.
				MCAN-201.5	Design application using sorting, searching and the concept of tree.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-202	Operating System	MCAN-202.1	Describe the main components of OS and their working.
				MCAN-202.2	Explain the concepts of process and thread and their scheduling policies.
				MCAN-202.3	Explain the various memory management

					techniques.
				MCAN-202.4	Compare the different techniques for managing memory, I/O, disk and files.
				MCAN-202.5	Explains the security and protection features of an Operating System.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-203	Object Oriented Programming with JAVA	MCAN-203.1	Use the characteristics of Java language in a program. Use variables and data types in program development.
				MCAN-203.2	Identify and implement arrays, String and Selection Statements.
				MCAN-203.3	Write Java programs using object-oriented programming techniques including classes, objects, methods, instance variables, interface.
				MCAN-203.4	Design and implementation programs of Exception handling, Packages, Multithreading Programming, Window based programs.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-204	Networking	MCAN-204.1	Understand the purpose of network layered models, network communication using the layered concept and able to compare and contrast OSI and TCP/IP model.
				MCAN-204.2	Differentiate among and discuss the four level of address (physical, logical, port and url) used by the internet TCP/IP

					protocols.
				MCAN-204.3	Understand the routing principals and algorithm such as distance vector routing and link state.
				MCAN-204.4	Judge the efficiency of the connection oriented and connectionless protocol.
				MCAN-204.5	Familiar with the routing techniques, protocols and quality of service.
				MCAN-204.6	Explain the concept of network security and cryptography.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-E205D	Introduction to Cyber Security	MCAN-E205D.1	Know Fundamental knowledge in Cyber Security.
				MCAN-E205D.2	Understand the security challenges as well as the best practices that are essential to protect one from becoming the victims of cybercrimes.
				MCAN-E205D.3	Understand the current status of cyber world.
				MCAN-E205D.4	To safe-guard the individual, society, organization and the government from the dangers of cyber frauds, scams, threats and attacks.
				MCAN-E205D.5	Able to further exploration in Cyber Security Domain.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-291	Data Structure Lab with Python	MCAN-291.1	To understand linear and non-linear data structures.
				MCAN-291.2	To understand different types of sorting and searching techniques.

				MCAN-291.3	To know how to create an application specific data structure.
				MCAN-291.4	To solve the faults / errors that may appear due to wrong choice of data structure.
				MCAN-291.5	To analyze reliability of different data structures in solving different problems.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-292	Operating System Lab (Unix)	MCAN-292.1	Do the use of basic UNIX Commands from the command line, and create Shell Scripts to customize their UNIX Working Environment.
				MCAN-292.2	Organize and manage their processes within UNIX through system calls.
				MCAN-292.3	Organize and manage their files within the UNIX through system calls.
				MCAN-292.4	Provide a mechanism for handling asynchronous events through signals (Software Interrupt).
				MCAN-292.5	Implement the Inter-process communication using FIFOs, Message Queues, Semaphores, and Shared Memory.
				MCAN-292.6	Explain Socket programming to design Client-Server Environment.
				MCAN-292.7	Understand and implement Multithreaded Programming Environment.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-293	Object Oriented Programming	MCAN-293.1	Apply object-oriented principles or features in software design

			Lab using JAVA		process to develop Java programs for real life applications.
				MCAN-293.2	Reduce the complexity of procedural language by employing different OOP technologies for developing robust and reusable software.
				MCAN-293.3	Develop programs using stream classes for various I/O operations and design concurrent.
				MCAN-293.4	Design graphical user interface to develop user interactive applications.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-301	Software Engineering using UML	MCAN-301.1	Analyze the problem scenario and identify classes/ objects and their properties, relationship in class model.
				MCAN-301.2	Demonstrate the conceptual modeling techniques of UML for solving Real-World problem.
				MCAN-301.3	To learn software development life cycle for Object-Oriented solutions for Real-World Problems.
				MCAN-301.4	Ability to apply the concepts of object oriented methodologies to analyze requirements and design to the point where it is ready for implementation.
				MCAN-301.5	Demonstrate the concept of Testing to measure quality of software.

MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN– 302	Artificial Intelligence	MCAN– 302.1	After successful completion of this course, students will be able to understand the underlying assumption of philosophy of the logical sequences of real life problem by applying State Space Search behind the limitation of non-solving method of conventional computational approach.
				MCAN– 302.2	Incorporating heuristic search technique on Game Playing.
				MCAN– 302.3	Various strategies of representing knowledge with decision making algorithms. Creation of substantial domain knowledge base with meta data. Application of knowledge representation issues using Prolog/LISP.
				MCAN– 302.4	To recognize the adoption of new system through learning by an Intelligent System and processing of Natural Language.
				MCAN– 302.5	Ability to apply machine learning techniques to solve real world problems and how Expert Systems can be carried out by the help of learning, analyzing by applying various search techniques and resolute to provide

					solutions.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN- 303	Design and Analysis of Algorithm	MCAN- 303.1	Understand and analyze the running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
				MCAN- 303.2	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it.
				MCAN- 303.3	Understand and implement the greedy paradigm for a given problem.
				MCAN- 303.4	Design the dynamic-programming paradigm and implement it.
				MCAN- 303.5	Understand and implement the Back Tracking and Branch-&-Bound problem.
				MCAN- 303.6	For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems.
				MCAN- 303.7	Explain the ways to analyze randomized algorithms (expected running time, probability of error).
				MCA-PG	MASTER OF COMPUTER APPLICATION
MCAN- E304F.2	Understand the fundamental knowledge of Data Science and the task of Data Science people.				

				MCAN-E304F.3	Understand fundamental of statistics.
				MCAN-E304F.4	Calculate the correlation, covariance, central tendency.
				MCAN-E304F.5	Estimate confidence interval.
				MCAN-E304F.6	Perform hypothesis testing.
				MCAN-E304F.7	Understand the mechanics of regression analysis.
				MCAN-E304F.8	Carry out regression, classification using kNN, decision tree.
				MCAN-E304F.9	Use clustering method to cluster records.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-305G	Machine Learning	MCAN-305G.1	Understand the concept of machine learning.
				MCAN-305G.2	Identify the regression and classification problem.
				MCAN-305G.3	Relate the supervised, unsupervised learning in the real life problem.
				MCAN-305G.4	Evaluate the machine learning models with respect to the performance parameters.
				MCAN-305G.5	Design and implement various machine learning algorithms in the range of real world problems.
MCA-PG	MASTER OF COMPUTER APPLICATION	MCAN-E394F	Basic Data Science Lab	MCAN-E394F.1	Perform the quantitative and qualitative analysis of the data.
				MCAN-E394F.2	Realized the basic trends in two variable plots of numerical data.

				MCAN-E394F.3	Compute the mean, median, mode, standard deviation, and variance of grouped data.
				MCAN-E394F.4	Determine the equation of the trend line to forecast outcomes for time periods in the future, using alternate coding for time periods if necessary.
				MCAN-E394F.5	Use a computer to develop a regression analysis, and interpret the output that is associated with it.
				MCAN-E394F.6	Construct machine learning models for providing business ideas.