PUNJABI UNIVERSITY REGIONAL CENTRE FOR IT & MANAGEMENT, MOHALI

Computer Science

MASTER OF COMPUTER APPLICATIONS (M.C.A.)

(Course Outcomes)

Program Name: Master of Computer Applications Semester	**Program Code**: MCAM2PUP

Program Name: Master of Computer Applications Semester	**Program Code**: MCAM2PUP
Course Name: Computer Organization and Architecture	**Course Code**: MCAM1101T
Course Outcomes: At the end of this course, the student will be able to: • understand the basics of computer hardware and how software interacts with computer hardware • understand how computers represent and manipulate data • understand computer arithmetic and convert between different number systems • understand basics of Instruction Set Architecture	

Program Name: Master of Computer Applications	**Program Code**:MCAM2PUP
Course Name: Data Structures and Algorithms	**Course Code**: MCAM1102T
Course Outcomes: Upon completion of this course, students will: • Be familiar with basic techniques of algorithm analysis • Be familiar with writing recursive methods • Master the implementation of linked data structures such as linked lists and binary trees • Be familiar with advanced data structures such as balanced search trees, hash tables, priority queues and the disjoint set union/find data structure	

Program Name: Master of Computer Applications >>	**Program Code**: MCAM2PUP

Course Name: Object Oriented Programming Using C++	**Course Code**: MCAM1103T

Course Outcomes: On completion of course, Students should be able to:

- Understand the basic components of an object-oriented program including methods and attributes.
- Perform object oriented programming to develop solutions to problems demonstrating usage of control structures, modularity, I/O. and other standard language constructs.
- Demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.
- Demonstrate ability to implement one or more patterns involving realization of an abstract interface and utilization of polymorphism in the solution of problems which can take advantage of dynamic dispatching.
- Learn syntax, features of, and how to utilize the Standard Template Library

Program Name: Master of Computer Applications	**Program Code**: MCAM2PUP
Course Name: Business Intelligence	**Course Code**: MCAM1104T

Course Outcomes: On successful completion of this course student will be able to:

- Appraise and apply evidence practice (EBP) to formulate effective solutions to deal with contemporary performance problems and issues associated with the delivery of business information systems.
- Create a consultant report that critically evaluates important design principles and operations involving business intelligence and that offers effective recommendations aimed at enhancing business outcomes.
- Devise a framework to assess company/industry performance and to apply it to produce a performance report about a nominated entity.
- Evaluate the importance and implementation of learning theory to construct and apply practices that facilitate aspects of personal and institutional change.
- Demonstrate competence in oral, written, and visual communication in business reports and presentations.

Program Name: Master of Computer Applications	**Program Code**: MCAM2PUP
Course Name: Information Systems	**Course Code**:MCAM1105E1

Course Outcomes:

On completion of this course, students should be able to:

- Understand the conceptual foundations of information systems in organizations
- Appreciate the salient peculiarities and differences among data, information, knowledge and other high-level concepts
- Become familiar with the theories of decision making and its related concepts
- Understand the treatment of quantitative decision problems
- Explain the elements and working of systems in general and information systems in particular

- Describe the different types of information systems and their relevance and functions in modern day organizations.

Program Name: Master of Computer Applications	**Program Code**: MCAM2PUP
Course Name: Programming Lab-I (Data Structures and Algorithms)	**Course Code**:MCAM1106L

Course Outcomes: On completion of this course, students should be able to:

- Develop solutions for a range of problems using objects and classes.
- Apply fundamental algorithmic problems including type casting, inheritance, and
- Implement linear data structures like stacks, queues, linked lists using static and dynamic allocation and their applications
- Implement program for binary search tree and Graphs using nonlinear data structure
- Understand and choose the appropriate data structure for solving real world problems.

Program Name: Master of Computer Applications	**Program Code**: MCAM2PUP
Programming Lab-II (OOP using C++)	**Course Code**:MCAM1107L

Course Outcomes: On completion of this course, students should be able to:

- Develop solutions for a range of problems using objects and classes.
- Programs to demonstrate the implementation of constructors, destructors and operator overloading.
- Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism.
- Understand generic programming, templates, file handling
- Write C ++programs using arrays, strings, dynamic memory allocation functions
- Implement C++ program for binary search tree and Graphs using nonlinear data structure
- Understand and choose the appropriate data structure for solving real world problems.

Program Name: Master of Computer Applications	**Program Code**: MCAM2PUP
Course Name: Data Communication and Computer Networks	**Course Code**: MCAM1201T

Course Outcomes: Upon completion of this course, students will:

- Learn how computer network hardware and software operate
- Investigate the fundamental issues driving network design
- Learn about dominant network technologies
- Understand and be able to describe for common services, system services, such as name and address lookups, and communications applications.

Program Name: Master of Computer Applications	**Program Code**: MCAM2PUP
Course Name: Operating Systems	**Course Code**: MCAM1202T

Course Outcomes:

Upon completion of this course, students will have the knowledge:

- Of the principles of operating systems
- the relationship between subsystems of a modern operating system
- Evaluate the efficiency aspect of using system resources (processor, memory, disk).
- Understand what a process is and how processes are synchronized and scheduled.
- Understand different approaches to memory management.
- Be able to use system calls for managing processes, memory, and the file system.
- Understand the data structures and algorithms used to implement an OS.

Program Name: Master of Computer Applications	**Program Code** :MCAM2PUP
Course Name: Relational Database Management System	**Course Code:** MCAM1203T

Course Outcomes: On completion of this course, the students will be able to

- Analyze the Information Systems as socio-technical systems, its need and advantages as compared to traditional file based systems.
- Comprehend architecture of DBMS, conceptual data modelling, logical database design and physical database design.
- Analyze Database design using E-R data model by identifying entities, attributes, relationships, generalization and specialization along with relational algebra.
- Apply and create Relational Database Design process with Normalization and De-normalization of data.
- Demonstrate use of SQL and PL/SQL to implementation database applications with usage of DDL aspect of SQL, DML aspect of SQL, aggregate functions, group by clause, sub query, joins, co-related sub query and indexes, cursor, stored function and procedure, triggers etc.

Program Name: Master of Computer Applications Semester	**Program Code** :MCAM2PUP
Course Name: Data Science using Python	**Course Code:** MCAM1204T

Course Outcomes: On completion of this course, the students will be able:

- To analyze the need and usage of various facets of data and data science process.
- To understand and apply various visualization techniques.
- To understand and perform Exploratory Data Analysis.

- To implement how to manage, manipulate, cleanse and analyze data.
- To understand the steps in model fitting and parameters fine-tuning.
- To apply model validation techniques.

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Object Oriented Modelling and Design using UML	**Course Code**: MCAM1205E3

Course Outcomes:

After completing this class, student will be able to:

- Describe the three pillars of object-orientation and explain the benefits of each.
- Create use case documents that capture requirements for a software system.
- Create class diagrams that model both the domain model and design model of a software system.
- Create interaction diagrams that model the dynamic aspects of a software system.
- Explain the facets of the Unified Process approach to designing and building a software system.
- Describe how design patterns facilitate development and list several of the most popular patterns.

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Programming Lab-III (RDBMS and Minor Project)	**Course Code**: MCAM2106L

Course Outcomes:

Upon successful completion of this course students will:

- The student will be exposed to a commercial RDBMS environment such as SQL server.
- The student will learn SQL commands for data definition and manipulation.
- The student understands conceptual through physical data base design and student takes up a case study and applies the design steps.

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Programming Lab-IV (Data Science using Python Lab)	**Course Code**: MCAM2107L

Course Outcomes: Upon successful completion of this course student will:

- Apply basic data science techniques using Python
- Understand and apply core concepts like Data Frames and joining data, and use data analysis libraries like pandas, numpy, and matplotlib
- Analyse data further by applying learned skills in data aggregation and summarization, as

well as basic data visualization

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Artificial Intelligence	**Course Code**: MCAM2101T
Course Outcomes: Upon successful completion of this course student will: • be able to design a knowledge based system, • be familiar with terminology used in this topical area, • have read and analyzed important historical and current trends addressing artificial intelligence	

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Theory of Computation	**Course Code**: MCAM2102T
Course Outcomes: At the end of this course, students will be able to do the following: • Acquire a full understanding and mentality of Automata Theory as the basis of all computer science languages design • Have a clear understanding of the Automata theory concepts such as RE's, DFA's, NFA's, Stack's, Turing machines, and Grammars • Be able to design FAs, NFAs, Grammars, languages modeling, small compilers basics • Be able to design sample automata • Be able to minimize FA's and Grammars of Context Free Languages	

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Programming in Java	**Course Code**: MCAM2103T
Course Outcomes: Upon completion of this course, students will: • Write, compile and execute Java programs • Build robust applications using Java's object-oriented features • Develop platform-independent GUIs • Read and write data using Java streams • Retrieve data from a relational database with JDBC • Write network programs.	

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Computer Graphics	**Course Code**: MCAM2104T

Course Outcomes:

After completing this course, students will be able to:

- Identify and explain the core concepts of computer graphics.
- Apply graphics programming techniques to design, and create computer graphics scenes.
- Understand the basic principles of implementing computer graphics primitives
- Familiarity with key algorithms for modeling and rendering graphical data
- Develop design and problem solving skills with application to computer graphics

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Cryptography and Network Security	**Course Code**: MCAM2105E5

Course Outcomes: After studying this course, student should be able to:

- identify some of the factors driving the need for network security
- identify and classify particular examples of attacks
- define the terms vulnerability, threat and attack
- identify physical points of vulnerability in simple networks
- compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems.

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Programming Lab-V (Java Programming and Minor Project)	**Course Code**: MCAM2106L

Course Outcomes: After studying this course, student should be able to:

- To understand Object Oriented Programming concepts, class hierarchy, characteristics of Java, inheritance and polymorphism and become familiar with the relationship between classes and objects in a Java program
- The course also intended for students who would like to learn how to develop internet based applications, graphical user interface (GUI), and graphics in both AWT and SWING.
- Advanced Java topics discussed helps students writing programs for Java database connectivity with JDBC; Manipulating databases with JDBC; Programming for Internet, JavaServer pages.
- Students will learn programming in Java. Java language elements and characteristics, including data types, operators, and control structures are discussed in order to make the students develop Java applications.

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: Programming Lab-VI (Computer Graphics)	**Course Code**: MCAM2107L

Course Outcomes: After studying this course, student should be able to:

- Programming User-interface issues
- Concepts of 2D & 3D object representation
- Implementation of various scan & clipping algorithms
- 2D modeling 6. Implementation of illumination model for rendering 3D objects
- Visibility detection & 3D viewing 8. Implementation of a project based on learned concepts

Program Name: Master of Computer Applications Semester	**Program Code**:MCAM2PUP
Course Name: PROJECT	**Course Code**: MCAM2401P

Course Outcomes: After studying this course, students should be able to:

- Discover potential research areas in the field of IT.
- Conduct a survey of several available literatures in the preferred field of study.
- Compare and contrast the several existing solutions for the research challenge.
- Demonstrate an ability to work in teams and manage the conduct.
- Formulate and propose a plan for creating a solution for the research plan identified.
- Report and present the findings of the study conducted in the preferred domain.