PUNJABI UNIVERSITY REGIONAL CENTRE FOR IT & MANAGEMENT, MOHALI

Computer Science

M. TECH.(COMPUTER SCIENCE AND ENGINEERING)

(Course Outcomes)

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP

Course Name: OBJECT ORIENTED PROGRAMMING USING C++	**Course Code**:MCSM1101T

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

- Write, compile and debug programs in C++language.
- Use different data types, operators and console I/O function in a computer program.
- Design programs involving decision control statements, loop control statements and case control structures.
- Understand the implementation of arrays, pointers and functions and apply the dynamics of memory by the use of pointers.
- Comprehend the concepts of structures and classes: declaration, initialization and implementation.
- Apply basics of object oriented programming, polymorphism and inheritance.
- Use the file operations, character I/O, string I/O, file pointers, pre-processor directives and create/update basic data files.

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: OPERATING SYSTEMS	**Course Code**: MCSM1102T

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

- Explain basic operating system concepts such as overall architecture, interrupts, APIs, user mode and kernel mode.
- Distinguish concepts related to concurrency including, synchronization primitives, race conditions, critical sections and multi-threading.
- Analyze and apply CPU scheduling algorithms, deadlock detection and prevention algorithms.
- Examine and categorize various memory management techniques like caching, paging, segmentation, virtual memory, and thrashing.
- Appraise high-level operating systems concepts such as file systems, security, protection, virtualization and device-management, disk-scheduling algorithms and various file systems.

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
1. **Course Name: COMPUTER ARCHITECTURE**	**Course Code**: MCSM1103T

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

- To conceptualize the basics of organizational and architectural issues of digital computer
- To analyze performance issues in processor and memory design of digital computer
- To understand various data transfer techniques in digital computers.
- To analyze processor performance improvement using instruction level parallelism

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: DATA STRUCTURES & ALGORITHMS	**Course Code**: MCSM1104T

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

- Impart the basic concepts of data structure and algorithms.
- Understand the concepts about searching and sorting techniques.
- Understood the basic concepts about stacks, queues, linked lists, trees and graphs.
- Understand about writing algorithms and step by step approach in solving problems with the help of fundamental data structure.

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: Business Intelligence	**Course Code**: MCSM1105E

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

- Identify the major frameworks of computerized decision support: decision support systems (DSS), data analytics and business intelligence (BI).
- Explain the foundations, definitions, and capabilities of DSS, data analytics and BI.
- List the definitions, concepts, and architectures of data warehousing.
- Demonstrate the impact of business reporting, information visualization, and dashboards.

- Explain data mining, neural networks, support vector machines, text analytics, text mining, sentiment analysis, web mining, web analytics, social analytics, social network analysis.
- Outline the definitions, concepts, and enabling technologies of big data analytics.
- Identify the major ethical and legal issues of analytics.
- Describe how analytics are powering consumer applications and creating a new opportunity for entrepreneurship for analytics.

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: SOFTWARE LAB-I (C++ and Data Structures)	**Course Code**: MCSM1106L

Course Outcomes: On completion of this course, the students will 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. d) Understand generic programming, templates, file handling
- Write C ++programs using arrays, strings, dynamic memory allocation functions
- Implement ++C linear data structures like stacks, queues, linked lists using static and dynamic allocation and their applications
- 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: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: DISTRIBUTED SYSTEMS	**Course Code**: MCSM1201T

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

- Be familiar with basic networking concepts
- Be familiar with computer networks, distributed systems and cloud computing concepts
- Have better understanding about cloud computing and network security aspects
- Be well known about the fundamentals of wireless communication technology

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: Research Methodology	**Course Code**: MCSM1202T

Course Outcomes: .At the end of the course, the students will be able to:

- Understand basic aspects of research, its types, and its scope and formulation
- Have better understanding of statistical methods used for research
- Develop the skills to identify the appropriate statistical techniques for the analysis of data
- Analyse the data using the appropriate statistical tool
- Learn how to collect, analyze, present and interpret research data.

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: ARTIFICIAL INTELLIGENCE	**Course Code**: MCSM1203T

Course Outcomes: At the end of the course, the students will be able to:

- design a knowledge-based system
- familiar with terminology used in this topical area
- Read and analyse important historical and current trends addressing artificial intelligence.

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: Computer Graphics	**Course Code**: MCSM1204T

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.
- Create effective OpenGL programs to solve graphics programming issues, including 3D transformation, objects modeling, color modeling, lighting, textures, and ray tracing

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: DATA SCIENCE	**Course Code**: MCSM1205E

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

- To analyze the need and usage of various facets of data and data science process.
- To understand and apply various visualization techniques.
- To 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: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP

Course Name: Software Lab – II (Computer Graphics)	**Course Code**: MCSM1206L

Course Outcomes: At the end of the course, the students will be able to:

- Create 3D graphical scenes using open graphics library suits
- Implement image manipulation and enhancement
- Create 2D animations using tools

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: Network Security	**Course Code**: MCSM2301T

Course Outcomes: Upon completion of this course students will be able to:

- Have internalized the fundamental notions of threat, vulnerability, attack and countermeasure.
- Have a theoretical understanding of the principles underlying cryptography and cryptanalysis and have a technical understanding of the main cryptographic concepts and technologies available today, including symmetric and asymmetric encryption, hashing, and digital signatures.
- Balance their knowledge of attack and defence mechanisms against the ethical and social norms of society, and act responsibly.

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: SOFTWARE ENGINEERING	**Course Code**: MCSM2302T

Course Outcomes: At the end of the course, the students will have:

- Knowledge of basic SW engineering methods and practices, and their appropriate application;
- A general understanding of software process models such as the waterfall and evolutionary models.
- An understanding of the role of project management including planning, scheduling, risk management, etc.
- An understanding of software requirements and the SRS document.
- An understanding of different software architectural styles.
- An understanding of implementation issues such as modularity and coding standards.
- An understanding of approaches to verification and validation including static analysis, and reviews.
- An understanding of software testing approaches such as unit testing and integration testing.
- An understanding of software evolution and related issues such as version management.
- An understanding on quality control and how to ensure good quality software.

- An understanding of some ethical and professional issues that is important for software engineers.
- Understanding of significance of teamwork and project based learning

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: DIGITAL IMAGE PROCESSING	**Course Code**: MCSM2303T

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

- Familiar with basic image processing techniques for solving real problems.
- Have sufficient expertise in both the theory of two-dimensional signal processing and its wide range of applications, for example, image restoration, image compression, and image analysis.
- Analyze general terminology of digital image processing.
- To examine various types of images, intensity transformations and spatial filtering.
- To develop Fourier transform for image processing in frequency domain.
- To evaluate the methodologies for image segmentation, restoration etc.
- To implement image process and analysis algorithms.
- To apply image processing algorithms in practical applications

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: OBJECT ORIENTED ANALYSIS AND DESIGN USING UML	**Course Code**: MCSM2304E

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: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: SOFTWARE LAB – III (Digital Image Processing)	**Course Code**: MCSM2305L

Course Outcomes: Upon completion of the course, students will have the ability to:

- Describe the theory and principles of image and video processing techniques

- Illustrate the theory and principles of image and video processing techniques
- Define algorithms for image enhancement and restoration
- Identify image transformations
- Produce image transformations
- Define image coding and compression techniques
- Propose image coding
- Select the appropriate compression technique
- Design software using MATLAB

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: Research Project	**Course Code**: MCSM2306P

Course Outcomes: : Upon completion of the course, students will have the ability to:

- Demonstrate sound fundamentals in a chosen area of computing
- Identify and formulate a problem of research interest in the chosen area of computing
- Analyse the computing problem and propose solutions
- Apply the emerging technologies in solving some challenging problem in chosen area
- Effectively communicate the work at all stages of the project

Program Name: M. TECH.(COMPUTER SCIENCE AND ENGINEERING)	**Program Code**: MCSM2PUP
Course Name: Dissertation	**Course Code**: MCSM2401D

Course Outcomes: students will have the ability to:

- Identify a suitable problem to be solved computationally
- Reflectively analyze proposed solutions to the identified computing problem
- Design and develop solutions to the problem and analyze results
- Prepare a thesis and defend the thesis on the work done
- Augment the knowledge base in the chosen area of computing, adhering to ethical practices at every stage