

**DEPARTMENT OF MCA**  
**1<sup>st</sup> YEAR COURSES**

**ODD SEMESTER**

**SOFTWARE ENGINEERING & TQM (MCA C103)**

**CO1:** **Identify** an effective software engineering process, based on knowledge of widely used development lifecycle models.

**CO2:** **Define** the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress, identification and implementation of the software metrics.

**CO3:** Work effectively alone or in a team to **analyze** the requirements of a complex software system, and **solve** problems by creating appropriate designs that satisfies these requirements.

**CO4:** Capture, document and **analyze** requirements and translate a requirements specification into an implementable design, following a function-oriented or object-oriented approach.

**CO5:** **Formulate** a testing strategy for a software system, employing techniques such as unit testing, test driven development and functional testing.

**CO6:** **Analyze** software risks and risk management strategies and defining the concepts of software quality and reliability on the basis of International quality standards.

**COMPUTER ORGANIZATION & ARCHITECTURE**  
**(MCA C102)**

**CO1:** Students will be able to **understand** the knowledge of memory hierarchy, cache memory, analyze cache performance and **apply** the principle of locality to cache design.

Students will be able to **understand** and **compare** various cache mapping techniques and **analyze** virtual memory concept including paging and allocation.

Students will **understand** the working principle of pipeline, **Analyze** the cause of pipelines hazards and **implement** ways to overcome them.

Students would able to **explore** various techniques of instruction-level parallelism, including superscalar execution, branch prediction, and speculation, in design of high-performance processors

Students would be able to **State** and **compare** properties of shared memory and **distributed** multiprocessor systems and cache coherency protocols.

Students will **understand** hardware design of multiprocessors including cache coherence and synchronization and will continue to **learn** and **justify** future aspects of computer architecture.

## **EVEN SEMESTER**

### **OPERATING SYSTEM (MCA C202)**

**CO1:** **Describes** the general architecture along with different structures of computers and operating system.

**CO2:** **Explain** the process management policies; **predicts** the requirement for process synchronization and coordination handled by operating system.

**CO3:** **Demonstrates** and **computes** Scheduling algorithms and formulate solutions for critical section problem

**Computes** System model for deadlock, Methods for handling

- CO4:** deadlocks and Describe; analyze the memory management and its allocation policies.
- CO5:** **Design** File, directory and **Constructs** various Access methods and implementation.
- CO6:** **Justifies** the tradeoffs in **design** and **implementation** concepts used in the development of various Operating Systems.

## **DATA BASE MANAGEMENT SYSTEMS (MCA C201)**

- CO1:** Students will be able to **Define** a **Problem** at the view level & ability to **Understand** the physical structure of the database to handle data.
- CO2:** Students would be able to **Implement** the logic by using tools like ERD.
- CO3:** Students will be able to **Formulate** using relational algebra, **Solutions** to a broad range of query and data update problems.
- CO4:** Students will be able to **Formulate** SQL query with data.  
Students will be able to **Understand** the **Knowledge** of functional
- CO5:** Dependencies to **Design** and Normalize the database & **Analyze** the internal data structure.
- CO6:** Students would clearly **Understand** the **Knowledge** of transaction system & could extract data efficiently.

## **DATA COMMUNICATION & COMPUTER NETWORKS (MCA C203)**

- CO1:** **Describes** the utility of layered architecture with OSI and TCP/IP models and **identify** the responsibility of each layer.
- CO2:** **Explain** different data link layer utilities, functions, control and protocols and Describe with their uses and applications.
- CO3:** **Demonstrate** network layer routing algorithms and **Classify** the congestion control algorithms. Implementation of the routing protocols is also taken care.
- CO4:** **Relates** the Session layer design issues and Transport layer services.

- C05:** **Estimates** the functions of Application layer and Presentation layer paradigms and Protocols.
- C06:** **Justifies** network security, cryptography, data integrity working concept.

### **ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS (MCA C204):**

- C01:** To review and analysis the fundamental concepts of digital image processing. Understand the relevant aspects of digital image representations and their practical applications.
- C02:** Try to analyze the spatial and frequency domain transformation of images for different applications. Students should have the ability to perform pixel-wise intensity as well as frequency-level transformations to obtain the desired transformed image representation.
- C03:** To understand and evaluate the different image enhancement techniques. Students should learn the different image enhancement algorithms to improve the quality of the image for further processing.
- C04:** Students should learn different techniques and algorithms to restore the image to its prior form from degraded states using spatial and frequency-level operations.
- C05:** To interpret different segmentation and object detection techniques. Students should learn different foreground object localization and detection algorithms for practical applications in computer vision related domain.
- C06:** Students should able to learn different algorithms and techniques to segment and extract object components from the whole image for further processing.

### **MATHEMATICS-II (MCA M205):**

- C01:** **Define** numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of the system of algebraic equations.
- C02:** **Explain** various interpolation methods and finite difference concepts.

- CO3:** **Compute** numerical differentiation and integration whenever and wherever routine methods are not applicable.
- CO4:** **Differentiate** numerically on the ordinary differential equations using different methods through the theory of finite differences.
- CO5:** **Formulate** numerically on the partial differential equations using different methods through the theory of finite differences.
- CO6:** **Conclude** with calculation and interpretation of errors in the numerical method.

### **DATABASE MANAGEMENT SYSTEMS (MCA C291):**

- CO1:** Students will be able to **understand** through laboratory activities to **solve problems** related to key concepts taught in the classroom.
- CO2:** Students will be able to **Create** and **populate** a RDBMS, using SQL.
- CO3:** Students will be Able to write queries in SQL to retrieve any type of information from a data base.
- CO4:** Students will be able to **Design** conceptual models of a database using ER modeling for real life applications and also construct queries in Relational Algebra.
- CO5:** Students will be able to **Create** and maintain tables using PL/SQL
- CO6:** Students will be able to **Construct problem** definition statements for real life applications and **implement** a database for the same.

DEPARTMENT OF mca  
**ALL COs 2ND YEAR COURSES**

**ODD SEMESTER**

**WEB TECHNOLOGY (MCA C303):**

- CO1:** Describe and define Intranet, Extranet, Internet, WWW and TCP/IP protocols.
- CO2:** Explain IP-Subnetting and addressing, Internet Routing Protocol and POP3, SMTP.
- CO3:** Brief introduction of HTML, CSS, Java Script, XML and Perl.
- CO4:** Define the concept of Threats, Network security techniques and Firewall.
- CO5:** Explain Internet Telephony, Multimedia Applications and Search Engine and Web Crawler.
- CO6:** Analyze a web page and identify its elements and attributes.

**INTRODUCTION TO MACHINE LEARNING (MCA C301):**

- CO1:** Identify and understand the technical aspect of multimedia systems including digitization.
- CO2:** Understand the principles for different media like image, audio, video and text applications.
- CO3:** Learn about multimedia database system, segmentation, indexing and animation.
- CO4:** Be familiar with the concept about various compression techniques for both textual and non-textual information.
- CO5:** Develop multimedia application and analyze the performance of the same. To gain hands-on experience in image, sound and video editing and in some aspects of multimedia authoring (incorporating images, sound, video, and animation).
- CO6:** Justify various compression techniques and develop different multimedia systems applicable in real time.

## **ORGANIZATIONAL BEHAVIOR (MCA C302):**

- CO1:** **Manage** the scope, cost, timing, and quality of the project, at all times focused on project success as defined by project stakeholders.
- CO2:** **Identify** project goals, constraints, deliverables, performance criteria, control needs, and resource requirements
- CO3:** **Implement** project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success.
- CO4:** **Utilize** technology tools for communication, collaboration, information management, and decision support.
- CO5:** **Apply** appropriate legal and ethical standards.
- CO6:** **Appraise** the role of project management in organization change.

## **CYBER SECURITY (MCA E304A):**

- CO1:** Recognize the various cryptographic techniques including private and public key cryptography, hashes and message digests.
- CO2:** Realize about existing cryptographic utilities, digital signature and its applications.
- CO3:** Identify with about classical encryption techniques and secure data communication.
- CO4:** Explore the design issues and working principles of various authentication protocols, different types of attacks and their characteristics.
- CO5:** Explore various communication standards as student may get knowledge about new strategies to secure data communication.
- CO6:** Survey the idea of cryptographic utilities and authentication mechanisms to design secure applications.

## **EVEN SEMESTER**

### **CLOUD COMPUTING (MCA E402B):**

- CO1:**     **Understand** various basic concepts related to cloud computing technologies.
- CO2:**     **Explain** the architecture and concept of different cloud models: IaaS, PaaS, SaaS.
- CO3:**     **Demonstrate** different cloud programming platforms and tools.
- CO4:**     **Differentiate** the underlying principle of cloud virtualization, cloud storage, data management and data visualization.
- CO5:**     **Create** application by utilizing cloud platforms such as Google app Engine and Amazon Web Services (AWS).
- CO6:**     **Justify** scalable applications using AWS features.

### **DATA ANALYTICS (MCA C401):**

- CO1:**     Identify and understand the technical aspect of multimedia systems including digitization.
- CO2:**     Understand the principles for different media like image, audio, video and text applications.
- CO3:**     Learn about multimedia database system, segmentation, indexing and animation.
- CO4:**     Be familiar with the concept about various compression techniques for both textual and non-textual information.
- CO5:**     Develop multimedia application and analyze the performance of the same. To gain hands-on experience in image, sound and video editing and in some aspects of multimedia authoring (incorporating images, sound, video, and animation).
- CO6:**     Justify various compression techniques and develop different multimedia systems applicable in real time.



