# Master of Computer Applications 2 Year Course w.e.f.2021-2022

# **Programme Outcomes:**

- PO1. The knowledge of mathematics/statistics and computing fundamentals to apply on various real life applications for any given requirement.
- PO2. Skills to analyze a problem along with identify and define the logical modelling of solutions.
- PO3. Ability to design, implement and evaluate a computer-based system, process, component to meet stakeholder needs.
- PO4. Integrate and apply efficiently the contemporary IT tools to all computer applications.
- PO5. Analyze and review literature to invoke the research skills to design, interpret and make inferences from the resulting data.
- PO6. Function effectively both as a team leader and team member on multi disciplinary projects to express computing and management skills.
- PO7. Apply the intrinsic skills with complete focus to function as a successful entrepreneur.
- PO8. Communicate effectively and present technical information.
- PO9. Apply ethical principles and commit to professional ethics and responsibilities.
- PO10. Have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **Programme Specific Outcomes:**

- PSO1. Design applications for any desired needs with appropriate considerations for any specific need on societal and environmental aspects.
- PSO2. The students can select the suitable data model, appropriate architecture and platform to implement a system with good performance.
- PSO3. The students can design and integrate various system based components to provide user interactive solutions for various challenges.

## *MCA I SEMESTER (w.e.f. Academic Year 2021-2022)* MCA 1.1: COMPUTER ORGANIZATION & ARCHITECTURE

## Course Objective:

The student should be able to learn the Concepts of the basic structure and operation of the functional modules of a digital computer and also understands functioning of ALU, Control Unit, Memory Units and I/O devices processors. Also learns to apply contextual knowledge to societal related issues.

- CO1. Understand the functional units of computer and how they operate, interact and communicate.
- CO2. Familiar with different types of number systems and simplification of Boolean Expressions.
- CO3. Learn the functions of flip-flops, counters and registers.
- CO4. Acquire knowledge on ALU and memory units functioning.
- CO5. Acquire knowledge on control unit and input / output units functioning.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
C01	-	L	-	L	-	-	-	-	-	L	-	М	L
CO2	Н	L	L	-	-	-	-	-	-	-	-	L	-
CO3	L	L	L	-	-	-	-	-	-	-	М	М	L
CO4	L	-	L	-	-	-	-	-	-	L	L	L	-
CO5	Μ	L	L	-	-	-	-	-	-	L	М	М	L

## MCA I SEMESTER (w.e.f. Academic Year 2021-2022) MCA 1.2: PROGRAMMING IN C++

## Course Objective:

The course provides an introduction to Object Oriented Programming concepts using C++ and emphases how they can be used to create modular and re-usable code in the development of Object-Oriented system.

- CO1. Understands and explains object-oriented programming principles and techniques using C++.
- CO2. Apply the concept of constructor and destructor and can use inheritance concepts of C++ for a given problem
- CO3. Understands and works with file processing in C++.
- CO4. Learns generic programming and exception handling features in C++.
- CO5. Understands process of object-oriented system development.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	М	L	L	-	L	-	L	-	Н	-	-	-
CO2	Н	М	L	L	-	L	-	L	-	Н	-	-	-
CO3	Н	Н	L	L	М	L	-	L	-	Н	М	М	L
CO4	Н	Η	L	L	М	L	-	L	-	Н	Н	М	L
CO5	Н	Н	L	L	М	L	-	L	-	Н	М	М	М

## MCA I SEMESTER (w.e.f. Academic Year 2021-2022) MCA 1.3: DATA STRUCTURES & ALGORITHMS

## Course Objective:

Expose the students to the concepts of data structures like Stacks, queues, lists, graphs and trees and concepts about searching and sorting techniques. Write algorithms for solving problems with the help of fundamental data structures.

- CO1. Analyze various ways of representing a Data Structure like stacks, queues, linked lists, trees, graphs and hash tables.
- CO2. Solve various real time problems using data structures.
- CO3. Develop sorting and searching algorithms.
- CO4. Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- CO5. Identify suitable data structure for computational problem solving.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Μ	Н	Η	Μ	L	-	-	-	-	-	Н	Μ	Н
CO2	Н	Μ	Η	Μ	L	-	-	-	-	-	Н	Μ	Н
CO3	Н	L	Μ	Μ	L	-	-	-	-	-	Н	Μ	Н
CO4	Н	L	Μ	Μ	L	-	-	-	-	-	Н	Μ	Н
CO5	Η	Μ	Н	Μ	L	-	-	-	-	-	Н	М	Н

#### MCA I SEMESTER (w.e.f. Academic Year 2021-2022) MCA 1.4: OPERATING SYSTEM

# Course Objective:

A successful student will be able to understand the basic components of a computer operating system, and the interactions among the various components. The course will cover the concepts of processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection.

## Course Outcomes:

CO1. Identify the basic components of operating system and their functions.

CO2. Study the concepts of processes, threads, scheduling, synchronization, deadlocks

CO3. Understand the various issues in memory management, file and I/O subsystems and protection.

CO4. Acquaintance with the class of abstractions affords by general purpose operating systemsthat

aid the development of user applications.

CO5. Able to use operating systems effectively.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	-	L	Н	Н	-	-	-	-	-	-	Н	Н	-
CO2	-	L	Н	Н	-	-	-	-	-	-	Н	Н	-
CO3	-	Н	Н	Н	-	-	-	-	-	-	Н	Н	-
CO4	-	Н	Н	Н	-	-	-	-	-	-	Н	Н	-
CO5	-	Н	Н	Н	Н	-	-	Н	-	-	Н	Н	-

#### MCA I SEMESTER (w.e.f. Academic Year 2021-2022) MCA 1.5: PRINCIPLES OF MANAGEMENT & PROFESSIONAL COMMUNICATION

#### Course Objective:

To help the students gain understanding of the functions and responsibilities of managers, to develop cognizance of the importance of management principles. To enable the students in learning communication and interview skills.

- CO1. Describe primary features, processes and principles of management. Explain functions of management in terms of planning, decision making and organizing.
- CO2. Illustrate key factors of leadership skill in directing and controlling business resources and processes.
- CO3. Exhibit adequate verbal and non-verbal communication skills
- CO4. Demonstrate effective discussion, presentation and writing skills.
- CO5. Training in Seminar presentation, Group Discussion and Interview skills.

Course PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PSO1 PSO2 PSO3 Outcomes C01 Η Η Μ Μ L L \_ \_ \_ \_ \_ \_ CO2 Η Η Μ Μ L L ------\_ CO3 Η Μ Η L Μ Μ Μ \_ \_ \_ \_ \_ \_ CO4 Η Μ Η L Μ M Μ \_ \_ -\_ \_ \_ CO5 Η Μ Η L Μ Μ Μ ---\_ --

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

# MCA I SEMESTER (w.e.f. Academic Year 2021-2022) MCA P1: C++ LAB

## Course Objective:

In this course, programs will be implemented based on lab syllabus that is related to content given in theory and executed in C++.

#### Course Outcomes:

- CO1. Implement object-oriented concepts such as objects, class abstraction, functions and message passing using C++
- CO2. Implement the friend function and function overloading, inheritance.
- CO3. Implement virtual function to achieve Run time polymorphism.
- CO4. Apply I/O operation to handle file system.
- CO5. Implement exception handling and templates.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	L	-	-	-	L	-	L	-	Н	-	-	-
CO2	Н	L	-	-	-	L	-	L	-	Н	-	-	-
CO3	Н	L	-	-	-	L	-	L	-	Н	-	-	-
CO3	Η	Μ	L	L	L	L	-	L	-	Н	L	Н	L
CO5	Η	Н	Μ	Μ	Μ	Μ	L	Μ	-	Н	Μ	Н	Μ

## MCA I SEMESTER (w.e.f. Academic Year 2021-2022) MCA P2: DATA STRUCTURES & OPERATING SYSTEM LAB

## Course Objective:

To expose the students to develop skills to design and analyse simple linear and non-linear data structures; Implement various sorting and searching methods. The goal of this lab is to have students understand and experiencing the principles in the design and implementation of operating systems.

- CO1. Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- CO2. Identify and implement the appropriate data structure for a real life computational problems.
- CO3. Determine and simulate the appropriate searching and sorting techniques for a given problem
- CO4. Would able to experiment the operating system concepts like CPU Scheduling, Process synchronization and Memory management
- CO5. Develop algorithms for deadlock prevention and disk scheduling

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Μ	Н	Н	М	L	-	-	-	-	-	Н	М	Н
CO2	Η	Μ	Н	Μ	L	-	-	-	-	-	Н	М	Н
CO3	Η	L	Μ	Μ	L	-	-	-	-	-	Н	М	Н
CO4	Η	L	Μ	М	L	-	-	-	-	-	Н	М	Н
CO5	Н	М	Н	М	L	-	-	-	-	-	Н	М	Н

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

#### MCA I SEMESTER (w.e.f. Academic Year 2021-2022) MCA P3: PC HARDWARE AND PROFESSIONAL COMMUNICATION LAB

# Course Objective:

To help the students in installing OS, other softwares and manage network connections and trouble shooting on user complaints. To enable the students in learning communication and interview skills.

## Course Outcomes:

CO1. Indicate the names and functions of hardware ports and the parts of the motherboard.

CO2. Installation of OS and other softwares.

- CO3. Manage network connections, configuring IP address and Domain name system.
- CO4. Exhibit adequate verbal and non-verbal communication skills.
- CO5. Trained in Seminar presentation, Group Discussion and Interview skills.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	-	-	-	Η	-	Н	Н	Μ	M	-	L	-	L
CO2	-	-	-	Н	-	Н	Н	Μ	Μ	-	L	-	L
CO3	-	-	-	Н	-	Н	Μ	Н	L	М	М	-	Μ
CO4	-	-	-	Η	-	Н	Μ	Н	L	Μ	Μ	-	Μ
CO5	-	-	-	Н	-	Η	Μ	Η	L	Μ	Μ	-	Μ

# MCA II SEMESTER (w.e.f. Academic Year 2021-2022) MCA 2.1: PRINCIPLES OF PROBABILITY & STATISTICS

## Course Objective:

To expose the students in the concepts of probability theory and its application, statistical distributions and sample tests of significance.

- CO1. Understand the elementary probability theory and its application along with the laws of probability.
- CO2. Get knowledge of statistics and computing fundamentals to apply on various real life applications for any given requirement.
- CO3. Get Awareness on the concept of the various statistical distributions along with the correlation and regression Analysis.
- CO4. Acquire Knowledge on the characteristics of the population and samples through large sample tests of significance.
- CO5. Classify any data through small sample tests of significance.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Η	-	-	-	Η	-	-	-	-	-	Н	-	-
CO2	Н	-	-	-	Н	-	-	-	-	-	Н	-	-
CO3	Η	-	-	-	Η	-	-	-	-	-	Н	-	-
CO4	Η	-	-	-	Η	-	-	-	-	-	Н	-	-
CO5	Η	-	-	-	Η	-	-	-	-	-	Н	-	-

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

## MCA II SEMESTER (w.e.f. Academic Year 2021-2022) MCA 2.2: CORE JAVA

# Course Objective:

To Understand evolution of Java, Java Working Principles and to solve java problems using Object Oriented Programming concepts.

- CO1. Ability to apply classes, objects, members of a class and relationships among them needed for a specific problem.
- CO2. Ability to Write Java application programs using OOP principles and proper program structuring.
- CO3. Ability to apply the concepts of polymorphism and inheritance in different applications
- CO4. Ability to write Efficient programs that handle exceptions
- CO5. Ability to apply the concept of streams and files in different Applications and to create user friendly interface.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Η	Н	Μ	L	-	-	L	-	-	-	Н	Μ	М
CO2	Η	Н	Μ	L	-	-	L	-	-	-	Н	Н	М
CO3	Η	Н	Μ	L	-	-	L	-	-	-	Н	Μ	М
CO4	Η	Н	Μ	L	-	-	L	-	-	-	Н	Н	М
CO5	Η	Μ	Μ	Н		-	L	-	-	-	Н	Н	Μ

# MCA II SEMESTER (w.e.f. Academic Year 2021-2022) MCA 2.3: DATA COMMUNICATIONS AND COMPUTER NETWORKS

## Course Objective:

The course will provide the students about fundamental concepts of different open systems interconnection layers of network protocol stack, and provide an understanding on the factors that influence the network performance.

- CO1. Gain the knowledge on to master the terminology and concepts of computer networks, the OSI reference model and the TCP-IP reference model.
- CO2. Understands the importance of Data Link layer and its design issues.
- CO3. Understands the protocols to multiple access of channel
- CO4. Understands various Routing algorithms and Congestion Control algorithms.
- CO5. Explain Transport layer services, TCP and UDP.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Η	Μ	L	-	-	-	-	-	-	Н	-	-	-
CO2	Η	L	L	-	L	-	-	L	-	Н	-	-	-
CO3	Η	L	L	-	L	L	-	L	-	Н	L	Μ	L
CO3	Η	L	L	-	L	L	-	L	-	Н	L	Μ	L
CO5	Н	L	L	L	L	L	-	L	-	Н	L	Μ	L

# MCA II SEMESTER (w.e.f. Academic Year 2021-2022) MCA 2.4: RELATIONAL DATABASE MANAGEMENT SYSTEMS

## Course Objective:

The student should be able to learn the basics of database systems, Understand the different issues involved in the design and implementation of a database system, different database designs & models. Also learns significance of Normalization, ER models, query languages for data processing. Transaction management, Query Processing, concurrency control and recovery mechanism also will be learned. Student will be trained to do data processing projects.

- CO1. The Student will understand the role of a database management system in an organization.
- CO2. Student learns to construct simple and moderately advanced database queries using Structured Query Language (SQL).
- CO3. An understanding of normalization theory & ER Diagrams and apply such knowledge to the normalization of a database will be learned by the student in this programme.
- CO4. A student can learn important features of DBMS such as query processing methods, Transaction management, concurrency control mechanism, Recovery control mechanism.
- CO5. Student thoroughly understands how to organize, maintain and retrieve efficiently, and effectively information from a DBMS.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	L	L	L	-	-	L	-	-	Μ	Н	Μ	L	-
CO2	Η	Μ	L	-	-	-	-	-	-	-	Н	Н	М
CO3	Μ	Н	Μ	L	-	-	Μ	L	L	-	-	Μ	L
CO3	-	-	Μ	-	L	L	Μ	Μ	L	Μ	Н	Μ	L
CO5	-	Н	L	Μ	-	L	Μ	L	L	Μ	Μ	L	Μ

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

# MCA II SEMESTER (w.e.f. Academic Year 2021-2022) MCA 2.5: SOFTWARE ENGINEERING

# Course Objective:

To provide the students with an overall view over Software Engineering discipline and with insight into the processes of software development.

- CO1. Ability to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment
- CO2. Ability to classify different types of software requirements and their gathering techniques.
- CO3. Ability to Convert the requirements model into the design model and demonstrate use of software and user interface design principles.
- CO4. Acquire knowledge to design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.
- CO5.Ability to Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs. And ability to Implement various test processes for quality improvement and estimation of software projects.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	L	Н	Μ	L	-	-	-	-	-	-	Н	Н	Н
CO2	L	Н	Н	L	-	-	-	-	-	-	Н	Н	Н
CO3	Н	Н	Н	L	-	-	-	-	-	-	Н	Н	М
CO4	Μ	Н	Μ	L	Μ	-	-	-	-	-	Н	Н	М
CO5	Μ	Н	Н	-	Μ	-	Μ	-	-	Μ	М	М	М

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

# MCA II SEMESTER (w.e.f. Academic Year 2021-2022) MCA P4: CORE JAVA LAB

# Course Objective:

To develop **so**ftware development skills applying Java Programming for real world Applications.

- CO1. Demonstrate the Knowledge in the concepts such as variables conditional, Iterative execution methods, classes, objects.
- CO2. Demonstrate the concept of Inheretance, Interfaces, Polymorphism and Package
- CO3. Create Threads using thread classes
- CO4. Demonstrate error handling techniques Using exception handling
- CO5. Demonstrate File concept & Applet programmes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	Н	Μ	-	-	-	L	-			Н	Μ	Μ
CO2	Н	Н	Μ	-	-	-	L	-		-	Н	Н	М
CO3	Н	Н	Μ		-	-	L	-	-	-	Н	М	Μ
CO4	Н	Н	Μ	-	-	-	L	-	-	-	Н	Н	Μ
CO5	Н	М	Μ	-		-	L	-	-	-	Н	Н	М

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

# MCA II SEMESTER (w.e.f. Academic Year 2021-2022) MCA P5: DCCN & SOFTWATE ENGINEERING LAB

## Course Objective:

To expose the students to the basic commands of networks, to implement some of the protocols flow control algorithms of computer networks and to develop UML diagrams related to software development.

# Course Outcomes:

- CO1. Execute the basic and important client server commands
- CO2. Demonstrate operation of network and its management commands
- CO3. Implement some of data link layer and transport layer protocols
- CO4. Implement applications of TCP and UDP
- CO5. Simulate Congestion Control Algorithms using Network simulator

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	-	-	-	-	L	-	L	-	Н	-	-	-
CO2	Н	-	-	-	-	L	-	L	-	Н	-	-	-
CO3	Н	L	L	L	Μ	L	-	L	-	Н	-	Μ	-
CO4	Н	L	Μ	Μ	Μ	L	-	L	-	Н	L	Μ	L
CO5	Н		Н	Μ	Μ	L	L	L	-	Н	L	М	L

# MCA II SEMESTER (w.e.f. Academic Year 2021-2022) MCA P6: RDBMS LAB

# Course Objective:

The student will understand how to design the database for any real life problems and also learns how to meet the user requirement for given problem, meeting DBMS characteristics by knowing SQL and PLSQL.

## Course Outcomes:

CO1. Student understands how to design the database for the solution to the given problem to meet various queries.

- CO2. Understands DML& DDL commands, aggregate operators.
- CO3. Understands set operators and Join operators
- CO4. Understands PL SQL features to automate queries in programs.
- CO5. Understands writing programs for answering various queries of the given problem.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	Н	Μ	-	-	Μ	L	-	Μ	-	Η	Μ	Μ
CO2	L	Η	Μ	-	-	-	-	-	-	-	-	L	-
CO3	Μ	Μ	L	-	-	-	-	-	-	-	М	-	L
CO4	Н	Η	Н	-	-	-	L	-	-	-	Н	Μ	-
CO5	Н	Н	Η	L	-	-	Μ	L	L	Μ	Н	Н	L

# MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA 3.1: ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

# Course Objectives:

To expose the students to the concepts of Artificial Intelligence, Knowledge Representation, Fundamental concepts in the area of machine learning. Student learns Machine learning techniques, significance of Neural network and types of various Neural Networks and Deep Learning

# **Course Outcomes:**

After successful completion of course the student should be able to:

- CO1. Acquires knowledge on Artificial Intelligence, Knowledge representation in solving AI problems.
- CO2. Students learns the skills for representing knowledge in solving AI problems.
- CO2. Understands Machine Learning Concepts and types of Machine Learning.
- CO3. Learns significant algorithms in Supervised and Un-Supervised Machine Learning
- CO4. Learns about Neural Network architecture and its significance.
- CO5. Understand the concepts of Deep Learning.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
Outcomes													
CO1	Н	Н	Н	Н	М	-	-	-	-	-	Н	Н	Н
CO2	Н	Н	Н	Н	М	-	-	-	-	-	Н	Н	Н
CO3	Н	Н	Н	Н	М	-	-	-	-	-	Н	Н	Н
CO4	Н	Н	Н	Н	М	-	-	-	-	-	Н	Н	Н
CO5	Η	Н	Н	Н	М	-	-	-	-	-	Н	Н	Н

## MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA 3.2: ADVANCED JAVA & WEB TECHNOLOGIES

# Course Objective:

On completion of this course, a student will be familiar with Advanced java concepts, client server architecture and able to develop a web application using java technologies. Students will gain the skills and project-based experience needed for web application and development careers.

## Course Outcomes:

CO1. Understand the concepts of AWT Controls and GUI Programming.

CO2. Integrate java and server side scripting languages to develop web applications

CO3. Illustrate database access and details for managing information using the JDBC API

CO4. Gain knowledge to develop a webpage by the use of HTML and XML concepts

CO5. Can develop Java-based web application architecture with Servlets.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	Н	Η	Μ	-	-	-	-	-	-	Н	Н	-
CO2	Μ	Н	Η	Н	-	-	-	-	-	-	Н	Н	-
CO3	Н	Н	Η	Н	Н	-	L	-	-	Н	Н	Н	Н
CO4	Н	Н	Н	Н	-	-	-	-	-	Н	Н	Н	Η
CO5	Н	Η	Н	Н	-	-	-	-	-	Н	Н	Н	Η

#### MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA 3.3: COMPUTER GRAPHICS

#### Course Objective:

The course provides introduction to computer graphics, Output primitives, 2D geometric transformations and viewing, 3D geometric transformations and viewing, 3D object representation, Illumination models, Visible surface detection methods and rendering methods.

- CO1. Analyze raster scan and random scan systems by applying knowledge on graphical interactive devices.
- CO2. Understands and explore the algorithms for output primitives such as lines, circles, ellipse and filled area primitives to fill specified area.
- CO3. Analyze the concepts of geometrical transformations, representations, and viewing for 2D and 3D objects.
- CO4. Illustrate filling and clipping with different techniques.
- CO5. Apply appropriate techniques for visible surface detection and illumination models

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	Μ	-	-	Μ	L	-	L	-	Н	-	-	-
CO2	Н	Μ	-	-	Μ	L	-	L	-	Н	-	-	-
CO3	Н	М	L	Μ	Μ	М	-	L	-	Η	L	Н	М
CO3	Н	М	L	М	М	М	-	L	-	Н	L	Н	Μ
CO5	Н	Μ	L	Μ	Μ	Μ	-	L	-	Н	L	Н	Μ

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

## MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 3.4 (1): MOBILE DEVICES APPLICATION DEVELOPMENT

## Course Objective:

To expose the students to the concepts of Basic Concepts of wireless enterprise applications, Develop and enhance web development and programming skills for mobile platforms, Data Storage, Scripting and programming techniques necessary to develop web based applications and Controlling 2D and 3D objects, audio, video and the interface with external devices.

- CO1. Install and configure Android application development tools.
- CO2. Design and develop user Interfaces for the Android platform.
- CO3. Apply Java programming concepts to Android application development.
- CO4. Understanding of the specific requirements, possibilities and challenges when developing for a mobile context.
- CO5. Explain the principles of technologies which support media production and delivery on a variety of platforms.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	-	-	Μ	Н	-	-	-	-	-	-	-	-	L
CO2	Н	Μ	Н	Μ	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	Μ	-	-	-	-	-	-	-	-
CO4	-	Μ	-	-	-	-	-	-	-	-	-	Μ	-
CO5	-	-	Μ	-	-	-	-	М	L	М	-	М	-

#### MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 3.4 (2): SOFTWARE TESTING METHODOLOGIES

## Course Objective:

To expose the students to the basics of the concepts Design techniques and tools of software testing, Life cycle of testing and techniques for estimation, Phases of testing process, Optimization techniques and issues and Testing of various applications.

- CO1. Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.
- CO2. Implement various test processes for quality improvement.
- CO3. Design test planning and manage the test process.
- CO4. Apply the software testing techniques in commercial environment.
- CO5. Use practical knowledge of a variety of ways to test software and an understanding of some of the tradeoffs between testing techniques.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	-	-	L	-	М	-	-	L	-	L	М	Н	Н
CO2	-	-	Μ	-	Н	-	-	-	-	-	-	Н	-
CO3	-	Μ	Μ	-	-	-	-	М	-	Μ	-	L	-
CO4	-	-	-	-	-	L	-	-	-	-	-	-	-
CO5	М	-	-	L	-	-	-	-	-	-	-	-	-

# MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 3.4 (3): DESIGN AND ANALYSIS OF ALGORITHMS

# Course Objective:

To teach techniques for effective problem solving in computing. Through different techniques how we can solve the problems in clever and efficient manner. In addition, the analysis of the algorithm will be used to show the efficiency of algorithm over the different techniques.

# Course Outcomes:

CO1. Describe the different problem-solving techniques.

CO2. Derive and solve the different algorithms for the problems.

CO3. Analyze the asymptotic performance of algorithms.

CO4. Ability to argue the correctness of algorithms for the problems in various domains.

CO5. Solve problems using algorithm design methods introduce P and NP classes.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	М	М	Н	-	-	-	-	-	-	-	L	-	Μ
CO2	L	М	Н	Н	-	-	-	-	-	-	-	Μ	Н
CO3	М	Н	-	-	-	-	-	-	-	-	-	-	Н
CO4	М	Н	Н	Н	М	-	-	-	-	-	Μ	Н	-
CO5	-	-	-	М	М	-	-	-	-	-	-	-	Μ

## MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 3.4 (4): LINUX PROGRAMMING

# Course Objective:

The students understand basic concepts of shell scripts, file structures, process creation and interruption for multitasking applications, Linux utilities to control the resources, also learns write distributed and network applications in Linux environment.

- CO1. Understand the basic commands of Linux operating system and Demonstrate Sed and awk scripting
- CO2. Demonstrate shell scripts and understand creation of file systems and directories and operate them
- CO3. Synthesis creation of background and fore ground processes management through system calls and Generalize signal functions to handle interrupts by using system calls.
- CO4. Demonstrate Inter process communication using shared memory segments, pipes, message queues
- CO5. Demonstrate various client server applications using TCP or UDP protocols.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	L	-	-	-	-	-	-	-	-	-	L	-	-
CO2	L	М	L	-	-	-	-	-	L	L	М	L	-
CO3	Μ	Μ	Η	L	-	L	L	-	М	М	М	Μ	L
CO4	Μ	М	L	М	-	L	М	L	L	L	Н	М	Н
CO5	Н	Н	Η	L	L	L	L	Μ	М	Н	Н	Μ	М

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

#### MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 3.4 (5): CRYPTOGRAPHY & NETWORK SECURITY

#### Course Objective:

To expose the students to the concepts of basic categories of threats to computers, networks and various cryptographic algorithms, Number Theory and cryptography principles, Functions to protect from unauthorized access, Standards of digital signature and Concepts related to security in the system.

#### Course Outcomes:

- CO1. Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of finite fields and number theory.
- CO2. Compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication.
- CO3. Evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes with the application of the knowledge of cryptographic utilities.
- CO4. Apply different digital signature algorithms to achieve authentication and create secure applications.
- CO5. Analyze attacks on networks and evaluate the performance of firewalls and security protocols.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Μ	-	-	L	-	Μ	-	Μ	-	-	Н	-	-
CO2	-	-	-	-	-	Н	Μ	-	-	-	-	Μ	Н
CO3	-	Н	Μ	-	-	-	-	-	-	-	-	L	Μ
CO4	-	-	-	-	-	-	Н	-	-	-	-	-	-
CO5	L	-	-	Μ	L	-	-	Μ	-	-	-	-	Μ

## MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE/EE) 3.5 (1): DISTRIBUTED SYSTEMS

#### Course Objective:

To expose the students to the Basic concepts of distributed systems and design issues, Protocols and remote procedure calls, Synchronization of distributed systems, Procedures and design issues in distributed systems, Files and directory services.

#### Course Outcomes:

- CO1. Learn the fundamental principles of distributed systems.
- CO2. Understand the issues involved in process and resource management.
- CO3. Apprehend communication process, file system, memory management and synchronization in distributed operating system environment.
- CO4. Design, test and communicate a large software system.
- CO5. Know the basics of file system and shared memory of distributed system

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	-	-	Μ	Μ	-	Μ	-	Η	-	-	Μ	Η	-
CO2	Η	-	Н	Н	-	Η	Μ	L	-	Μ	L	-	Н
CO3	Μ	Н	L	L	-	-	-	Μ	-	-	-	Μ	-
CO4	-	-	-	-	Μ	-	-	-	-	L	-	-	L
CO5	Η	L	-	-	-	-	-	-	L	-	-	L	-

#### MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE/EE) 3.5 (2): INTERNET OF THINGS

## Course Objective:

To expose the students to the concepts of the latest micro controllers with application development, Product design and prototyping, Develop IoT systems, Web of things, Basics of cloud and web server.

#### Course Outcomes:

CO1. Familiarity with the essential protocols of IoT and their operations.

- CO2. Design and implementation of IoT networks.
- CO3. Identifying various design parameters for developing IoT applications.
- CO4. Understand the definition and significance of the Internet of Things.

CO5. Explore the relationship between IoT, cloud computing, and big data.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
Outcomes													
CO1	Н	-	Μ	-	-	-	-	Μ	-	-	-	Μ	L
CO2	M	-	-	-	-	Μ	-	L	-	-	-	-	-
CO3	-	-	-	-	-	-	Μ	-	L	-	-	-	-
CO4	-	-	-	Μ	-	-	Μ	-	-	-	L	-	М
CO5	-	L	-	-	-	-	-	-	-	Μ	-	L	-

#### MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE/EE) 3.5 (3): WEB COMMERCE

#### Course Objective:

This course provides foundations and importance of E-commerce for business and management. Students will be familiarizing with organizational and digital marketing methods, the impact of E-Commerce on business models.

#### Course Outcomes:

- CO1. Understand the foundations and importance of E-commerce.
- CO2. Assess electronic payment systems
- CO3. Know the Internet trading relationships including Inter-organizational Commerce and, Intraorganizational Commerce.
- CO4. Describe digital marketing methods the organizations can use in combination with other marketing methods.
- CO5. Analyze the impact of E-commerce on business models and strategy.

Course Outcome s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	-	-	Н	Н	Μ	-	L	-	-	-	L	Н	-
CO2	-	Н	Н	Н	-	-	Μ	-	-	-	Н	Н	-
CO3	-	L	Н	Н	Н	-	L	-	-	Н	Н	Н	-
CO4	L	Н	Н	L	-	-	-	-	-	-	L	Μ	-
CO5	-	L	Н	Н	-	-	-	-	-	-	Н	Н	-

## MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE/EE) 3.5 (4): MULTI MEDIA SYSTEMS AND APPLICATIONS

#### Course Objective:

Student understands the principles of how different types of media can be processed and presented by computers. Learns how multimedia can be used in various application areas. It provides a solid foundation to the students so that they can identify the proper applications of multimedia, evaluate the appropriate multimedia systems and develop effective multimedia application.

#### Course Outcomes:

- CO1. Learns properties and significance of multimedia system.
- CO2. Understand about various latest interactive multimedia devices, the basic concepts about images and image formats.
- CO3. Gain Knowledge about data compression techniques, image compression techniques like JPEG, video compression techniques like MPEG, and the basic concepts about animation.
- CO4. Develop an interactive multimedia presentation by using multimedia devices.
- CO5. Identify theoretical aspects in designing multimedia applications surrounding the emergence of multimedia technology.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Η	М	М	Η	-	-	-	Η	L	Н	Н	М	L
CO2	L	-	-	-	-	-	L	М	L	М	Н	-	L
CO3	Μ	М	L	L	-	-	L	L	L	М	Н	М	L
CO4	Η	М	М	М	-	-	L	L	М	М	Н	L	L
CO5	Н	L	L	L	L	Μ	L	Μ	L	М	Н	M	L

## MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE/EE) 3.5 (5): OPTIMIZATION TECHNIQUES

## Course Objective:

To provide mathematical models used in Operations Research and to apply these techniques constructively to provide optimum solutions in business decisions.

- CO1. Ability to identify and develop operational research models from the verbal description of the real and be able to understand to define and formulate linear programming problems with limitations.
- CO2. Ability to Solve linear programming problems using appropriate techniques and interpret the results obtained which can be translated to optimum solutions for action.
- CO3. Ability to develop queuing Models, transportation models and replacement models to get optimum solutions.
- CO4. For Optimum solutions ability to develop network scheduling problems with PERT/CPM techniques.
- CO5. Ability to develop Inventory system and also able to give better solutions to many inventory problems.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	Η	М	-	-	-	-	-	-	-	Н	Н	Μ
CO2	Н	Η	Μ	-	-	-	-	-	-	-	Н	Μ	Μ
CO3	Μ	Μ	L	L	L	Μ	Μ	-	-	Μ	М	Н	Μ
CO4	Н	Η	L	-	-	-	-	-	-	-	М	Μ	Μ
CO5	Μ	-	Н	-	Μ	Μ	Н	-	-	Μ	М	М	Μ

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

## MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA P7: ADVANCED JAVA & WEB TECHNOLOGIES LAB

# Course Objective:

This course provides the design and development of GUI applications using Abstract Windowing Toolkit (AWT), Swing, Event Handling and JavaScript. The students will be familiarizing in design and development of Web applications using Java Technologies.

## Course Outcomes:

- CO1. Develop web pages using AWT controls.
- CO2. Design and implement Client side and Server side programs.
- CO3. Access and Manipulate Databases with JDBC.
- CO4. Write a server side java application to catch form data sent from client, process it and store it on database.
- CO5. Develop Web applications using Java Technologies.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	-	Н	Н	Н	Μ	-	L	-	-	-	Н	Н	-
CO2	-	Н	-	L	-	-	-	-	-	-	L	L	-
CO3	-	Н	Η	Н	-	-	Μ	-	-	-	Н	Н	-
CO4	-	L	Н	Н	Η	-	L	-	-	Н	Н	Н	-
CO5	L	Н	Η	Н	-	-	-	-	-	-	Н	Μ	-

## MCA III SEMESTER (w.e.f. Academic Year 2021-2022) MCA P8: COMPUTER GRAPHICS LAB

# Course Objective:

To develop programming skills in Computer Graphics concepts through implementation of basic Graphical drawing algorithms, two and three dimensional graphical structure, visibility etc.

# Course Outcomes:

CO1. Implement basic algorithms related to line & circle drawing.

CO2. Implement various line & circle drawing algorithms.

CO3. Hands on experiments on 2D/3D transformations.

CO4. Conceptual implementation of clipping and filling algorithms.

CO5. Describe the importance of viewing, projections and Hidden surface removal

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Η	Н	-	-	-	Μ	-	L	-	Н	-	-	-
CO2	Η	Η	-	-	-	Μ	-	L	-	Н	-	-	-
CO3	Η	Η	Μ	Μ	Μ	Μ	-	L	-	Н	L	Μ	L
CO3	Η	H	Μ	Μ	Μ	Μ	-	L	-	Н	L	Μ	L
CO5	H	H	Μ	Μ	Μ	Μ	L	L	-	Η	M	H	M

#### MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA 4.1: CLOUD COMPUTING TECHNOLOGIES

## Course Objective:

To understand the idea of evolution of cloud computing and its services available today, which may led to the design and development of simple cloud service. It also focused cloud computing technology and some key challenges and security issues around cloud computing.

#### Course Outcomes:

- CO1. Ability to understand the current cloud technologies and understand the techniques of big data analysis in cloud.
- CO2. Ability to Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures
- CO3. Ability to Explore Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application
- CO4. Ability to Apply and design suitable Virtualization concept, Cloud Resource Management.
- CO5. Ability to Explore some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure, IBM and Amazon Web Services and other business cloud applications and to apply different cloud programming models as per need.

Course Outcome s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PSO 1	PSO 2	PSO 3
CO1	Н	Μ	Μ	L	-	-	-	-	-	-	Н	М	М
CO2	Н	Μ	Н	L	-	-	-	-	-	-	Н	Н	М
CO3	Μ	Μ	Μ		-	-	-	-	-	-	Μ	Н	Μ
CO3	Н	Η	Μ	-	-	-	-	-	-	-	Μ	Н	Μ
CO5	Μ	Μ	Μ	-	Μ	L	-	-	-	Μ	Н	Н	М

## MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.2 (1): CYBER SECURITY

#### Course Objective:

The course is designed in a way that a candidate can identify, analyze the nature of attacks, exhibit knowledge to secure corrupted systems, protect personal data, Cyber laws and secure computer.

- CO1. To understand cyber-attacks, types of cybercrimes, cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.
- CO2. Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.
- CO3. To study the defensive techniques against these attacks
- CO4. Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.
- CO5. Analyze and evaluate the cyber security needs of an organization.

Course	Outcomes -	Program	Outcomes -	Program	Snecific	Outcomes	(CO-PO)	-PSO	Mannin	o.
Course	Outcomes -	I I Ogi um	Outcomes -	Trogram	Specific	Outcomes	(UU-IU)	-1 50)	mappin	8.

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
S													
CO1	-	-	-	L	-	L	L	-	Н	Μ	Н	-	-
CO2	-	-	-	Μ	-	Μ	L	-	Μ	L	Н	-	-
CO3	-	-	-	L	-	L	-	-	Н	L	Н	-	-
CO4	-	-	-	Μ	-	Μ	L	-	Н	Н	Н	-	-
CO5	-	-	-	L	-	L	L	-	Н	Н	Н	-	-

## MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.2 (2): DATA ANALYTICS

## Course Objective:

The student can understand the basic concepts and principles of data mining and data warehousing, data mining techniques to build analytical applications. Students are familiarizing with Hadoop, MapReduce Technologies and Pig and Hive.

# Course Outcomes:

CO1. Learn the basic concepts and principles of data mining and data warehousing.

- CO2. Ability to perform data mining techniques like association rule mining, classification and clustering on data sets.
- CO3. Able to select and apply proper Data mining algorithms to build analytical applications.
- CO4. Understand HADOOP and Map Reduce technologies associated with big data analytics.
- CO5. Able to analyze the big data applications using Pig and Hive.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	Μ	L	Н	Н	-	-	-	-	-	Н	Н	Н
CO2	-	Н	Н	Η	Н	-	-	-	-	-	Н	Н	Н
CO3	Н	Н	-	Η	Н	-	-	-	-	-	Н	Н	Н
CO4	-	Н	Н	Η	Н	-	-	-	-	-	Н	Н	-
CO5	Η	Н	Η	Η	-	-	-	-	-	-	Н	Н	-

# MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.2 (3): SOFTWARE PROJECT MANAGEMENT

# Course Objective:

Student Learns Principles, different phases, estimations, role of professional ethics in Software Project Management, Scope of the project and also learns next generation software economics, COCOMO Cost Estimation Model.

- CO1. Identify the different project contexts and suggest an appropriate management strategy.
- CO2. Practice the role of professional ethics in successful software development.
- CO3. Identify and describe the key phases of project management.
- CO4. Determine an appropriate project management approach through an evaluation of the business context and scope of the project.
- CO5. Understands Modern project profiles, Modern process transitions.

Course	Outcomes -	Program	<b>Outcomes</b> -	- Program	Specific	<b>Outcomes</b>	(CO-PO	- <b>PSO</b> )	Mapping:
		0		0	1 0		•		11 0

Course Outcome s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Μ	L	Н	-	-	Μ	Μ	L	Н	-	М	L	-
CO2	-	-	Н	-	-	Н	L	Μ	Н	-	М	-	-
CO3	-	L	Н	-	-	Н	Μ	L	L	-	Н	L	-
CO4	-	-	Н	-	L	Н	Н	Μ	L	-	Н	М	-
CO5	-	L	-	-	-	Н	Μ	L	L	М	Н	М	L

# MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.2 (4): PROGRAMMING IN DOT NET TECHNOLOGIES

# Course Objective:

This course is designed to provide the knowledge of Dot Net Frameworks along with ASP.Net and C#.

# Course Outcomes:

CO1. Understand ASP.NET Framework and designing of ASP.NET Websites with master pages.

CO2. Study to perform Data Access using SQL components.

CO3. Develop web applications using C#.NET Concepts.

CO4. Learn Exception handling within .NET application environment.

CO5. Design and Implement database connectivity using ADO.NET in window based application.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	Н	Н	-	-	-	-	-	-	-	Н	Н	Н
CO2	L	Н	Н	-	-	-	-	-	-	-	Н	Н	Н
CO3	Н	Н	Н	-	-	-	-	-	-	-	Н	Н	Н
CO4	Н	Н	Н	Η	-	-	-	-	-	-	Н	Н	Н
CO5	Н	Н	Н	Η	-	-	-	-	-	-	Н	Н	Н

## MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.2 (5): BIOINFORMATICS

# Course Objective:

To understand basic concepts of molecular biology and genetics, the concepts of computer Science that relate to problems in biological sciences, IT techniques for biomedical research, and important functional relationships from gene data.

# Course Outcomes:

CO1. Ability to develop models for biological data.

C02. Ability to apply Data Mining techniques in Bioinformatics

CO3. Ability to Apply pattern matching techniques to bioinformatics data, protein data, genomic data.

CO4. Ability to Apply micro array technology for genomic expression study.

CO5. Ability to analyze biomedical data and pair wise sequence alignment methods

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	Н	Н	-	Μ	-	L	-	-	М	Н	М	М
CO2	Н	Н	Н	-	-	-	Μ	-	-	-	Н	М	М
CO3	Н	Н	Μ		Μ	-	L	-	-	-	Н	М	М
CO4	Н	Н	Μ	-	Μ	-	Μ	-	-	-	Н	М	М
CO5	Н	Н	Н	-	Μ	-	Μ	-	-	М	Н	М	М

## MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.3 (1): NEURO FUZZY AND GENETIC ALGORITHMS

## Course Objective:

To expose the students to the concepts of Fundamental concepts in the area of Soft Computing, Hebb Network, Neural networks, Fuzzy logic and its applications, Genetic algorithms and its Applications and Hybrid Soft Computing algorithms.

#### **Course Outcomes:**

- CO1. Identify and describe soft computing techniques and their roles in building intelligent machines.
- CO2. Evaluate and compare solutions by various soft computing approaches for a given problem.
- CO3. Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.
- CO4. Apply genetic algorithms to combinatorial optimization problems.
- CO5. Apply neural networks to pattern classification and regression problems.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	Η	Η	Η	Μ	-	-	-	-	-	Н	Н	-
CO2	Н	Н	Η	Н	Μ	-	-	-	-	-	Н	Н	-
CO3	Н	Н	Н	Н	Μ	-	-	-	-	-	Н	Н	-
CO4	Η	Η	Η	Η	M	-	-	-	-	-	Н	Η	-
CO5	Н	Η	Η	Н	Μ	-	-	-	-	-	Н	Н	-

#### MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.3 (2): DIGITAL IMAGE PROCESSING

## Course Objective:

To expose the students to the concepts of Digital Image, Image preprocessing steps and Image processing techniques.

#### Course Outcomes:

CO1. Learn Fundamental concepts in digital image processing.

- CO2. Be Exposed to Simple Image Processing Techniques.
- CO3. Learn basic Image Compression methods.
- CO4. Be Familiar with point, line and edge detection methods for Segmentation.

CO5. Understands Morphological Image Processing and Boundary Descriptors.

Course Outcomes – Program Outcomes – Program Specific Outcomes (CO-PO-PSO) Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Н	-	Н	Н	-	-	-	-	-	-	Н	-	-
CO2	Н	-	Н	Н	-	-	-	-	-	-	Н	-	-
CO3	Н	-	Н	Н	-	-	-	-	-	-	Н	-	-
CO4	Н	-	Н	Н	-	-	-	-	-	-	Н	-	-
CO5	Н	-	Н	Н	-	-	-	-	-	-	Н	-	-

## MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.3 (3): INNOVATION AND ENTREPRENEURSHIP

## Course Objective:

To expose the students to the concepts of Develop entrepreneurs by inculcating and nurturing design thinking, entrepreneurial skills and capabilities and by providing opportunities for experiential learning and presenting opportunities to start new business ventures and start-ups.

# Course Outcomes:

- CO1. understand on various aspects of innovation, creativity, evolving business models, incubation and entrepreneurship.
- CO2. Understand ocean strategy and technology incubation which are proving as game changer in todays competitive scenario.
- CO3. Knowledge in role of IPR and IP management in innovation management.
- CO4. Understand innovation and its applications in different spheres of development and growth.
- CO5. Start new business ventures and start-ups.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
Outcomes													
CO1	-	Η	Н	-	Н	Н	Н	Н	Μ	Н	Н	Н	Н
CO2	-	Η	Н	-	Н	Н	Н	Н	Μ	Н	Н	Н	Н
CO3	-	-	-	-	-	-	-	-	Н	-	Μ	-	-
CO4	-	Η	Н	-	Η	Н	Н	Н	Μ	Н	Н	Н	Н
CO5	-	Η	Н	-	Н	Н	Η	Н	Μ	Н	Н	Н	Н

#### MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.3 (4): PYTHON & R PROGRAMMING

# Course Objective:

To expose the students to the concepts of core syntax and semantics of Python programming language, need for working with the strings and functions, Illustrate the process of structuring the data using lists, dictionaries, tuples and sets, and use of R Programming and built-in functions to navigate the system.

# Course Outcomes:

- CO1. Learn the fundamental Python & R syntax, semantics and control flow statements.
- CO2. Express proficiency in handling strings and functions.
- CO3. Realise Python & Rprograms for file systems and various data structures like lists, dictionaries, tuples and sets.
- CO4. Formulate data sets for real world applications.
- CO5. Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
Outcome													
CO1	-	Н	Н	Н	-	Н	-	Н	-	Н	Н	Н	Н
CO2	-	Н	Н	Н	-	Н	-	Н	-	Н	Н	Н	Н
CO3	-	Н	Н	Н	-	Н	-	Н	-	Н	Н	Н	Н
CO4	-	Н	Н	Н	-	Н	-	Н	-	Н	Н	Н	Н
CO5	-	Н	Н	Н	-	Н	-	Н	-	Н	Н	Н	Н

## MCA IV SEMESTER (w.e.f. Academic Year 2021-2022) MCA (IE) 4.3 (5): BLOCK CHAIN TECHNOLOGY

# Course Objective:

To expose the students to the concepts of Uses of block chain, Different components involved with block chain, Block chain environment, Block chain in Financial Software and Systems and High level crypto currency.

## Course Outcomes:

- CO1. Understand the architectural components of a block chain system
- CO2.Realize the inner workings of smart contracts as means for developing decentralized applications
- CO3. Know the details of interactions between the enclosed smart contract network and the external world, be aware of further implications these interactions pose to the aspect of decentralization
- CO4. Distinguish between block chain technology and traditional system
- CO5. Incorporate security in block chain based systems.

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	-	L	L	-	-	-	-	-	-	Н	-	L	Н
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	Н	-	Μ	-	Н	-	-	-	Μ	-	-
CO4	Μ	-	-	Μ	-	-	-	-	Η	-	-	Μ	-
CO5	-	Н	-	Μ	-	L	-	-	Μ	L	-	-	Μ

#### EXTERNAL ELECTIVE - III SEMESTER (w.e.f. Academic Year 2021-2022) CSEE01: C PROGRAMMING

#### Course Objective:

The course provides an introduction to C Programming and Concepts of arrays, Structures & Unions. Pointers and file management.

#### Course Outcomes:

- CO1. Understand the basic concepts of C programming languages and design algorithms to solve simple problems.
- CO2. Understand the various steps in Program development.
- CO3. Learn how to write modular and readable C Programs
- CO4. Demonstrate the ability to correct, test and debug C programs.
- CO5. Understand process of File Management in C.

# EXTERNAL ELECTIVE- III SEMESTER (w.e.f. Academic Year 2021-2022) CSEE02: WEB DESIGNING

#### Course Objective:

On completion of this course, a student able to create a web page with style sheets, students will gain the skills and project based experience needed for web application and development careers.

#### Course Outcomes:

CO1. Ability to create web elements like buttons, banners & Bars, Forms and validations for your website.

- CO2. Ability to successfully design and implement a web site.
- CO3. Ability to create and optimize images, video and audio for the web.
- CO4. Ability to write accessible Cascading Style Sheets.
- CO5. Understands and works how to add graphics to your web pages.

## EXTERNAL ELECTIVE- III SEMESTER (w.e.f. Academic Year 2021-2022) CSEE03: PYTHON PROGRAMMING

#### Course Obiective:

To expose the students to the concepts of core syntax and semantics of Python programming language, need for working with the strings and functions. Illustrate the process of structuring the data using lists, dictionaries, tuples and sets. Also learns to write programs using Modules, File handling, OOPs and GUI in python.

#### Course Outcomes:

CO1. Learn the fundamental of Python syntax, Semantics and control flow statements.

- CO2. Express proficiency in handling Strings and Functions.
- CO3. Lear how to write programs with List, Tuple, Set and Dictionary Data Structure.
- CO4. Learns about Modules in Python and How to create User defined Modules in Python.
- CO5. Learns to write programs using OOPS concepts, File Handling, Exception Handling, GUI applications.

# FOUNDATION COURSE IN COMPUTER APPLICATIONS (w.e.f. Academic Year 2021-2022)

#### Course Objective:

Student is able to know in-depth of why computers are essential components in business, education and society. To provide hands-on use of Microsoft Office applications Word, Excel and Power Point. Completion of course fulfills to qualify for high-demand employment.

- CO1. Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software.
- CO2. Identify categories of programs, system software and applications. Organize and work with files and folders.
- CO3. Provide hands-on use of Microsoft Office applications Word, Excel and PowerPoint. Completion of the assignments will result in MS Office applications knowledge and skills.
- CO4. Describe various types of networking components and Internet fundamentals.
- CO5. Utilize the Internet Web resources and digital access tools.