MARTHANDAM COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Outcomes – Odd Semester 2023-24

Regulation 2021

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1)	3	Theory	MA3354 Discrete Mathematics
2)	3	Theory	CS3301 Data Structures
3)	3	Theory	CS3352 Foundations of Data Science
4)	3	Theory	CS3391Object Oriented Programming
5)	3	Theory	CS3351Digital Principles and Computer Organization
6)	3	Practical	CS3311Data Structures Laboratory
7)	3	Practical	CS3361 Data Science Laboratory
8)	3	Practical	CS3381 Object Oriented Programming Laboratory
9)	3	Practical	GE3361Professioinal Development

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1)	5	Theory	CS3591Computer Networks
2)	5	Theory	CS3501Compier Design
3)	5	Theory	CB3491Cryptography and Cyber Security
4)	5	Theory	CS3551Distributed Computing
5)	5	Theory	CCS375Web Technologies
6)	5	Theory	CCS366Software Testing and Automation
7)	5	Theory	MX3084Disaster Risk Reduction and Management

Regulation 2017

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1)	7	Theory	MG8591 Principles of Management
2)	7	Theory	CS8792 Cryptography and Network Security
3)	7	Theory	CS8791 Cloud Computing
4)	7	Theory	IT8075 Software Project Management
5)	7	Theory	OBM752 Hospital Management
6)	7	Practical	CS8711 Cloud Computing Laboratory
7)	7	Practical	IT8761 Security Laboratory

Course Outcomes – EVEN Semester 2023-24

Regulation 2021

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1)	4	Theory	CS3452 Theory of Computation
2)	4	Theory	CS3491 Artificial Intelligence and Machine Learning
3)	4	Theory	CS3492 Database Management Systems
4)	4	Theory	CS3401 Algorithms
5)	4	Theory	CS3451 Introduction to operating System
6)	4	Theory	GE3451 Environmental Science and Sustainability
7)	4	Practical	CS3481 Database Management system Laboratory
8)	4	Practical	CS3461 Operating System Laboratory

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1)	6	Theory	CCS356 Object Oriented Software Engineering
2)	6	Theory	CS3691 Embedded Systems and IoT
3)	6	Theory	CCS370 UI and UX design
4)	6	Theory	CCS354 Network Security
5)	6	Theory	CCS335 Cloud Computing
6)	6	Theory	CCW332 Digital Marketing
7)	6	Theory	OEE351 Renewable Energy System
8)	6	Theory	MX3089 Industrial Safety

Regulation 2017

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1)	8	Theory	GE8076-Professional Ethics in Engineering
2)	8	Theory	CS8078 Green Computing
3)	8	Practical	CS8811 Project Work

ODD Semester 2023-24

3 rd Semester B.E. CSE

MA3354 – Discrete Mathematics	
COs	Course Outcome : The students, after the completion of the course, are expected to
CO1	Have knowledge of the concepts needed to test the logic of a program.
CO2	Have an understanding in identifying structures on many levels.
CO3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
CO4	Be aware of the counting principles.
CO5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

CS3301 Data Structures	
COs	Course Outcome : The students, after the completion of the course, are expected to
CO1	Define linear and non-linear data structures.
CO2	Implement linear and non–linear data structure operations.
CO3	Use appropriate linear/non–linear data structure operations for solving a given problem.
CO4	Apply appropriate graph algorithms for graph applications.
CO5	Analyze the various searching and sorting algorithms.

CS3352 Foundations of Data Science	
COs	Course Outcome : The students, after the completion of the course, are expected to
CO1	Define the data science process
CO2	Understand different types of data description for data science process
CO3	Gain knowledge on relationships between data
CO4	Use the Python Libraries for Data Wrangling
CO5	Apply visualization Libraries in Python to interpret and explore data

CS3391Object Oriented Programming	
COs	Course Outcome : The students, after the completion of the course, are expected to
CO1	Apply the concepts of classes and objects to solve simple problems
CO2	Develop programs using inheritance, packages and interfaces
CO3	Make use of exception handling mechanisms and multithreaded model to solve real world problems
CO4	Build Java applications with I/O packages, string classes, Collections and generics concepts
CO5	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications

CS3351 Digital Principles and Computer Organization	
COs	Course Outcome : The students, after the completion of the course, are expected to
CO1	Design various combinational digital circuits using logic gates
CO2	Design sequential circuits and analyze the design procedures
CO3	State the fundamentals of computer systems and analyze the execution of an instruction
CO4	Analyze different types of control design and identify hazards
CO5	Identify the characteristics of various memory systems and I/O communication

Laboratory

CS3311 Data Structures Laboratory	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Implement Linear data structure algorithms.
CO2	Implement applications using Stacks and Linked lists.
CO3	Implement Binary Search tree and AVL tree operations.
CO4	Implement graph algorithms.
CO5	Analyze the various searching and sorting algorithms.

CS3361 Data Science Laboratory	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Make use of the python libraries for data science
CO2	Make use of the basic Statistical and Probability measures for data science.
CO3	Perform descriptive analytics on the benchmark data sets.
CO4	Perform correlation and regression analytics on standard data sets
CO5	Present and interpret data using visualization packages in Python

CS3381 Object Oriented Programming Laboratory	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Design and develop java programs using object oriented programming concepts
CO2	Develop simple applications using object oriented concepts such as package, exceptions
CO3	Implement multithreading, and generics concepts
CO4	Create GUIs and event driven programming applications for real world problems
CO5	Implement and deploy web applications using Java

GE3361 Professioinal Development	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Use MS Word to create quality documents
CO2	Use MS EXCEL to perform data operations and analytics
CO3	Use MS PowerPoint to create high quality academic presentations by including common tables

CO4	Use advanced MS Excel using chat gpt
CO5	Use advanced MS POWERPOINT using chat gpt

5 th Semester B.E. CSE

CS3591 Computer Networks	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Explain the basic layers and its functions in computer networks
CO2	Understand the basics of how data flows from one node to another
CO3	Analyze routing algorithms
CO4	Describe protocols for various functions in the network
CO5	Analyze the working of various application layer protocols

CS3501 Compier Design	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Understand the techniques in different phases of a compiler
CO2	Design a lexical analyser for a sample language and learn to use the LEX tool
CO3	Apply different parsing algorithms to develop a parser and learn to use YACC tool
CO4	Understand semantics rules (SDT), intermediate code generation and run-time environment
CO5	Implement code generation and apply code optimization techniques

CB3491Cryptography and Cyber Security	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
CO2	Apply the different cryptographic operations of symmetric cryptographic algorithms
CO3	Apply the different cryptographic operations of public key cryptography
CO4	Apply the various Authentication schemes to simulate different applications
CO5	Understand various cyber crimes and cybersecurity

CS3551Distributed Computing	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Explain the foundations of distributedsystems (K2)
CO2	Solve synchronization and state consistency problems (K3)
CO3	Use resource sharing techniques in distributed systems (K3)

CO4	Apply working model of consensus and reliability of distributed systems (K3)
CO5	Explain the fundamentals of cloud computing (K2)

CCS375Web Technologies	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Construct a basic website using HTML and Cascading Style Sheets
CO2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
CO3	Develop server side programs using Servlets and JSP.
CO4	Construct simple web pages in PHP and to represent data in XML format.
CO5	Develop interactive web applications.

CCS366 Software Testing and Automation	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Understand the basic concepts of software testing and the need for software testing
CO2	Design Test planning and different activities involved in test planning
CO3	Design effective test cases that can uncover critical defects in the application
CO4	Carry out advanced types of testing
CO5	Automate the software testing using Selenium and TestNG

MX3084Disaster Risk Reduction and Management	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
CO2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
CO3	To develop disaster response skills by adopting relevant tools and technology
CO4	Enhance awareness of institutional processes for Disaster response in the country and
CO5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

MG8591 Principles of Management	
COs to	**Course Outcome : The students, after the completion of the course, are expected**
CO1	Describe the basic of management and its types, skills, management roles, types of business organization and current trends in business
CO2	Explain the nature and purpose of planning, types, objectives of planning and decision process.
CO3	Compare the different organization structures, authorities and responsibilities, human resource management and training and development.
CO4	Estimate the individual and group behavior, motivation, job satisfaction types and theories of leadership, communication and IT
CO5	Apply the knowledge using the various system and process of controlling, budgetary and non-budgetary control techniques, use of computer and IT in management control, reporting.

CS8792 Cryptography and Network Security	
COs to	**Course Outcome : The students, after the completion of the course, are expected**
CO1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
CO2	Apply the different cryptographic operations of symmetric cryptographic algorithms
CO3	Apply the different cryptographic operations of public key cryptography
CO4	Apply the various Authentication schemes to simulate different applications.
CO5	Understand various Security practices and System security standards

CS8791 Cloud Computing	
COs to	**Course Outcome : The students, after the completion of the course, are expected**
CO1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
CO2	Learn the key and enabling technologies that help in the development of cloud.
CO3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
CO4	Explain the core issues of cloud computing such as resource management and security.
CO5	Be able to install and use current cloud technologies.Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

IT8075 Software Project Management	
COs to	**Course Outcome : The students, after the completion of the course, are expected**
CO1	Understand Project Management principles while developing software.
CO2	Gain extensive knowledge about the basic project management concepts, framework and the process models.

CO3	Obtain adequate knowledge about software process models and software effort estimation techniques.
CO4	Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.
CO5	Learn staff selection process and the issues related to people management

OBM752 Hospital Management	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Explain the principles of Hospital administration.
CO2	Identify the importance of Human resource management.
CO3	List various marketing research techniques.
CO4	Identify Information management systems and its uses.
CO5	Understand safety procedures followed in hospitals

Laboratory

CS8711 Cloud Computing Laboratory	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Configure various virtualization tools such as Virtual Box, VMware workstation.
CO2	Design and deploy a web application in a PaaS environment.
CO3	Learn how to simulate a cloud environment to implement new schedulers.
CO4	Install and use a generic cloud environment that can be used as a private cloud.
CO5	Manipulate large data sets in a parallel environment.

IT8761 Security Laboratory	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Develop code for classical Encryption Techniques to solve the problems.
CO2	Build cryptosystems by applying symmetric and public key encryption algorithms
CO3	Construct code for authentication algorithms.
CO4	Develop a signature scheme using Digital signature standard
CO5	Demonstrate the network security system using open source tools

EVEN Semester

4 th Semester – B.E. CSE

CS3452 Theory of Computation	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Construct automata theory using Finite Automata
CO2	Write regular expressions for any pattern
CO3	Design context free grammar and Pushdown Automata
CO4	Design Turing machine for computational functions
CO5	Differentiate between decidable and undecidable problems

CS3491 Artificial Intelligence and Machine Learning	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Use appropriate search algorithms for problem solving
CO2	Apply reasoning under uncertainty
CO3	Build supervised learning models
CO4	Build ensembling and unsupervised models
CO5	Build deep learning neural network models

CS3492 Database Management Systems	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Construct SQL Queries using relational algebra
CO2	Design database using ER model and normalize the database
CO3	Construct queries to handle transaction processing and maintain consistency of the database
CO4	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database
CO5	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement

CS3401 Algorithms	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Analyze the efficiency of algorithms using various frameworks
CO2	Apply graph algorithms to solve problems and analyze their efficiency.
CO3	Make use of algorithm design techniques like divide and conquer, dynamic programming and greedy techniques to solve problems
CO4	Use the state space tree method for solving problems.
CO5	Solve problems using approximation algorithms and randomized algorithms

CS3451 Introduction to operating System	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Analyze various scheduling algorithms and process synchronization.
CO2	Explain deadlock prevention and avoidance algorithms.
CO3	Compare and contrast various memory management schemes.
CO4	Explain the functionality of file systems, I/O systems, and Virtualization
CO5	Compare iOS and Android Operating Systems.

GE3451 Environmental Science and Sustainability

COs	Course Outcome : The students, after the completion of the course, are expected to
CO1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
CO2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
CO3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
CO4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

Laboratory

CS3481 Database Management system Laboratory	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Create databases with different types of key constraints.
CO2	Construct simple and complex SQL queries using DML and DCL commands.
CO3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.
CO4	Create an XML database and validate with meta-data (XML schema).
CO5	Create and manipulate data using NOSQL database.

CS3461 Operating System Laboratory	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Define and implement UNIX Commands.
CO2	Compare the performance of various CPU Scheduling Algorithms.
CO3	Compare and contrast various Memory Allocation Methods.
CO4	Define File Organization and File Allocation Strategies.
CO5	SImplement various Disk Scheduling Algorithms.

6th Semester B.E. CSE

CCS356 Object Oriented Software Engineering	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Compare various Software Development Lifecycle Models
CO2	Evaluate project management approaches as well as cost and schedule estimation strategies.
CO3	Perform formal analysis on specifications.
CO4	Use UML diagrams for analysis and design.

CO5	Architect and design using architectural styles and design patterns, and test the system

CS3691 EmbeddedSystems and IoT	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Explain the architecture of embedded processors.
CO2	Write embedded C programs.
CO3	Design simple embedded applications.
CO4	Compare the communication models in IOT
CO5	Design IoT applications using Arduino/Raspberry Pi /open platform.

CCS370 UI and UX design	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Build UI for user Applications
CO2	Evaluate UX design of any product or application
CO3	Demonstrate UX Skills in product development
CO4	Implement Sketching principles
CO5	Create Wireframe and Prototype

CCS354 Network Security	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Classify the encryption techniques
CO2	Illustrate the key management technique and authentication.
CO3	Evaluate the security techniques applied to network and transport layer
CO4	Discuss the application layer security standards
CO5	Apply security practices for real time applications.

CCS335 Cloud Computing	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Understand the design challenges in the cloud.
CO2	Apply the concept of virtualization and its types.
CO3	Experiment with virtualization of hardware resources and Docker.
CO4	Develop and deploy services on the cloud and set up a cloud environment.
CO5	Explain security challenges in the cloud environment

CCW332 Digital Marketing	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	To examine and explore the role and importance of digital marketing in today's rapidly changing business environment
CO2	To focuses on how digital marketing can be utilized by organizations and how its effectiveness can be measured.
CO3	To know the key elements of a digital marketing strategy.
CO4	To study how the effectiveness of a digital marketing campaign can be measured
CO5	To demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs.

OEE351 Renewable Energy System	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Attained knowledge about various renewable energy technologies
CO2	Ability to understand and design a PV system.
CO3	Understand the concept of various wind energy system.
CO4	Gained knowledge about various possible hybrid energy systems
CO5	Attained knowledge about various application of renewable energy technologies

MX3089 Industrial Safety	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Understand the basic concept of safety.
CO2	Obtain knowledge of Statutory Regulations and standards.
CO3	Know about the safety Activities of the Working Place.
CO4	Analyze on the impact of Occupational Exposures and their Remedies.
CO5	Obtain knowledge of Risk Assessment Techniques.

8th Semester B.E. CSE

GE8076-Professional Ethics in Engineering	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	To understand the core values that shapes the ethical behavior of an engineer and

	exposed awareness on professional ethics and human values
CO2	To understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories
CO3	The students will understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field
CO4	The students will be aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer
CO5	The students will acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives

CS8078 GREEN COMPUTING	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.
CO2	Enhance the skill in energy saving practices in their use of hardware.
CO3	Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.
CO4	Understand the ways to minimize equipment disposal requirements .
CO5	Understand about Green IT Strategies and Applications

Laboratory

CS8811 Project Work	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Discover potential research areas in the field of IT
CO2	Conduct a survey of several available literature in the preferred field of study
CO3	Compare and contrast the several existing solutions for research challenge
CO4	Demonstrate an ability to work in teams and manage the conduct of the research study.
CO5	Formulate and propose a plan for creating a solution for the research plan identified