MARTHANDAM COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Outcomes – Odd Semester 2022-23

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

Regulation 2017

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1)	5	Theory	MA8551 Algebra and Number Theory
2)	5	Theory	CS8591 Computer Networks
3)	5	Theory	EC8691Microprocessors and Microcontrollers
4)	5	Theory	CS8501 Theory of Computation
5)	5	Theory	CS8592 Object Oriented Analysis and Design
6)	5	Theory	OCE551 Airpollution and Control Engineering
7)	5	Practical	EC8681 Microprocessors and Microcontrollers Laboratory
8)	5	Practical	CS8582 Object Oriented Analysis and Design Laboratory
9)	5	Practical	CS8581 Networks Laboratory

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
8)	7	Practical	HX8001 Experimental Based Learning Course

Course Outcomes – EVEN Semester 2022-23

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

Regulation 2017

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1)	6	Theory	CS8651 Internet Programming
2)	6	Theory	CS8691 Artificial Intelligence
3)	6	Theory	CS8601 Mobile Computing
4)	6	Theory	CS8602 Compiler Design
5)	6	Theory	CS8603 Distributed Systems
7)	6	Practical	CS8661 Internet Programming Laboratory
8)	6	Practical	CS8662 Mobile Application Development Laboratory

9)	6	Practical	CS8611 Mini Project
10)	6	Practical	HS8581 Professional Communication

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 2022-23

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

GE3361Professioinal 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

MA8551 Algebra and Number Theory	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.
CO2	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
CO3	Demonstrate accurate and efficient use of advanced algebraic techniques.
CO4	Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.
CO5	Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

CS8591 Computer Networks	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Understand the basic layers and its functions in computer networks and evaluate the performance of a network.
CO2	Understand the basics of how data flows from one node to another.
CO3	Analyze and design routing algorithms.
CO4	Design protocols for various functions in the network
CO5	Understand the working of various application layer protocols.

EC8691 Microprocessors and Microcontrollers	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Understand and execute programs based on 8086 microprocessor.
CO2	Design Memory Interfacing circuits.
CO3	Design and interface I/O circuits
CO4	Understand and execute programs based on 8051 microcontroller

CO5	Design and implement 8051 microcontroller based systems.

CS8501 Theory of Computation	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Construct automata, regular expression for any pattern.
CO2	Write Context free grammar for any construct.
CO3	Design Turing machines for any language.
CO4	Propose computation solutions using Turing machines
CO5	Derive whether a problem is decidable or not.

CS8592 Object Oriented Analysis and Design	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Express software design with UML diagrams
CO2	Design software applications using OO concepts.
CO3	Identify various scenarios based on software requirements
CO4	Transform UML based software design into pattern based design using design patterns
CO5	Understand the various testing methodologies for OO software

OCE551 Airpollution and Control Engineering	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
CO2	Ability to identify, formulate and solve air and noise pollution problems
CO3	Ability to design stacks and particulate air pollution control devices to meet applicable standards.
CO4	Ability to select control equipment.
CO5	Ability to ensure quality, control and preventive measures.

Laboratory

EC8681 Microprocessors andMicrocontrollers Laboratory	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Develop ALP for fixed and Floating Point and Arithmetic operations using 8086 microprocessor.
CO2	Make use of different I/O interfacing with 8086 microprocessor

CO3	Make use of different I/O interfacing with 8086 microprocessor
CO4	Construct different waveforms using 8086 microprocessor
CO5	Model serial and parallel interfacing of 8086 microprocessor

CS8582 Object Oriented Analysis and Design Laboratory	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Perform OO analysis and design for a given problem specification.
CO2	Draw the UML diagrams for the given specification
CO3	Identify and map basic software requirements in UML mapping.
CO4	Improve the software quality using design patterns and to explain the rationale behind
CO5	Applying specific design patterns. Test the compliance of the software with the SRS.

CS8581 Networks Laboratory	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Implement various protocols using TCP and UDP.
CO2	Compare the performance of different transport layer protocols.
CO3	Use simulation tools to analyze the performance of various network protocols.
CO4	Analyze various routing algorithms.
CO5	Implement error correction codes.

7 th Semester B.E. CSE

MG8591 Principles of Management	
COs Course Outcome : The students, after the completion of the course, are expected to	
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 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 Security practices and System security standards

CS8791 Cloud Computing	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
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	**Course Outcome : The students, after the completion of the course, are expected to**
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

HX8001 Experimental Based Learning Course	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Demonstrate a sound technical knowledge of the selected project topics.
CO2	Undertake problem identification formulation and solution.
CO3	Design Engineering solutions to complex problems utilizing a system approach.
CO4	Conduct an Engineering project and communicate with Engineers and the community at large in written and oral forms.
CO5	Demonstrate the knowledge, skills and attitudes of a professional Engineer.

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

CS8651 Internet Programming	
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	Use AJAX and web services to develop interactive web applications

CS8691 Artificial Intelligence	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Use appropriate search algorithms for any AI problem

CO2	Represent a problem using first order and predicate logic
CO3	Provide the apt agent strategy to solve a given problem
CO4	Design software agents to solve a problem
CO5	Design applications for NLP that use Artificial Intelligence

CS8601 Mobile Computing	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Explain the basics of mobile telecommunication systems
CO2	Illustrate the generations of telecommunication systems in wireless networks
CO3	Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network
CO4	Explain the functionality of Transport and Application layers
CO5	Develop a mobile application using android/blackberry/ios/Windows SDK

CS8602 Compiler Design	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Understand the different phases of compiler,Design a lexical analyzer for a sample language.
CO2	Apply different parsing algorithms to develop the parsers for a given grammar.
CO3	Understand syntax-directed translation and run-time environment.
CO4	Learn to implement code optimization techniques and a simple code generator.
CO5	Design and implement a scanner and a parser using LEX and YACC tools.

CS8603 Distributed Systems	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Elucidate the foundations and issues of distributed systems
CO2	Understand the various synchronization issues and global state for distributed systems.
CO3	Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems
CO4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
CO5	Describe the features of peer-to-peer and distributed shared memory systems

Laboratory

CS8661 Internet Programming Laboratory	
COs	**Course Outcome : The students, after the completion of the course, are expected to**
CO1	Construct Web pages using HTML/XML and style sheets.
CO2	Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.
CO3	Develop dynamic web pages using server side scripting.
CO4	Use PHP programming to develop web applications.

CO5	Construct web applications using AJAX and web services.

CS8662 Mobile ApplicationDevelopment Laboratory	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Develop mobile applications using GUI and Layouts.
CO2	Develop mobile applications using Event Listener.
CO3	Develop mobile applications using Databases.
CO4	Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS.
CO5	Analyze and discover own mobile app for simple needs.

CS8611 Mini Project	
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

HS8581 Professional Communication	
COs Course Outcome : The students, after the completion of the course, are expected to	
CO1	Make effective presentations
CO2	Participate confidently in Group Discussions.
CO3	Attend job interviews and be successful in them.
CO4	Develop adequate Soft Skills required for the workplace
CO5	Enhance the Employability and Career Skills.

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