

MARTHANDAM COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course Outcomes – Odd Semester 2022-23

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
	R2021		
1)	3	Theory	MA3355 Random Processes and Linear Algebra
2)	3	Theory	CS3353 C Programming and Data Structures
3)	3	Theory	EC3354 Signals and Systems
4)	3	Theory	EC3353 Electronic Devices and Circuits
5)	3	Theory	EC3351 Control Systems
6)	3	Theory	EC3352 Digital Systems Design
7)	3	Practical	EC3361 Electronic Devices and Circuits Laboratory
8)	3	Practical	CS3362 C Programming and Data Structures Laboratory
	3	Practical	GE3361-Professional Development
	R2017		
9)	5	Theory	EC8501 Digital Communication
10)	5	Theory	EC8553 Discrete-Time Signal Processing
11)	5	Theory	EC8552 Computer Architecture and Organization
12)	5	Theory	EC8551 Communication Networks
13)	5	Theory(professional elective -I)	EC8073 Medical Electronics
14)	5	Theory(open elective -I)	OMD551 Basic of Biomedical Instrumentation
15)	5	Practical	EC8562 Digital Signal Processing Laboratory
16)	5	Practical	EC8561 Communication Systems Laboratory
	5	Practical	EC8563 Communication Networks Laboratory
17)	R2017		
18)	7	Theory	EC8701 Antennas and Microwave Engineering
19)	7	Theory	EC8751 Optical Communication
20)	7	Theory	EC8791 Embedded and Real Time Systems
21)	7	Theory	EC8702 Ad hoc and Wireless Sensor Networks
22)	7	Theory (Professional Elective -III)	GE8071 Disaster Management
23)	7	Theory (Open Elective – II)	OCH752 Energy Technology
24)	7	Practical	EC8711 Embedded Laboratory
25)	7	Practical	EC8761 Advanced Communication Laboratory

Course Outcomes – Even Semester 2022-23

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1) 2) 3) 4) 5) 6) 7) 8) 9) 10) 11) 12) 13) 14) 15) 18) 19) 22)	R2021		
	4	Theory	EC3452 Electromagnetic Fields
	4	Theory	EC3401 Networks and Security
	4	Theory	EC3451 Linear Integrated Circuits
	4	Theory	EC3492 Digital Signal Processing
	4	Theory	EC3491 Communication Systems
	4	Theory	GE3451 Environmental Sciences and Sustainability
	4	Practical	EC3461 Communication Systems Laboratory
	4	Practical	EC3462 Linear Integrated Circuits Laboratory
			SB8021- Naan Muthalvan
	R2017		
	6	Theory	EC8691 Microprocessors and Microcontrollers
	6	Theory	EC8095 VLSI Design
	6	Theory	EC8652 Wireless Communication
	6	Theory	MG8591 Principles of Management
	6	Theory	EC8651 Transmission Lines and RF Systems
	6	Theory(Professional Elective -II)	EC8004 Wireless Networks
	6	Practical	EC8681 Microprocessors and Microcontrollers Laboratory
	6	Practical	EC8661 VLSI Design Laboratory
	6	Practical	EC8611 Technical Seminar
	6	Practical	HS8581 Professional Communication
	R2017		
	8	Theory(Professional Elective IV)	GE8076 Professional Ethics in Engineering
	8	Theory(Professional Elective V)	EC8094 Satellite Communication
	8	Practical	EC8811 Project Work

ODD SEMESTER 2022-23

III Semester B.E ECE

MA3355 Random Processes and Linear Algebra
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
CO2: Demonstrate accurate and efficient use of advanced algebraic techniques.
CO3: Apply the concept of random processes in engineering disciplines.
CO4: Understand the fundamental concepts of probability with a thorough knowledge of standard distributions that can describe certain real-life phenomenon.
CO5: Understand the basic concepts of one and two dimensional random variables and apply them to model engineering problems.

CS3353 C Programming and Data Structures
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Develop C programs for any real world/technical application.
CO2: Apply advanced features of C in solving problems.
CO3: Write functions to implement linear and non-linear data structure operations.
CO4: Suggest and use appropriate linear/non-linear data structure operations for solving a given problem.
CO5: Appropriately use sort and search algorithms for a given application.
CO6: Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.

EC3354 Signals and Systems
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: determine if a given system is linear/causal/stable
CO2: determine the frequency components present in a deterministic signal
CO3: characterize continuous LTI systems in the time domain and frequency domain
CO4: characterize discrete LTI systems in the time domain and frequency domain
CO5: compute the output of an LTI system in the time and frequency domains

EC3353 Electronic Devices and Circuits
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Explain the structure and working operation of basic electronic devices.
CO2: Design and analyze amplifiers.
CO3: Analyze frequency response of BJT and MOSFET amplifiers
CO4: Design and analyze feedback amplifiers and oscillator principles.
CO5: Design and analyze power amplifiers and supply circuits

EC3351 Control Systems
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Compute the transfer function of different physical systems.
CO2: Analyse the time domain specification and calculate the steady state error.
CO3: Illustrate the frequency response characteristics of open loop and closed loop system response

CO4: Analyse the stability using Routh and root locus techniques.
CO5: Illustrate the state space model of a physical system and discuss the concepts of sampled data control system.

EC3352 Digital Systems Design
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Use Boolean algebra and simplification procedures relevant to digital logic.
CO2: Design various combinational digital circuits using logic gates.
CO3: Analyse and design synchronous sequential circuits.
CO4: Analyse and design asynchronous sequential circuits. .
CO5: Build logic gates and use programmable devices

EC3361 Electronic Devices and Circuits Laboratory
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Characteristics of PN Junction Diode and Zener diode.
CO2: Design and Testing of BJT and MOSFET amplifiers.
CO3: Operation of power amplifiers.

CS3362 C Programming and Data Structures Laboratory
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Use different constructs of C and develop applications
CO2: Write functions to implement linear and non-linear data structure operations
CO3: Suggest and use the appropriate linear / non-linear data structure operations for a given problem
CO4: Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
CO5: Implement Sorting and searching algorithms for a given application

GE3361-Professional Development
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
CO2: Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO3: Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

V Semester B.E. ECE

EC 8501-Digital Communication
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Design PCM systems
CO2: Design and implement base band transmission schemes
CO3 :Design and implement band pass signalling schemes

CO4: Analyse the spectral characteristics of band pass signaling schemes and their noise performance
CO5: Design error control coding schemes

EC8553 Discrete Time Signal Processing
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Apply DFT for the analysis of digital signals and systems
CO2: Design IIR and FIR filters
CO3: Characterize the effects of finite precision representation on digital filters
CO4: Design multirate filters
CO5: Apply adaptive filters appropriately in communication systems

EC 8552 & Computer Architecture and Organization
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Describe data representation, instruction formats and the operation of a digital computer
CO2: Illustrate the fixed point and floating-point arithmetic for ALU operation
CO3: Illustrate the fixed point and floating-point arithmetic for ALU operation
CO4: Explain the concept of various memories, interfacing and organization of multiple processors
CO5: Discuss parallel processing technique and unconventional architectures

EC8551 – Communication Networks
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Identify the components required to build different types of networks.
CO2: Choose the required functionality at each layer for given application
CO3: Identify solution for each functionality at each layer
CO4: Trace the flow of information from one node to another node in the network.
CO5: Understand the basic layers and its functions in computer networks.

EC8073- Medical Electronics
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Know the human body electro- physiological parameters and recording of bio-potentials
CO2: Comprehend the non-electrical physiological parameters and their measurement – body temperature, blood pressure, pulse, blood cell count, blood flow meter etc
CO3: Interpret the various assist devices used in the hospitals viz. pacemakers, defibrillators, dialyzers and ventilators.
CO4: Comprehend physical medicine methods eg. ultrasonic, shortwave, microwave surgical diathermies, and bio-telemetry principles and methods
CO5: Know about recent trends in medical instrumentation

OMD551 Basics of Biomedical Instrumentation

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1:To Learn the different bio potential and its propagation.

CO2:To get Familiarize the different electrode placement for various physiological recording

CO3:Students will be able design bio amplifier for various physiological recording

CO4:Students will understand various technique non electrical physiological measurements

CO5:Understand the different biochemical measurements

EC8563 Communication Networks Laboratory

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1:Communication between two desktop computers

CO2:Implementation of different protocols

CO3:To Implement Program using sockets

CO4:To Implement and compare the various routing algorithms

CO5:To Use the simulation tool

EC8562 Digital Signal Processing Laboratory

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1:Carryout basic signal processing operations

CO2:Demonstrate their abilities towards MATLAB based implementation of various DSP systems

CO3:Analyze the architecture of a DSP Processor

CO4:Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals

CO5:Design a DSP system for various applications of DSP

EC8561- Communication Systems Laboratory

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1:Simulate & validate the various functional modules of a communication system

CO2:Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes

CO3:Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system

CO4:Simulate Error control coding schemes

CO5:Simulate end-to-end communication Link

VII Semester B.E. ECE

EC8701 Antennas And Microwave Engineering

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1: Apply the basic principles and evaluate antenna parameters and link power budgets

CO2: Design and assess the performance of various antennas

CO3: Design a microwave system given the application specifications

EC8751 Optical Communication

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1: Realize basic elements in optical fibers, different modes and configurations.

CO2: Analyze the transmission characteristics associated with dispersion and polarization techniques

CO3: Design optical sources and detectors with their use in optical communication system

CO4: Construct fiber optic receiver systems, measurements and coupling techniques.

CO5: Design optical communication systems and its networks.

EC8791 Embedded And Real Time Systems

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1: Describe the architecture and programming of ARM processor

CO2: Outline the concepts of embedded systems

CO3: Explain the basic concepts of real time operating system design

CO4: Model real-time applications using embedded-system concepts

EC8702 Ad Hoc And Wireless Sensor Networks

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1: Know the basics of Ad hoc networks and Wireless Sensor Networks

CO2: Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement

CO3: Apply the knowledge to identify appropriate physical and MAC layer protocols

CO4: Understand the transport layer and security issues possible in Ad hoc and sensor networks.

CO5: Be familiar with the OS used in Wireless Sensor Networks and build basic modules

GE8071 Disaster Management

Course Outcomes COs: Upon completion of the course, the student should be able to:

• Differentiate the types of disasters, causes and their impact on environment and society

• Assess vulnerability and various methods of risk reduction measures as well as mitigation.

• Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

OCH752 Energy Technology

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1. Understand the concepts of energy usage and global energy scenario.

CO2: Identify the working principle of different resources of energy.

CO3: Understand the field applications of solar energy, Geothermal & tidal energy, Winds energy and to know how it can be tapped.

CO4: Identify the Biomass sources and develop design parameters for equipment to be used in chemical process industries and its impact on environment.

EC8711 Embedded Laboratory

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1: Write programs in ARM for a specific Application

CO2: Interface memory, A/D and D/A convertors with ARM system

CO3: Analyze the performance of interrupt

CO4: Write program for interfacing keyboard, display, motor and sensor.

CO5: Formulate a mini project using embedded system

EC8761 Advanced Communication Laboratory

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1: Analyze the performance of simple optical link by measurement of losses and Analyzing the mode characteristics of fiber

CO2: Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER

CO3: Estimate the Wireless Channel Characteristics and Analyze the performance of Wireless Communication System

BCO4: Understand the intricacies in Microwave System design

Even Semester 2022-23

IV Semester B.E ECE

EC3401 Networks and Security

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1: Explain the Network Models, layers and functions.

CO2: Categorize and classify the routing protocols.

CO3: List the functions of the transport and application layer.

CO4: Evaluate and choose the network security mechanisms.

CO5: Discuss the hardware security attacks and countermeasures.

EC3451 Linear Integrated Circuits

Course Outcomes COs: Upon completion of the course, the student should be able to:

CO1 : Design linear and nonlinear applications of OP – AMPS

CO2 : Design applications using analog multiplier and PLL
CO3 : Design ADC and DAC using OP – AMPS
CO4 : Generate waveforms using OP – AMP Circuits
CO5 : Analyze special function ICs

EC3492 Digital Signal Processing
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Apply DFT for the analysis of digital signals and systems
CO2:Design IIR and FIR filters
CO3: Characterize the effects of finite precision representation on digital filters
CO4:Design multirate filters
CO5:Apply adaptive filters appropriately in communication systems

EC3491 Communication Systems
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Gain knowledge in amplitude modulation techniques
CO2: Understand the concepts of Random Process to the design of communication systems
CO3: Gain knowledge in digital techniques
CO4: Gain knowledge in sampling and quantization
CO5: Understand the importance of demodulation techniques

GE3451 Environmental Sciences and Sustainability
Course Outcomes COs: Upon completion of the course, the student should be able 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.

EC3461 Communication Systems Laboratory
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Design AM, FM & Digital Modulators for specific applications
CO2:Compute the sampling frequency for digital modulation
CO3:Simulate & validate the various functional modules of Communication system.
CO4:Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.

CO5:Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of Communication system.
EC3462 Linear Integrated Circuits Laboratory
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Analyze various types of feedback amplifiers
CO2: Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators
CO3:Design and simulate feedback amplifiers,oscillators, tuned amplifiers, wave- shaping circuits and multivibrators, filters using SPICE Tool
CO4:Design amplifiers, oscillators, D-A converters using operational amplifiers.
CO5:Design filters using op-amp and perform an experiment on frequency response

VI - Semester B.E. ECE

EC8691 Microprocessors and Microcontrollers
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Understand and execute programs based on 8086 microprocessor.
CO2: Design Memory Interfacing circuits.
CO3: Design and interface I/O circuits.
CO4: Design and implement 8051 microcontroller based systems.

EC8095 VLSI Design
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Realize the concepts of digital building blocks using MOS transistor.
CO2: Design combinational MOS circuits and power strategies.
CO3: Design and construct Sequential Circuits and Timing systems.
CO4: Design arithmetic building blocks and memory subsystems.
CO5:Apply and implement FPGA design flow and testing

EC8652 Wireless Communication
Course Outcomes COs: Upon completion of the course, the student should be able to:
Characterize a wireless channel and evolve the system design specifications
CO1:Design a cellular system based on resource availability and traffic demands
CO2:Types of digital signals for fading channels
CO3:Identify suitable signaling and multipath mitigation techniques for the wirelesschannel and system under consideration.
CO4:Identify suitable multiple antenna techniques
CO5:Characterize a wireless channel and evolve the system design specifications

MG8591 Principles of Management
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Identify the factors that make up an organization's environment and the four stages of an organization's life cycle
CO2:Identify the relationship between strategic, tactical and operational plans
CO3:Identify the stages of team development
CO4:Identify the relationship between behaviors and motivation
CO5:Identify the steps managers can take to implement planned change

EC8651 Transmission Lines and RF Systems
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Explain the characteristics of transmission lines and its losses
CO2:Write about the standing wave ratio and input impedance in high frequency transmission lines
CO3:Analyze impedance matching by stubs using smith charts
CO4:Analyze the characteristics of TE and TM waves
CO5:Design a RF transceiver system for wireless communication

EC8004 Wireless Networks
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Conversant with the latest 3G/4G networks and its architecture
CO2:Implement the Network layer in the internet
CO3:Design and implement wireless network environment for any application using latest wireless protocols and standards
CO4:Ability to select the suitable network depending on the availability and requirement
CO5:Implement different type of applications for smart phones and mobile devices with latest network strategies

Laboratory

EC8681 Microprocessors and Microcontrollers Laboratory
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Write ALP Programmes for fixed and Floating Point and Arithmetic operation
CO2:Interface different I/Os with processor
CO3:Generate waveforms using Microprocessors
CO4:Execute Programs in 8051
CO5:Explain the difference between simulator and Emulator

EC8661 VLSI Design Laboratory
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Write HDL code for basic as well as advanced digital integrated circuit
CO2:Import the logic modules into FPGA Boards
CO3:Synthesize Place and Route the digital IP
CO4:Design the layouts of Digital & Analog IC Blocks using EDA
CO5:Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA

HS8581 Professional Communication
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Enhance the Employability and Career Skills of students
CO2:Orient the students towards grooming as a professional
CO3:Make them Employability Graduates
CO4:Develop their confidence and help them attend interviews successfully.

VIII -Semester B.E. ECE

GE8076 Professional Ethics in Engineering
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:To apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

EC8094 Satellite Communication
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Analyze the satellite orbits
CO2:Analyze the earth segment and space segment
CO3:Analyze the satellite Link design
CO4:Design various satellite applications

EC8811 Project Work
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

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.