MARTHANDAM COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course Outcomes – Odd Semester 2023-24

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 Plus Practical	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	Naan Muthalvan
	R2021		
9)	5	Theory Plus Practical	EC3501 Wireless Communication
10)	5	Theory	EC 3552 VLSI and Chip Design
11)	5	Theory	EC3551 Transmission lines and RF Systems
13)	5	Theory(Professional Elective -I)	CEC365 Wireless Sensor Network Design
14)	5	Theory(Professional Elective II)	CEC 352 Satellite Communication
	5	Theory(Professional Elective III)	CEC345 Optical Communication & Networks
15)	5	Mandatory Course-I	MX3084 Disaster Risk Reduction and Management
16)	5	Practical	EC3561 VLSI Laboratory
	5	Practical	Naan Muthalvan-Internet of Things
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 2023-24

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
	R2021		
1)	4	Theory	EC3452 Electromagnetic Fields
2)	4	Theory	EC3401 Networks and Security
3)	4	Theory	EC3451 Linear Integrated Circuits
4)	4	Theory	EC3492 Digital Signal Processing
5)	4	Theory	EC3491 Communication Systems
6)	4	Theory	GE3451 Environmental Sciences and Sustainability
7)	4	Practical	EC3461 Communication Systems Laboratory
8)	4	Practical	EC3462 Linear Integrated Circuits Laboratory
			Naan Muthalvan Course
	R2021		
9)	6	Theory Plus Practical	ET3491 Embedded Systems and IOT Design
10)	6	Theory Plus Practical	CS3491 Artificial Intelligence and Machine Learning
11)	6	Open Elective– I	OEE351 Renewable Energy System
12)	6	Professional Elective V	CEC338 EMI/EMC Pre Compliance Testing
13)	6	Professional Elective VI	CBM355 Medical Imaging Systems
14)	6	Professional Elective VII	CEC347 Radar Technologies
15)	6	Mandatory Course-II	MX3089 Industrial Safety
	R2017		
18)	8	Theory(Professional Elective IV)	GE8076 Professional Ethics in Engineering
19)	8	Theory(Professional Elective V)	EC8094 Satellite Communication
22)	8	Practical	EC8811 Project Work

ODD Semester 2023-2024

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

Laboratory

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- NAAN Muthalvan Course
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

EC3501 Wireless Communication
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Understand The Concept And Design Of A Cellular System.
CO2:Understand Mobile Radio Propagation And Various Digital Modulation Techniques.
CO3:Understand The Concepts Of Multiple Access Techniques And Wireless Networks
CO4:Characterize a wireless channel and evolve the system design specifications
CO5:Design a cellular system based on resource availability and traffic demands

EC3552 VLSI AND CHIP DESIGN
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: In depth knowledge of MOS technology
CO2: Understand Combinational Logic Circuits and Design Principles
CO3: Understand Sequential Logic Circuits and Clocking Strategies
CO4: Understand Memory architecture and building blocks
CO5: Understand the ASIC Design Process and Testing.

EC3551 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: Calculate the standing wave ratio and input impedance in high frequency transmission lines.
CO3: Analyze impedance matching by stubs using Smith Charts.
CO4: Comprehend the characteristics of TE and TM waves.
CO5: Design a RF transceiver system for wireless communication

CEC365 Wireless Sensor Network Design
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: To be able to design solutions for WSNs applications
CO2: To be able to develop efficient MAC and Routing Protocols
CO3: To be able to design solutions for 6LOWPAN applications
CO4: To be able to develop efficient layered protocols in 6LOWPAN
CO5: To be able to use Tiny OS and Contiki OS in WSNs and 6LOWPAN applications

CEC 352 Satellite Communication
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1:Identify the satellite orbits
CO2:Analyze the satellite subsystems
CO3:Evaluate the satellite link power budget
CO4:Identify access technology for satellite
CO5:Design various satellite applications

CEC345 Optical Communication & Networks
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 Techniques.
CO5:Design Optical Communication Systems And Its Networks.

MX3084 Disaster Risk Reduction and Management
Course Outcomes COs: Upon completion of the course, the student should be able 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
CO5: Develop rudimentary ability to respond to their surroundings with potential

Laboratory

EC3561 VLSI 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 Ips
CO4: Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools
CO5: Test and Verification of IC design

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
CO4: Understand the intricacies in Microwave System design

Even Semester 2023-24

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.

Laboratory

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

ET3491 Embedded Systems and IOT Design
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Explain the architecture and features of 8051
CO2: Develop a model of an embedded system
CO3: List the concepts of real time operating systems.
CO4: Learn the architecture and protocols of IoT.
CO5: Design an IoT based system for any application.

CS3491 Artificial Intelligence and Machine Learning
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Use appropriate search algorithms for problem solving
CO2: Apply reasoning under uncertainity
CO3: Build supervised learning models
CO4: Build ensembling and unsupervised models
CO5: Build deep learning neural network model

OEE351 Renewable Energy System
Course Outcomes COs: Upon completion of the course, the student should be able 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

CEC338 EMI/EMC Pre Compliance Testing
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Perceive the various types and mechanisms of Electromagnetic Interference
CO2: Propose a suitable EMI mitigation technique
CO3: Evaluate EMI coupling & control principles
CO4: Explain the importance receivers & Analyzer functionalities
CO5: Inspect the design issues in EMI/EMC

CBM355 Medical Imaging Systems
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Describe the working principle of the X-ray machine and its application
CO2: Illustrate the principle computed tomography
CO3: Interpret the technique used for visualizing various sections of the body using Magnetic Resonance Imaging.
CO4: Demonstrate the applications of radionuclide imaging.
CO5: Analyze different imaging techniques and choose appropriate imaging equipment for better diagnosis and outline the methods of radiation safety.

CEC347 Radar Technologies
Course Outcomes COs: Upon completion of the course, the student should be able to:
CO1: Identify the Radar parameters
CO2: Differentiate various radar types
CO3: Evaluate different tracking and filtering schemes

CO4: Apply signal processing in target detection
CO5: Design Radar transmitter and receiver blocks

MX3089 Industrial Safety
Course Outcomes COs: Upon completion of the course, the student should be able 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.