

CO FOR ELECTRONICS AND TELECOMMUNICATIONS.

2nd year Third semester:

Course name: - MATHEMATICS – III (M-III) 3XT01

Course outcomes

CO201.1	Solve higher order Diff. Eq.
CO201.2	Find Laplace Transform of function and how to solve Diff. Eq. using L.T.
CO201.3	Solve Difference Eq. using Z-transform
CO201.4	Solve Partial Diff. Eq. & Fourier transform of a function
CO201.5	Gain the knowledge how to solve complex integration along closed curve
CO201.6	Gain the knowledge of relation between Line, Surface & Volume integration

Course Name: CPA3XT02

Course outcomes

CO202.1	Analyze OOP paradigm - concepts & structure of C++ programming
CO202.2	Use functions, objects and classes along with their subtypes in C++
CO202.3	Use operators to build simple c++ programs. Apply overloading concepts to enhance capabilities of c++ programs.
CO202.4	Apply inheritance and polymorphism mechanisms to build applications using c++.
CO202.5	Use different methods such as false position, Newton Raphson, Secant to solve non linear and polynomial equation.
CO202.6	Use Different methods such as Euler's, Runge Kutta, predictor corrector to solve differential equation

Course Name: EMF3XT03

Course outcomes:

CO203.1	Analyze Orthogonal Coordinate Systems for their applications in Stokes and Divergence Theorem.
CO203.2	Apply Gauss Law, Coulombs Law & Poisson's Equations to find fields and potentials for varying charge distributions.
CO203.3	Use Ampere's Law of forces and Biot-Savart's Law to analyze the behavior of magnetic field for charges that are stationary or varying.
CO203.4	Apply the behavior of electric and magnetic fields for boundary conditions of dielectric and magnetic materials.

CO203.5	Analyze behavior of Electromagnetic Wave propagation and attenuation in dielectric media and through boundaries between media.
CO203.6	Derive fundamental antenna parameters from Maxwell's equations and apply these in the design of rudimentary wireless communications systems.

Course Name: 3XT04/3XN04 EDF

Course Outcome:

CO204.1	Analyze the measurement of resistance, inductance and capacitance by using AC/DC bridges.
CO204.2	Determine the parameters of power measurement using measuring instruments for balanced and unbalanced load.
CO204.3	Analyze the construction and characteristics and application of D.C. motor.
CO204.4	Analyze the construction and characteristics and application of three phase induction motor.
CO204.5	Examine types of connections for three phase transformer.
CO204.6	Analyze the construction and working of special purpose single phase motors.

Course Name: 3XT05 Electronic devices and component

Course Outcome:

CO205.1	To illustrate fundamentals of resistor and capacitor to measure the values of different types of resistors and capacitors.
CO205.2	To illustrate Switches, Relays, Fuses, Cables and Connectors and to identify various applications areas of it.
CO205.3	To examine the basic manufacturing process of PCB and to demonstrate soldering and de-soldering techniques.
CO205.4	To identify construction, operation and characteristics of PN Junction Diode and Zener Diode & demonstrate their testing using ohmmeter and CRO.
CO205.5	To compare the principle, construction, characteristics and applications of special purpose diodes.
CO205.6	To inspect the characteristics of Transistor configurations and demonstrate testing of transistor using ohmmeter and CRO.

Semester:Four

Course Name: 4XT01/4XN01 Communication Engineering-I

Course Outcome :

CO206.1	To illustrate various signals and noises and to analyze noise in amplifier circuits.
CO206.2	To analyze signals in Fourier domain.
CO206.3	To analyze signals as mathematical model using probability theory.
CO206.4	To recognize fundamentals of electromagnetic waves and illustrate wave's propagation schemes.
CO206.5	To analyze transmission lines and validate using Smith chart.
CO206.6	To Employ antenna fundamentals to identify antenna applications.

Course Name: Communication Engineering-II (5XT4 / 5XN4)

Course outcome:

CO207.1	Illustrate the need of modulation. Apply Amplitude modulation and its mathematical equation to the analog communication domain.
CO207.2	Analyse block diagram of AM receiver and various characteristics of AM receivers. Devise the use of SNR of sideband communication
CO207.3	Correlate and contrast Amplitude Modulation and Frequency Modulation. Appraise the need of preemphasis and Deemphasis circuits in FM. Compare Wideband and narrow band FM
CO207.4	Analyse the FM receivers and its types. Employ the stereo FM system.
CO207.5	Compare Analog and Pulse modulation system. Appraise need of the sampling theorem and Quantization.
CO207.6	Analyse Telephone Switching Techniques (EPABX system).

Course Name: 4XT02/4XN02 EDC-I

Course Outcome:

CO208.1	To analyze various types of rectifiers and filters and to illustrate zener diode as voltage regulator
CO208.2	To analyze CE amplifier using DC load line hybrid parameters.

CO208.3	To recognize categories of feedback amplifiers and to illustrate various types of transistorized sinusoidal oscillators.
CO208.4	To identify various types of multistage amplifiers and differentiate between emitter follower circuits.
CO208.5	To analyze power amplifier circuits.
CO208.6	To illustrate categorization and characteristics of MOS devices and to analyze biasing techniques.

Course Name:4XT03NA

Course Outcome:

CO208.1	To analyze behavior of basic circuit elements and to apply concepts of mesh and Node analysis in circuit theory.
CO208.2	Apply concepts of graph theory for analyzing given network.
CO208.3	To apply transformation of a network to analyze time domain differential equations.
CO208.4	Apply various network theorems to determine the circuit response/ behavior.
CO208.5	To use Two port network theory for analyzing the circuits.
CO208.6	To study necessary conditions for driving point functions, transfer functions for their application to a given network for analyzing circuit design.

Course Name: 4XT04/4XN04 IMQC

Course Outcome:

CO209.1	Explain and practice the fundamental principles and functions of business management.
CO209.2	Recognize and develop knowledge of marketing strategy, management and material management.
CO209.3	interpret and evaluate personnel management and evaluation method of job rating.
CO209.4	evaluate balance sheet, project report, profit and loss statement and ratio analysis & to identify the principles of costing and budget.
CO209.5	compare quality control factors controlling design and conformance & 7 QC's of quality control.
CO209.6	apply kaizen and quality circles in organization and use of ISO-9000 series for total quality management (TQM)

Course Name: 4XT05/4XN05 INSTRUMENTATION

Course Outcome:

CO210.1	Generalized study of Instrumentation system and signal conditioning circuits.
CO210.2	To determine the Static characteristics, errors & statistical parameters.
CO210.3	To analyze the Electronics Instrumentation system like multimeter and recorders.
CO210.4	To use the various sensors and measurement techniques in the measurement of Temperature & Strain.
CO210.5	To analyze various techniques for measurement of Displacement. Pressure & Level.
CO210.6	To analyze various techniques for measurement of Flow, Humidity, and Velocity.

Semester:Fifth

Course Name: 5FEKS05 DCN

Course Outcome:

CO301.1	Develop an understanding of the fundamental concepts of computer networking and Data Communications System and its components.
CO301.2	Use basic taxonomy and terminology of Encoding and Modulating to analyze the behavior of a Digital Data and Signals.
CO301.3	Introduce advanced Multiplexing concepts; build the analytic behavior among the students to analyze various techniques used for error detection and correction.
CO301.4	Draw a conclusions related to data link control and about its related protocols.
CO301.5	Gain expertise in some specific areas of networking such as the design and maintenance of individual networks.
CO301.6	Derive fundamentals of Networking and Internetworking Devices from various Standard Protocols.

Course Name: Fiber optics (5FEXT5 / 5FEXN5)

Course Outcome:

CO302.1	Analyse the propagation of light in optical fiber. Apply light theory to solve the problems of light transmission in optical fiber.
CO302.2	Evaluate Losses and dispersion in optical fiber. Examine various causes of losses and dispersion in optical fiber.
CO302.3	Demonstrate different types of optical sources. Compare LED, stimulation emission and lasing population inversion in optical sources.
CO302.4	Illustrate optical detection principles. Demonstrate different optical detectors and determine its parameters.

CO302.5	Generalize optical data communication. Analyse joints and couplers in optical fibers
CO302.6	Measure different optical parameters. Deduce different techniques of optical parameter measurements.

Course Name: EDC-II (5XT1/5XN1)

Course Outcome:

CO303.1	To analyze linear wave shaping using RC/ RL filters, clipping and clamping circuits.
CO303.2	To illustrate switching characteristics of semiconductor devices and to demonstrate logic gates and K-map.
CO303.3	To analyze BJT multivibrators, waveform generators and to use Boolean Algebra and Number System for binary operations.
CO303.4	To analyze Digital Logic Families and their characteristics
CO303.5	To use logic gates and flip flops for constructing combinational and sequential logic circuits and analyze DAC and ADC
CO303.6	To illustrate various types of registers and semiconductor memories.

Course Name: 5XT02 PE

Course Outcome:

CO304.1	To illustrate the construction, characteristics of thyristor family and understand the basic principle of operation of SCR.
CO304.2	To illustrate the operation of various triggering circuits for series and parallel operation of SCRs and various protection circuits of thyristors.
CO304.3	To analyze and design AC/DC rectifier circuits.
CO304.4	To analyze and design DC/AC inverter circuits.
CO304.5	To analyze and design DC/DC converter circuits.
CO304.6	To examine different applications of power converters.

Course Name:Control System Engineering

Course Outcome:

COs	Course Outcomes
CO304.1	Review the fundamentals of Laplace domain for determining the transfer function for different control system using methods like block diagram reduction, signal flow graph and develop the relationship between different physical quantities
CO304.2	Understand the time response of physical system and evaluate the switching speed of systems using transient and steady state analysis
CO304.3	Examine the stability of systems using R H criterion and Root locus
CO304.4	Employ different frequency stabilizing techniques like bode plot, nyquist plot, etc to determine the stability of systems
CO304.5	Evaluate the Transfer function of systems using state space analysis and validate its importance over other control system methods for obtaining the transfer function
CO304.6	Analyze the sampled data system using Z transform method and find the stability of systems

Course Name: 5XT4 Communication engineering –II

Course Outcome:

CO305.1	To recognize the significance of AM modulation in communication to select appropriate modulation scheme.
CO305.2	To discuss various demodulation schemes for amplitude modulation and interpret the tradeoff in analog modulations between bandwidth, receiver SNR, and receiver complexity.
CO305.3	To examine frequency modulation and determine the spectrum of frequency modulated signal.
CO305.4	To analyze different frequency demodulation methods for noise reduction in information signal..
CO305.5	To apply sampling theorem in analog and digital pulse modulation schemes.
CO305.6	To identify the route of message transmission in telephone switching system using different switching techniques.

Course Name: 5XT6/5XN6 COMMUNICATION SKILL

Course Outcome:

CO307.1	Practice the fundamental concepts of English Grammar.
CO307.2	Describe the importance and process of verbal & non-verbal communication with the concept of oral communication and body language .

CO307.3	Determine and practice written communication and types of business letters, interviews and group discussions.
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Year:Third

Semester:six

Course Name: 6XT1Digital Integrated Circuits

Course Outcome:

CO308.1	To use K-map and logic gates for synthesis of combinational logic functions.
CO308.2	To design combinational logic circuits using 74/54 series MSI chips.
CO308.3	To design combinational logic circuits using ROM, PLA, PAL and recognize design concepts using FPGAs and to construct adders.
CO308.4	To design and evaluate synchronous sequential circuits.
CO308.5	To design and evaluate asynchronous sequential circuits.
CO308.6	To validate combinational and sequential logic circuits using fault detection and location techniques.

Code: 6XT02 LIC

Course Outcome:

Course Outcomes	
CO309.1	To illustrate the basics of Differential Amplifier and OP-AMP
CO309.2	To examine the different linear applications of OP-AMP
CO309.3	To examine the different non linear applications of OP-AMP
CO309.4	To analyze and design the voltage regulator IC 723
CO309.5	To analyze and design the timer IC 555
CO309.6	To analyze and design the phase locked loop IC 565

Course Name: 6XT3 Introduction to Microprocessor**Course Outcome:**

CO310.1	Recognize the use of architecture of 8085 microprocessor, instruction set, addressing modes and calculate time require for execution.
CO310.2	Develop a programming logic for 8085 microprocessor.
CO310.3	Recognize various interrupts of 8085 and construct ALP for serial communication.
CO310.4	Develop ALPs for various interfacing programmable peripherals.
CO310.5	Recognize the use of architecture of 8086 microprocessor, instruction set, addressing modes and calculate time require for execution.
CO310.6	Develop a programming logic for 8086 microprocessor.

Course Name: 6XT04 Digital Communication**Course Outcome:**

CO311.1	To illustrate fundamentals of Digital Communication systems and to recognize various line coding techniques
CO311.2	To categorize information contents in symbol sequence and to validate information transmission over discrete channels capacity using different source coding technique.
CO311.3	To employ digital modulation and demodulation fundamentals and their comparison.
CO311.4	To analyze base band transmission system using equalization techniques and synchronization techniques.
CO311.5	To analyze error detection and correction techniques.
CO311.6	To illustrate the Multiple Access Schemes and spread spectrum system

Year:Fourth**Semester:Seven****Code: (7XT01) DCN****Course Outcome:**

COs	Course Outcomes
CO401.1	To analyze network topology , types of network, by using basics to understand switching, OSI Reference model; demonstrate of TCP/IP architecture.
CO401.2	Demonstrate Peer Protocols and Data Link control, use of flow control; analyze transmission efficiency of ARQ.

CO401.3	Demonstrate of LAN and Access Control Protocols, analyze MAC,LLC for LAN; analyze contention Techniques such as CSMA, CSMA/CD (IEEE 80), analyze control Access Techniques such as Token Bus ,Token Ring , Polling; FDDI.
CO401.4	Identify networking Devices such as router, hub , repeater and Routing Techniques and Traffic Control Protocols use Routing Algorithms for calculating nearest path.
CO401.5	Analyze of ATM and it cell format and demonstrate Frame Relay and ISDN, B-ISDN and distinguish between them.
CO401.6	Analyze of TCP/IP protocol along with IP Services by using it calculating IP address ,interpret ICMP, IGMP

Code: (7XT01) Data Communication Network

Course Outcome:

COs	Course Outcomes
CO402.1	To analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
CO402.2	Able to examine the need of flow control techniques and peer to peer data link communication protocols.
CO402.3	Able to examine Access Control protocols and various control access techniques for data communication network.
CO402.4	To identify networking Devices and compare Routing Techniques and Traffic Control Protocols for calculating nearest path.
CO402.5	To analyze the services and features of Asynchronous Transfer mode, Frame relay and ISDN for digital telecommunication network.
CO402.6	To Design, calculate, and apply subnet masks and addresses to fulfill networking requirements.

Course Name: 7XT02 Microcontroller and Application (MCA)

Course Outcome:

CO403.1	To illustrate significance of 8051 microcontroller architecture.
CO403.2	To develop logic for assembly language programming and apply programming techniques for solving simple problems by using instruction sets of microcontroller.
CO403.3	To construct assembly language code using ADC/DAC and analog sensors for controlling applications.
CO403.4	To demonstrate interfacing of LCD, keyboard, DC and stepper motors.
CO403.5	To set up serial communication with microcontroller and its interfacing for real time clock.
CO403.6	To develop logic of C programming for microcontroller and its interfacing.

Course Name: 7XT02 Microcontroller and Application (MCA)**Course Outcome:**

CO404.1	To illustrate significance of 8051 microcontroller architecture.
CO404.2	To develop logic for assembly language programming and apply programming techniques for solving simple problems by using instruction sets of microcontroller.
CO404.3	To construct assembly language code using ADC/DAC and analog sensors for controlling applications.
CO404.4	To demonstrate interfacing of LCD, keyboard, DC and stepper motors.
CO404.5	To set up serial communication with microcontroller and its interfacing for real time clock.
CO404.6	To develop logic of C programming for microcontroller and its interfacing.

Course Name: 7XT03 WLC**Course Outcome:**

CO	Course Outcomes
CO405.1	To illustrate discrete time sequences, frequency domain description of signals, convolution and unit sample response. To correlate the linear, stable, causal and time invariant system.
CO405.2	To analyze the applicability of Z-transform and Inverse Z-transform in determination of filter coefficient and solution of difference equation.
CO405.3	To interpret the use of Fourier transforms of discrete time signals and its different algorithm for signal processing.
CO405.4	To review realization of digital filter using different type of structure and design of FIR filter.
CO405.5	To evaluate the analog filter design approximations and different methods for conversion of analog filter into digital filter
CO405.6	To diagnose multirate signal processing to design the practical rate converter and its use in filter bank. To operationalize DSP processor TMS 320.

Course: 7XT4 (1) VLSI Design**Course Outcome:**

CO405.1	To recognize the need of VLSI and its applications and advantages, To explain the technologies of VLSI like CMOS technology, Integrated circuit design technology, IP based design Technology.
CO405.2	To apply VHDL constructs and modeling styles for combinational and sequential Circuits.
CO405.3	To employ the elements of VHDL on various digital circuits and compare Hardware Description Languages.
CO405.4	To utilize FPGA/CPLD as controller/ platform for implementing digital circuits by

	recognizing the architecture of Altera / Xilinx made FPGA and CPLD.
CO405.5	To recognize behavior of MOS transistor and CMOS as inverter for developing digital circuits using CMOS.
CO405.6	To utilize CMOS layout and design rules for various CMOS fabrication process.

Semester:Eight

Course Name: 8XT01, UHF

Course Outcome:

CO406.1	To criticize the limiting performance of conventional devices at high frequencies and to examine working principles for generation of microwave energy from Microwave Tubes.
CO406.2	To appraise working principles for generation of microwave energy from Microwave Solid State Devices.
CO406.3	To determine field components of electromagnetic field in transmission lines and to examine the microwave transmission through waveguide, microstriplines with field equations & field patterns.
CO406.4	To recognize fundamental concepts of resonance at microwave frequencies for analyzing the transmission line resonators and cavity resonators based on resonant frequency, quality factors, etc.
CO406.5	To discriminate microwave propagation in ferrites and related devices and analyze microwave passive components with scattering matrix formulations.
CO406.6	To recognize various microwave measurement techniques for estimating frequency, power, attenuation, VSWR, impedance, insertion loss, dielectric constant measurement using microwave instruments.

Course Name: 8XT2 ECD

Course Outcome:

CO407.1	To develop transistor based Regulated power supply, To employ the applications of operational amplifier to design summing amplifier, scaling amplifier, window detector, and comparator.
CO407.2	To employ the applications of operational amplifier to design waveform generator and filters, To develop IC based waveform generator.
CO407.3	To design instrumentation amplifier for temperature controller /indicator using various Temperature sensors
CO407.4	To analyze behavior of MOS Transistor switch, to construct universal gates and compound gates using MOS transistors and draw CMOS physical layout for simple logic gates.
CO407.5	To apply VHDL elements and different modeling styles for various digital circuits and compare VHDL and Verilog

CO407.6	To compose VHDL code for various combinational and sequential circuits.
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Course Name: 8XT03 WLC

Course Outcome:

CO	Course Outcomes
CO408.1	To illustrate fundamentals of Wireless communication and technologies used in 1G, 2G, 3G and 4G & correlate the basic cellular system, cell Shape, concept of frequency reuse, cellular system architecture.
CO408.2	To analyze the Cellular system spectrum, frequency assignments Channel assignment strategies & Analyze the system capacity of cellular system
CO408.3	To discuss the mechanism of signal propagation & compare the types of fading in wireless communication.
CO408.4	To Review structure of GSM system & analyze the radio subsystem, channel types, frame structure, GSM signaling protocols.
CO408.5	To correlate forward and reverse link of CDMA system & relate the theory of soft handoff, power control in CDMA.
CO408.6	To predict the communication using short range technologies & analyze structure of protocols used.

Course Name: 8XT3 WLC

Course Outcome:

CO	Course Outcomes
CO408.1	To illustrate fundamentals of wireless communication and technologies used in 1G, 2G, 3G and 4G & correlate the basic cellular system, cell Shape, concept of frequency reuse, cellular system architecture.
CO408.2	To analyze the cellular system spectrum, frequency assignments, channel assignment strategies and capacity of cellular system
CO408.3	Debate the mechanism of signal propagation; analyze and compare types of fading in wireless communication.
CO408.4	To review structure of GSM system, radio subsystem, channel types, GSM signaling protocols and analyze frame structure.
CO408.5	To correlate forward and reverse link of CDMA system & relate the theory of soft handoff, power control in CDMA.
CO408.6	To predict the communication using short range technologies & analyze structure of protocols used.

Course Name: 8XT4 Embedded and Real Time System

Course Outcome:

CO409.1	To recognize System development Process for its applications in Embedded Systems design.
CO409.2	To illustrate Real time operating System and its application in Embedded System.
CO409.3	To design interrupt routines in a Real time operating System environment.
CO409.4	To examine PIC and ARM microcontrollers for identifying their applicability in Embedded System Design.
CO409.5	To identify role of simulator, debugger, compiler and assembler of integrated development environment for its applicability in object oriented programming.
CO409.6	To identify the application of I2C Bus, CAN bus, Ethernet and Bluetooth technologies in Embedded System Networking.

Course Name: 8XT4- Digital Image Processing

Course Outcome:

CO409.1	Recognize fundamentals of digital image processing in analyzing real world problems.
CO409.2	Identify image transformation methods and apply them for feature extraction.
CO409.3	Analyze 2D signals in the frequency domain and apply different preprocessing techniques for improving the image quality.
CO409.4	Examine noise models and degradation processes for image restoration.
CO409.5	Recognize image compression techniques and apply these techniques to real world problems.
CO409.6	Recognize image segmentation techniques and apply these techniques to real world problems.