

Jagadambha College of Engineering and Technology Yavatmal
Department of Electronics & Telecommunication Engineering(UG as per Old Syllabus)

Year: Second Year	Semester: Third
Course Name: Mathematics III	Course Code: CO23XT01
CO23XT01.1	Solve higher order Diff. Eq
CO23XT01.2	Find Laplace Transform of function and how to solve Diff. Eq. using L.T
CO23XT01.3	Solve Difference Eq. using Z-transform
CO23XT01.4	Solve Partial Diff. Eq. & Fourier transform of a function
CO23XT01.5	Gain the knowledge how to solve complex integration along closed curve
CO23XT01.6	Gain the knowledge of relation between Line, Surface & Volume integration

Course Name: Computer Programming & Applications	Course Code: CO23XT02
CO23XT02.1	Analyze OOP paradigm - concepts & structure of C++ programming
CO23XT02.2	Use functions, objects and classes along with their subtypes in C++
CO23XT02.3	Use operators to build simple C++ programs. Apply overloading concepts to enhance capabilities of C++ programs.
CO23XT02.4	Apply inheritance and polymorphism mechanisms to build applications using C++.
CO23XT02.5	Use different methods such as false position, Newton Raphson, Secant to solve non linear and polynomial equation.
CO23XT02.6	Use Different methods such as Euler's, RungeKutta, predictor corrector to solve differential equation

Course Name: ELECTROMAGNETIC FIELD	Course Code: CO23XT03
CO23XT03.1	Analyze Orthogonal Coordinate Systems for their applications in Stokes and Divergence Theorem.
CO23XT03.2	Apply Gauss Law, Coulombs Law & Poisson's Equations to find fields and potentials for varying charge distributions.
CO23XT03.3	Use Ampere's Law of forces and Biot-Savart's Law to analyze the behaviour of magnetic field for charges that are stationary or varying.
CO23XT03.4	Apply the behaviour of electric and magnetic fields for boundary conditions of dielectric and magnetic materials
CO23XT03.5	Analyze behaviour of Electromagnetic Wave propagation and attenuation in dielectric media and through boundaries between media
CO23XT03.6	Derive fundamental antenna parameters from Maxwell's equations and apply these in the design of rudimentary wireless communications systems.

Course Name: ELECTRIC DRIVES & MEASUREMENTS	Course Code: CO23XT04
CO23XT04.1	Analyze the measurement of resistance, inductance and capacitance by using AC/DC bridges.
CO23XT04.2	Determine the parameters of power measurement using measuring instruments for balanced and unbalanced load.
CO23XT04.3	Analyze the construction and characteristics and application of D.C. motor
CO23XT04.4	Analyze the construction and characteristics and application of three phase induction motor.
CO23XT04.5	Examine types of connections for three phase transformer
CO23XT04.6	Analyze the construction and working of special purpose single phase motors

Course Name: Electronic devices and	Course Code: CO23XT05
CO23XT05.1	To illustrate fundamentals of resistor and capacitor to measure the values of different types of resistors and capacitors.
CO23XT05.2	To illustrate Switches, Relays, Fuses, Cables and Connectors and to identify various applications areas of it.

CO23XT05.3	To examine the basic manufacturing process of PCB and to demonstrate soldering and de- soldering techniques.
CO23XT05.4	To identify construction, operation and characteristics of PN Junction Diode and Zener Diode & demonstrate their testing using ohmmeter and CRO.
CO23XT05.5	To compare the principle, construction, characteristics and applications of special purpose diodes
CO23XT05.6	To inspect the characteristics of Transistor configurations and demonstrate testing of transistor using ohmmeter and CRO

Year: Second Year	Semester:Fourth
Course Name: Communication Engineering-I	Course Code: CO24XT01
CO24XT01.1	To illustrate various signals and noises and to analyze noise in amplifier circuits.
CO24XT01.2	To analyze signals in Fourier domain
CO24XT01.3	To analyze signals as mathematical model using probability theory
CO24XT01.4	To recognize fundamentals of electromagnetic waves and illustrate wave's propagation schemes.
CO24XT01.5	To analyze transmission lines and validate using Smith chart
CO24XT01.6	To Employ antenna fundamentals to identify antenna applications

Course Name: ELECTRONIC DEVICES AND CIRCUITS-I	Course Code: CO24XT02
CO24XT02.1	To analyze various types of rectifiers and filters and to illustrate zener diode as voltage regulator.
CO24XT02.2	To analyze CE amplifier using DC load line hybrid parameters
CO24XT02.3	To recognize categories of feedback amplifiers and to illustrate various types of transistorized sinusoidal oscillators
CO24XT02.4	To identify various types of multistage amplifiers and differentiate between emitter follower circuits.
CO24XT02.5	To analyze power amplifier circuits.
CO24XT02.6	To illustrate categorization and characteristics of MOS devices and to analyze biasing techniques.

Course Name: Network Analysis	Course Code: CO24XT03
CO24XT03.1	To analyze behaviour of basic circuit elements and to apply concepts of mesh and Node analysis in circuit theory.
CO24XT03.2	Apply concepts of graph theory for analyzing given network
CO24XT03.3	Apply transformation of a network to analyze time domain differential equations.
CO24XT03.4	Apply various network theorems to determine circuit behaviour.
CO24XT03.5	To use Two port network theory for analyzing the circuits
CO24XT03.6	To study necessary conditions for driving point functions, transfer functions for their application to a given network for analyzing circuit design.

Course Name: INDUSTRIAL MANAGEMENT & QUALITY CONTROL	Course Code: CO24XT04
CO24XT04.1	Explain and practice the fundamental principles and functions of business management.
CO24XT04.2	Recognize and develop knowledge of marketing strategy, management and material management.
CO24XT04.3	interpret and evaluate personnel management and evaluation method of job rating.
CO24XT04.4	evaluate balance sheet, project report, profit and loss statement and ratio analysis & to identify the principles of costing and budget
CO24XT04.5	compare quality control factors controlling design and conformance & 7 QC's of quality control
CO24XT04.6	apply kaizen and quality circles in organization and use of ISO-9000 series for total quality management (TQM)

Course Name: INSTRUMENTATION	Course Code: CO24XT05
CO24XT05.1	Study the Instrumentation system and signal conditioning circuits.
CO24XT05.2	Determine Static characteristics, errors & statistical parameters
CO24XT05.3	Analyze Electronics Instrumentation system like multimeter and recorders
CO24XT05.4	Use of various sensors and measurement techniques in the measurement of Temperature & Strain
CO24XT05.5	Analyze various techniques for measurement of Displacement. Pressure & Level
CO24XT05.6	Analyze various techniques for measurement of Flow, Humidity, and Velocity

Year: Third Year	Semester: Fifth
Course Name: ELECTRONIC DEVICES & CIRCUIT-II	Course Code: CO35XT01
CO35XT01.1	To analyze linear wave shaping using RC/RL filters, clipping and clamping circuits.
CO35XT01.2	To illustrate switching characteristics of semiconductor devices and to demonstrate logic gates and K-map.
CO35XT01.3	To analyze BJT multivibrators, waveform generators and to use Boolean Algebra and Number System for binary operations.
CO35XT01.4	To analyze Digital Logic Families and their characteristics.
CO35XT01.5	To use logic gates and flip flops for constructing combinational and sequential logic circuits and analyze DAC and ADC.
CO35XT01.6	Illustrate various types of registers & semiconductor memories.

Course Name: POWER	Course Code: CO35XT02
CO35XT02.1	To illustrate the construction, characteristics of thyristor family and understand the basic principle of operation of SCR.
CO35XT02.2	Illustrate operation of various triggering circuits for series, parallel operation of SCR & various protection circuits of thyristors.
CO35XT02.3	To analyze and design AC/DC rectifier circuits.
CO35XT02.4	To analyze and design DC/AC inverter circuits.
CO35XT02.5	To analyze and design DC/DC converter circuits.
CO35XT02.6	To examine different applications of power converters.

Course Name: Control System Engineering	Course Code: CO35XT03
CO35XT03.1	Review fundamentals of Laplace domain for determining T.F. for different control system using various methods.
CO35XT03.2	Understand time response of physical system, evaluate switching speed of systems using transient & steady state analysis.
CO35XT03.3	Examine the stability of systems using R H criterion & Root locus.
CO35XT03.4	Employ different frequency stabilizing techniques like bode plot, nyquist plot, etc To determine the stability of systems
CO35XT03.5	Evaluate T.F. of systems using state space analysis & validate its importance over other control system methods for obtaining T.F.
CO35XT03.6	Analyze sampled data system using Z.T. method & find stability of Systems

Course Name: Communication Engineering –II	Course Code: CO35XT04
CO35XT04.1	Recognize significance of AM modulation in communication to select appropriate modulation scheme.
CO35XT04.2	Interpret tradeoff in AM between BW, receiver SNR, discuss various demodulation schemes for amplitude modulation & receiver complexity.
CO35XT04.3	Examine frequency modulation and determine the spectrum of frequency modulated signal.
CO35XT04.4	Analyze different frequency demodulation methods for noise reduction in information signal..
CO35XT04.5	Apply sampling theorem in analog & digital PM schemes.
CO35XT04.6	To identify the route of message transmission in telephone switching system using different switching techniques

Course Name: Consumer Electronics	Course Code: CO35FEXT05(1)
CO35FEXT05(1).1	Understand Audio Systems and its Applications.
CO35FEXT05(1).2	Understand Video Systems and Various Displays used in Video Telephone and Video Conferencing.
CO35FEXT05(1).3	Understand the various Domestic Appliances & Computers Office Systems.
CO35FEXT05(1).4	Know the Recording and Reproduction Systems.
CO35FEXT05(1).5	Design Power Supplies and other systems.
CO35FEXT05(1).6	Understand Calculators, Servicing In Car, Computers.

Course Name: FIBER OPTICS	Course Code: CO35FEXT05(2)
CO35FEXT05(2).1	Understand the Light Ray Theory & Propagation of light in different media.
CO35FEXT05(2).2	Understand Losses and Dispersion in Optical Fiber Losses.
CO35FEXT05(2).3	Understand Light Sources and Detectors for Optical Fiber.
CO35FEXT05(2).4	Understand Fiber optic Communication systems and Modulation Fiber Communication systems.
CO35FEXT05(2).5	Understand Optical Fiber Communication application Optical fiber communication systems.

CO35FEXT05(2).6	Design Measurement Techniques in Fibre Optics.
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Year: Third Year	Semester:Sixth
Course Name: Digital Integrated Circuits	Course Code: CO36XT01
CO36XT01.1	To use K-map and logic gates for synthesis of combinational logic functions.
CO36XT01.2	To design combinational logic circuits using 74/54 series MSI chips.
CO36XT01.3	To design combinational logic circuits using ROM, PLA, PAL and recognize design concepts using FPGAs and to construct adders
CO36XT01.4	To design and evaluate synchronous sequential circuits
CO36XT01.5	To design and evaluate asynchronous sequential circuits
CO36XT01.6	To validate combinational and sequential logic circuits using fault detection and location techniques.

Course Name: Linear Integrated Circuits	Course Code: CO36XT02
CO36XT02.1	To illustrate the basics of Differential Amplifier and OP-AMP
CO36XT02.2	To examine the different linear applications of OP-AMP
CO36XT02.3	To examine the different non linear applications of OP-AMP
CO36XT02.4	To analyze and design the voltage regulator IC 723
CO36XT02.5	To analyze and design the timer IC 555
CO36XT02.6	To analyze and design the phase locked loop IC 565

Course Name: Introduction to	Course Code: CO36XT03
CO36XT03.1	Recognize use of architecture of 8085 μ p, instruction set, addressing modes and calculate time require for execution.
CO36XT03.2	Develop a programming logic for 8085 μ p.
CO36XT03.3	Recognize various interrupts of 8085 and construct ALP for serial communication.
CO36XT03.4	Develop ALPs for various interfacing programmable peripherals.
CO36XT03.5	Recognize the use of architecture of 8086 μ p, instruction set, addressing modes and calculate time require for execution.
CO36XT03.6	Develop a programming logic for 8086 μ p.

Course Name: Digital Communication	Course Code: CO36XT04
CO36XT04.1	To illustrate fundamentals of Digital Communication systems and to recognize various line coding techniques
CO36XT04.2	To categorize information contents in symbol sequence and to validate information transmission over discrete channels capacity using different source coding technique.
CO36XT04.3	To employ digital modulation and demodulation fundamentals and their comparison.
CO36XT04.4	To analyze base band transmission system using equalization techniques and synchronization techniques.
CO36XT04.5	To analyze error detection and correction techniques.
CO36XT04.6	To illustrate the Multiple Access Schemes and spread spectrum system

Course Name:Introduction To Wireless Technology	Course Code: CO36FEXT05(1)
CO36FEXT05(1).1	Understand Networking, OSI model, Network types,topologies, wireless technologies.
CO36FEXT05(1).2	Understand Wireless LAN, satellite communication, wireless application protocol (WAP), antennas.
CO36FEXT05(1).3	Know Wireless Application Protocol model, WAP architecture component, Trends.
CO36FEXT05(1).4	Know history, design,and operation of analog & digital cellular telephones.
CO36FEXT05(1).5	Understand Wireless LAN, IEEE 802.11, 802.11b and 802.11a, selecting the WLAN, microwave LANs.
CO36FEXT05(1).6	Knowabout Communication with a satellite, LEOs, MEOs, GEOs and HEOs systems, Future of GPS.

Course Name: Electronic Test Instruments: Analog and Digital	Course Code: CO36FEXT05(2)
CO36FEXT05(2).1	Know Electronics Equipments with specifications.
CO36FEXT05(2).2	Understand Responses of Electronics Test Equipement.
CO36FEXT05(2).3	Know the working and operation of Oscilloscope.
CO36FEXT05(2).4	Know about the Responses observed on Oscilloscope.
CO36FEXT05(2).5	Know about the Spectrum and network analyzers.
CO36FEXT05(2).6	Know about the Logic Analyzers.

Year: Fourth Year	Semester: Seventh
Course Name: Data Communication	Course Code: CO47XT01
CO47XT01.1	Identify Different Types of Network & Their Functions, Topology &Protocol, Identify OSI & TCP/IP Layer & Their Task.
CO47XT01.2	Discuss the data link layer & Protocol, Issues related to framing flow & error control, solution to delivery & Forwarding of Packets.
CO47XT01.3	Explain Wired LAN, Virtual LAN & Ethernet, and IEEE Standard of LAN
CO47XT01.4	Solve Problem Associated with Delivery & Forwarding of Packets. Differentiate between unicast & Multicast routing Protocol in Transport Layer.

CO47XT01.5	Delve in to the requirement for resolving access to shared Media.
CO47XT01.6	Define Network Layer & Describe its Function, Interpret logical Address and compare IP _v 4 & IP _v 6, Discuss UDP & TCP Protocol.

Course Name: Microcontroller & Applications	Course Code: CO47XT02
CO47XT02.1	To illustrate significance of 8051 microcontroller architecture.
CO47XT02.2	To develop logic for assembly language programming and apply programming techniques for solving simple problems by using instruction sets of microcontroller
CO47XT02.3	To construct assembly language code using ADC/DAC and analog sensors for controlling applications.
CO47XT02.4	To demonstrate interfacing of LCD, keyboard, DC and stepper motors
CO47XT02.5	To set up serial communication with microcontroller and its interfacing for real time clock.
CO47XT02.6	To develop logic of C programming for microcontroller and its interfacing

Course Name: Digital Signal Processing	Course Code: CO47XT03
CO47XT03.1	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.
CO47XT03.2	To analyze the applicability of Z-transform and Inverse Z-transform in determination of filter coefficient and solution of difference equation.
CO47XT03.3	To interpret the use of Fourier transforms of discrete time signals and its different algorithm for signal processing
CO47XT03.4	To review realization of digital filter using different type of structure and design of FIR filter.
CO47XT03.5	To evaluate the analog filter design approximations and different methods for conversion of analog filter into digital filter
CO47XT03.6	To diagnose multirate signal processing to design the practical rate converter and its use in filter bank. Understand DSP processor TMS 320.

Course Name: VLSI Design	Course Code: CO47XT04(1)
CO47XT04(1).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.
CO47XT04(1).2	To apply VHDL constructs and modelling styles for combinational and sequential Circuits.
CO47XT04(1).3	To employ the elements of VHDL on various digital circuits and compare Hardware Description Languages
CO47XT04(1).4	To utilize FPGA/CPLD as controller/ platform for implementing digital circuits by recognizing the architecture of Altera / Xilinx made FPGA and CPLD.
CO47XT04(1).5	To recognize behaviour of MOS transistor and CMOS as inverter for developing digital circuits using CMOS
CO47XT04(1).6	To utilize CMOS layout and design rules for various CMOS fabrication process.

Course Name: COMPUTER	Course Code: CO47XT04(2)
CO47XT04(2).1	Understand Organization and architecture, structure and function, Computer evolution and performance.
CO47XT04(2).2	Know the External devices I/O modules, I/O Channels and IOPs, SCSI and firewire interfaces, operating system overview, memory management, swapping, partitioning, paging, virtual memory.
CO47XT04(2).3	Design ALU Machine instruction characteristics, operand types, operation types, Addressing modes, instruction formats.
CO47XT04(2).4	Understand RISC machine, instruction execution characteristics, register, compiler based register optimization, RISC architecture, RISC pipelining, RISC vs CISC, case study of power PC 620.
CO47XT04(2).5	Know Control unit operation such as Micro operation, micro program control.
CO47XT04(2).6	Design Multiple processor organizations.

Course name: ARTIFICIAL INTELLIGENCE	Course Code: CO47XT04(3)
CO47XT04(3).1	Detailing about Artificial Intelligence and current trends in applied AI.
CO47XT04(3).2	Knowledge Representation of issues in Artificial Intelligence.
CO47XT04(3).3	Search a problem-solving technique, techniques for heuristic search, hill climbing heuristic, best-first search, and application of search technique in game playing and planning.
CO47XT04(3).4	Know about Expert Systems, and difficulties in developing ES, applications of expert systems.
CO47XT04(3).5	Understand Various Artificial Neural Networks, basic terms and operations and hardware realization of the analog fuzzy controller.
CO47XT04(3).6	Know about Genetic Algorithms, working of evolutionary programming.

Course name: SATELLITE AND OPTICAL FIBER	Course Code: CO47XT04(4)
CO47XT04(4).1	Analyse Satellite frequency bands, Satellite types-LEO, MEO, GEO, HEO, Kepler's laws, Satellite orbits, Geo-stationary Satellite and <u>Orbital Aspects of Satellite Communication</u> .
CO47XT04(4).2	Know about Electromagnetic field Propagation, Antennas, losses. Satellite system link model.
CO47XT04(4).3	Describe Very Small Aperture Satellite, Satellite Navigation and Global Positioning System.
CO47XT04(4).4	Analyse Ray Theory of Optical Fiber, Total internal reflection, Snell's law, Acceptance Angles, Numerical Aperture. <u>Transmission Characteristics of Optical Fiber</u> .
CO47XT04(4).5	Understand Optical Sources, Optical Detectors.
CO47XT04(4).6	Know about Optical Transmitter and Receiver.

Course Name: AUDIO & VIDEO	Course Code: CO47XT04(5)
CO47XT04(5).1	Understand Principle of disc recording, principle of disc reproduction and Block diagram of disc reproduction system, Block diagram tape recording, Rumble, Hissing noise, Types of optical recording of sound, methods of optical recording of sound on films.
CO47XT04(5).2	Understand Multimedia Definition, Elements, need, compression, etc. Introduction to video system.
CO47XT04(5).3	Know Television, TV receivers and Video detectors.
CO47XT04(5).4	Understand Sound signal separation and Colour TV system.
CO47XT04(5).5	Analyse Digital TV, Compression of Frames, Compression of Moving Pictures and Basic blocks of MPEG2 and MPEG4.
CO47XT04(5).6	Analyse OFDM for Terrestrial Digital TV (DVB -T), Reception of Digital TV Signals and Display Technologies.

Year: Fourth Year	Semester: Eighth
Course Name: UHF & Microwaves	Course Code: CO48XT01
CO48XT01.1	Understand the limitations of conventional devices at high frequencies and working principles of Microwave Tubes.
CO48XT01.2	Understand the working of Microwave Solid State Devices such as Gun Diode, IMPATT, TRAPATT Diodes & MASER.
CO48XT01.3	Understand transmission of Microwaves in Rectangular, Circular Waveguide, microstrip lines & Find Characteristics Impedance & Losses.
CO48XT01.4	Understand Microwave resonator and find resonance frequency & Quality Factor.
CO48XT01.5	Understand various microwave passive components with scattering matrix formulations.

CO48XT01.6	Know various microwave measurement techniques.
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Course Name: Electronic Circuit Design	Course Code: CO48XT02
CO48XT02.1	To develop transistor based Regulated power supply, employ the applications of operational amplifier to design summing amplifier, scaling amplifier, window detector and comparator
CO48XT02.2	To employ the applications of operational amplifier to design waveform generator and filters, develop IC based waveform generator.
CO48XT02.3	To design instrumentation amplifier for temperature controller /indicator using various Temperature sensors
CO48XT02.4	To analyze behaviour of MOS Transistor switch to construct universal gates & compound gates using MOS transistors & draw CMOS physical layout for simple logic gates.
CO48XT02.5	To apply VHDL elements and different modelling styles for various digital circuits and compare VHDL and Verilog
CO48XT02.6	To compose VHDL code for various combinational and sequential circuits.

Course Name: Wireless Communication	Course Code: CO48XT03
CO48XT03.1	To Know fundamentals of wireless communication technologies used in 1G, 2G, 3G and 4G, correlate basic cellular system, cell Shape, concept of frequency reuse, cellular system architecture
CO48XT03.2	To analyze cellular system spectrum, frequency assignments, channel assignment strategies & capacity of cellular system
CO48XT03.3	Understand mechanism of signal propagation, analyze & compare types of fading in wireless communication
CO48XT03.4	To know structure of GSM system, radio subsystem, channel types, GSM signalling protocols & analyze frame structure.
CO48XT03.5	To correlate forward & reverse link of CDMA system. Relate the theory of soft handoff, power control in CDMA
CO48XT03.6	To predict the communication using short range technologies & analyze structure of protocols used.

Course Name: BIOMEDICAL ENGINEERING	Course Code: CO48XT04(1)
CO48XT04(1).1	Understand Physiological system of heart and Skin contact Theory.
CO48XT04(1).2	Designing of Biomedical Recorder And Measurement
CO48XT04(1).3	Examine Medical Imaging System Instrumentation for diagnostics X-ray and Ultrasonic imaging system.
CO48XT04(1).4	Understand Therapeutic Equipments Need Of Physiological And Electrotherapy Equipments.
CO48XT04(1).5	Understand Patient Care And Monitoring And Safety System concepts.
CO48XT04(1).6	Understand Computers In Biomedical Engineering Computerized Axial Tomography (CAT) Computerized Aided ECG analysis Computerized patient monitoring system. Computerized Catheterization.

Course Name: - Digital Image Processing	Course Code: CO48XT04(2)
CO48XT04(2).1	Recognize fundamentals of digital image processing in analyzing real world problems.
CO48XT04(2).2	Identify image transformation methods and apply them for feature extraction.
CO48XT04(2).3	Analyze 2D signals in the frequency domain and apply different pre-processing techniques for improving the image quality.
CO48XT04(2).4	Examine noise models & degradation processes for image restoration.
CO48XT04(2).5	Recognize image compression techniques and apply these techniques to real world problems.
CO48XT04(2).6	Recognize image segmentation techniques and apply these techniques to real world problems

Course Name: -ARM SYSTEM DEVELOPMENT AND DESIGN	Course Code: CO48XT04(3)
CO48XT04(3).1	Learn to Design a Processor, Instruction set, Processor trade-offs, To Reduce Instruction Set, Computer for low power consumption.

CO48XT04(3).2	Understand ARM Architecture, The ARM programmer's model, ARM development tools.
CO48XT04(3).3	Understand Assembly Language Programming for ARM.
CO48XT04(3).4	Know about ARM Organization and Implementation and The ARM coprocessor interface.
CO48XT04(3).5	Understand The Set -1 ARM Instruction, Single word & unsigned byte data transfer instructions, Halfword & signed byte data transfer instructions.
CO48XT04(3).6	Understand The ARM Instruction Set -2, Unused instruction, space Memory faults, ARM architecture variants.

Course Name: EMBEDDED AND REAL TIME	Course Code: CO48XT04(4)
CO48XT04(4).1	Know about an embedded systems design, Design cycle in the development phase for an embedded system & Use of software tools for development of an ES.
CO48XT04(4).2	Understand Real Time Operating System, semaphores and shared Data Operating system.
CO48XT04(4).3	Understand Services Message queues-Timer Function-Events-Memory Management, Interrupt Routines in an RTOS environment and basic design Using RTOS.
CO48XT04(4).4	Understand Role Microcontroller for selection in Embedded System. PIC Microcontroller Architecture and basic assembly language programming concepts with Instruction set.
CO48XT04(4).5	Design Embedded system & evolution trends such as Round - Robin, Object Oriented Interfacing, Recursion, Debugging strategies, Simulators.
CO48XT04(4).6	Know Networks for Embedded Systems, Bluetooth and IEEE 11491 (JTAG) Testability.

Course Name: Network & Sensor	Course Code: CO48XT04(5)
CO48XT04(5).1	Understand Smart Sensor and the Nature of Semiconductor Sensor Output.
CO48XT04(5).2	Design various Sensing Technologies and find combined Solution.
CO48XT04(5).3	Know about Amplification and Signal Conditioning, Instrumentation Amplifiers, Switched Capacitor Amplifier, Barometer Application Circuit.
CO48XT04(5).4	Understand MCUs/DSPs to Increase Sensor IQ.
CO48XT04(5).5	Analyse Control Techniques such as PID Control, State Machines, Fuzzy Logic, Neural Networks, Combined Fuzzy Logic and Neural Networks, Combined CISC, RISC, and DSP, The Impact of Artificial Intelligence.
CO48XT04(5).6	Know about Transceivers, Transponders and Telemetry.

Department of Electronics & Telecommunication Engineering (UG as per New Syllabus)

Year: Second Year	Semester: Third
Course Name: Mathematics III	Course Code: CO23ET01
CO23ET01.1	Solve contour integration as applied to analog systems.
CO23ET01.2	Comprehend knowledge of complex analysis in terms of complex variables, harmonic functions and conformal mapping.
CO23ET01.3	Apply numerical methods to obtain approximate solutions to mathematical problems
CO23ET01.4	Demonstrate the knowledge of differential equations to solve engineering problems of analog systems.
CO23ET01.5	Identify and solve certain forms of partial difference equations as applied to discrete systems.
CO23ET01.6	Apply Laplace transform to solve differential equations.

Course Name: Object Oriented Programming	Course Code: CO23ET02
CO23ET02.1	Justify the basics of object-oriented programming concepts such as data types, functions, classes, objects, constructors, inheritance, overloading etc.
CO23ET02.2	Design, implement, test, and debug simple programs in C++.
CO23ET02.3	Describe how the class mechanism supports encapsulation and information hiding
CO23ET02.4	Design and test the implementation of Java programming concepts
CO23ET02.5	Design Classes & Objects in Java Programming
CO23ET02.6	Design Constructor, Inheritance & Implementation of Interfaces in Java Programming

Course Name: ELECTRONIC DEVICES AND CIRCUITS	Course Code: CO23ET03
CO23ET03.1	Comprehend the knowledge of diode and its applications in rectifier and regulator circuits.
CO23ET03.2	Understand basics of BJT and design and analyze their operational parameters.
CO23ET03.3	Understand feedback concept, topologies and their applications.
CO23ET03.4	Implement and analyze various multistage amplifiers using BJT to determine frequency response and concept of voltage regulator.
CO23ET03.5	Know about different power amplifier circuits, their design & use in electronics circuits.
CO23ET03.6	Understand basics of JFET, MOSFET, UJT and design and analyze their operational parameters.

Course Name: INSTRUMENTATION & SENSORS	Course Code: CO23ET04
CO23ET04.1	Describe various sensors, transducers and their performance specifications.
CO23ET04.2	Understand working principle of various transducers.
CO23ET04.3	Make comparative study of various transducers
CO23ET04.4	Understand the applications of Different Transducers in industries.
CO23ET04.5	Application of Transducer for velocity, Strain Measurement & Understand the concept of smart sensor.
CO23ET04.6	Understand Data Acquisition Systems

Course Name: ELECTROMAGNETIC FIELDS	Course Code: CO23ET05
CO23ET05.1	Apply vector calculus to understand the behaviour of static electric and magnetic fields.
CO23ET05.2	Formulate and solve problems in electrostatics in dielectric media.
CO23ET05.3	Formulate and solve problems in magnetostatics in dielectric media.
CO23ET05.4	Analyze plane electromagnetic waves at boundaries between homogeneous media.
CO23ET05.5	Describe and analyze electromagnetic wave propagation in free-space.
CO23ET05.6	Analyze the electromagnetic radiation from localized charges considering retardation effects.

Course Name: Object Oriented Programming	Course Code: CO23ETp7
CO23ETp7.1	Justify the basics of object-oriented programming concepts such as data types, functions, classes, objects, constructors, inheritance, overloading etc
CO23ETp7.2	Design, implement, test, and debug simple programs in C++.
CO23ETp7.3	Describe how the class mechanism supports encapsulation and information hiding
CO23ETp7.4	Design and test the implementation of Java programming concepts
CO23ETp7.5	Design Classes & Objects in Java Programming
CO23ETp7.6	Design Constructor, Inheritance & Implementation of Interfaces in Java Programming

Course Name: Electronic Devices & Circuits	Course Code: CO23ETp8
CO23ETp8.1	Comprehend the knowledge of diode and its applications in rectifier and regulator circuits.
CO23ETp8.2	Understand basics of BJT and design and analyze their operational parameters.
CO23ETp8.3	Understand feedback concept, topologies and their applications.
CO23ETp8.4	Implement and analyze various multistage amplifiers using BJT to determine frequency response and concept of voltage regulator.
CO23ETp8.5	Know about different power amplifier circuits, their design & use in electronics circuits.

CO23ETp8.6	Understand basics of JFET, MOSFET, UJT and design and analyze their operational parameters.
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Year: Second Year	Semester: Fourth
Course Name: SIGNALS AND SYSTEMS	Course Code: CO24ET01
CO24ET01.1	Describe signals mathematically and understand how to perform mathematical operations on signals and systems.
CO24ET01.2	Analyze the spectral characteristics of continuous-time periodic and a periodic signals using Fourier analysis.
CO24ET01.3	Classify systems based on their properties and determine the response of LTI system.
CO24ET01.4	Analyze system properties based on impulse response and Fourier analysis.
CO24ET01.5	Understand the process of sampling and its effects.
CO24ET01.6	Apply the Laplace transform and Z- transform for analysis of continuous-time and discrete-time systems.

Course Name: NETWORK	Course Code: CO24ET02
CO24ET02.1	Analyze electrical circuits using mesh and node analysis.
CO24ET02.2	Draw oriented graph of the network to determine their currents and voltages
CO24ET02.3	Apply Laplace Transform for circuit analysis.
CO24ET02.4	Apply suitable network theorems to analyze electrical circuits
CO24ET02.5	Apply Suitable Network Functions to analyze electrical circuits
CO24ET02.6	Relate various two port network and apply two-port network theory for network analysis.

Course Name: Analog Electronics- I	Course Code: CO24ET03
CO24ET03.1	Analyze different wave shaping circuits.
CO24ET03.2	Perform evaluation of the switching behaviour of semiconductor devices
CO24ET03.3	Comprehend the knowledge of basic concepts and performance parameters of Op-Amp.
CO24ET03.4	Use Op-Amp for implementation of linear applications
CO24ET03.5	Use Op-Amp for implementation of non-linear applications
CO24ET03.6	Comprehend the knowledge of PLL, its applications and data converters.

Course Name: DIGITAL ELECTRONICS	Course Code: CO24ET04
CO24ET01.1	Use Boolean algebra to solve logic functions, number systems and its conversion.
CO24ET01.2	Understand digital logic families and their characteristics
CO24ET01.3	Identify, analyze and design combinational circuits
CO24ET01.4	Design and Implement Register & Counter using FF's.
CO24ET01.5	Identify, analyze and design sequential circuits
CO24ET01.6	Use the knowledge of semiconductor memories, programmable logic devices in digital design.

Course Name: COMMUNICATION ENGINEERING –I	Course Code: CO24ET05
CO24ET01.1	Understand the necessity of modulation and identify the various components of analog communication systems.
CO24ET01.2	Understand AM modulation and demodulation schemes in analog communication systems.
CO24ET01.3	Understand FM modulation schemes in analog communication systems

CO24ET01.4	Understand FM demodulation schemes in analog communication systems
CO24ET01.5	Describe the properties and characteristics of RF Transmission lines
CO24ET01.6	Understand the basics of antennas, Types & Design of it.

Course Name: Analog Electronics- I	Course Code: CO24ETp7
CO24ETp7.1	Analyze different wave shaping circuits.
CO24ETp7.2	Perform evaluation of the switching behaviour of semiconductor devices
CO24ETp7.3	Comprehend the knowledge of basic concepts and performance parameters of Op-Amp.
CO24ETp7.4	Use Op-Amp for implementation of linear applications
CO24ETp7.5	Use Op-Amp for implementation of non-linear applications
CO24ETp7.6	Comprehend the knowledge of PLL, its applications and data converters.

Course Name: DIGITAL ELECTRONICS	Course Code: CO24ETp8
CO24ETp8.1	Use Boolean algebra to solve logic functions, number systems and its conversion.
CO24ETp8.2	Understand digital logic families and their characteristics
CO24ETp8.3	Identify, analyze and design combinational circuits
CO24ETp8.4	Design and Implement Register & Counter using FF's.
CO24ETp8.5	Identify, analyze and design sequential circuits
CO24ETp8.6	Use the knowledge of semiconductor memories, programmable logic devices in digital design.

Year: Third Year	Semester: Fifth
Course Name: Analog Electronics -II	Course Code: CO35ET01
CO35ET01.1	Acquire and apply knowledge for design of voltage regulator circuits using ICS and discrete components.
CO35ET01.2	Analyze and design electronic circuits for various linear and non-linear applications.
CO35ET01.3	Design waveform generator circuits using different ICs.
CO35ET01.4	To analyze and design the timer IC 555, phase locked loop IC 565
CO35ET01.5	Design the various types of filters such as all pass, low pass, high pass, band pass and band stop.
CO35ET01.6	Design temperature monitoring system using Op-Amp and sensors.

Course Name: POWER ELECTRONICS & DRIVES	Course Code: CO35ET02
CO35ET02.1	Analyze the characteristics of various power electronics devices
CO35ET02.2	Understand SCR firing circuits.
CO35ET02.3	Understand various commutation techniques.
CO35ET02.4	Design and develop power electronic circuits for various applications
CO35ET02.5	Illustrate the operation of various DC motors; Know various applications of power converters in DC drives.
CO35ET02.6	Illustrate the operation of various AC motors; Know various applications of power converters in AC drives.

Course Name: MICROPROCESSOR & MICROCONTROLLER	Course Code: CO35ET3
CO35ET3.1	Understand architectural difference between Microprocessor and Microcontroller
CO35ET3.2	Develop Assembly Language Programming concepts of Microprocessor & Microcontroller.
CO35ET3.3	Interface different peripheral devices with Microprocessor and Microcontroller.
CO35ET3.4	Understand architecture of 8051 Microcontroller
CO35ET3.5	Develop Assembly Language Programming of 8051
CO35ET3.6	Interfacing different peripheral devices with 8051

Course Name: Communication Engineering –II	Course Code: CO35ET4
CO35XT4.1	To recognize the significance of AM modulation in communication to select appropriate modulation scheme.
CO35XT4.2	To interpret the trade-off in analog modulations between bandwidth, receiver SNR, discuss various demodulation schemes for amplitude modulation and receiver complexity.
CO35XT4.3	To examine frequency modulation and determine the spectrum of frequency modulated signal.
CO35XT4.4	To analyze different frequency demodulation methods for noise reduction in information signal..
CO35XT4.5	To apply sampling theorem in analog and digital pulse modulation schemes.
CO35XT4.6	To identify the route of message transmission in telephone switching system using different switching techniques

Course Name: ELECTRONIC TEST INSTRUMENTS (FE)	Course Code: CO35ET5
CO35ET5.1	Understand the Basic Electronics Test Equipments
CO35ET5.2	Understand Basic Responses of Electronics Test Equipments
CO35ET5.3	Understand the basic techniques of electronic testing and measuring equipments
CO35ET5.4	Identify electronic instruments, their use and errors associated with the instruments
CO35ET5.5	Explain the use of electronic instruments for testing
CO35ET5.6	Explain the use of electronic instruments for measurement in various applications.

Year: Third Year	Semester: Sixth
Course Name: MICROCONTROLLER PROGRAMMING & APPLICATIONS	Course Code: CO36ET1
CO36ET1.1	Use various members of AVR family.
CO36ET1.2	Program AVR Microcontroller in assembly language and C language.
CO36ET1.3	Use different inbuilt block of AVR.
CO36ET1.4	Implement a system for dedicated applications.
CO36ET1.5	Understand different serial protocols and IDE tools for AVR.
CO36ET1.6	Use AVR System Development Tool.

Course Name: CONTROL SYSTEMS ENGINEERING	Course Code: CO36ET2
CO36ET2.1	Determine transfer function models of electrical, mechanical and electromechanical systems.
CO36ET2.2	Determine specified transfer functions from block diagrams and signal flow graph.
CO36ET2.3	Determine transient response and steady state response parameters.
CO36ET2.4	Analyze stability/relative stability of the LTI system.
CO36ET2.5	Determine the state model and the response of the system using state variable method.
CO36ET2.6	Analyze the response of the discrete time system.

Course Name: DIGITAL COMMUNICATION	Course Code: CO36ET3
CO36ET3.1	Understand basic building blocks of digital communication system and formatting of digital signal.
CO36ET3.2	Understand concepts of information theory and analyze information transmission over communication channel.
CO36ET3.3	Analyze performance of different digital modulation techniques.
CO36ET3.4	Understand methods to mitigate inter symbol interference in baseband transmission system.
CO36ET3.5	Implement different error control coding schemes for the reliable transmission.
CO36ET3.6	Understand various multiple access schemes and spreading techniques.

Course Name: DIGITAL SIGNAL PROCESSING	Course Code: CO36ET4
CO36ET4.1	Manipulate the discrete time signals and identify the type system
CO36ET4.2	Compute the z-transform of a sequence, identify its region of convergence, and compute the inverse z-transform.
CO36ET4.3	Evaluate the Fourier transform of a signal.
CO36ET4.4	Design FIR and IIR filters
CO36ET4.5	Understand the concepts of Multirate Digital Signal Processing and need of Filter banks.
CO36ET4.6	Understand the architecture of DSP processor TMS320C54XX.

Course Name: CONSUMER ELECTRONICS (FE)	Course Code: CO36ET5
CO36ET5.1	Understand audio systems commonly used in consumer electronics
CO36ET5.2	Understand video systems commonly used in consumer electronics
CO36ET5.3	Explain the working of commonly used electronic appliances.
CO36ET5.4	Describe recording and reproduction systems.
CO36ET5.5	Acquire knowledge of working principle of calculator and In-Car-Computers
CO36ET5.6	Observe occupational and safety practices in consumer electronics.

Course Name: COMMUNICATION SKILLS	Course Code: CO36ET6
CO36ET6.1	Acquire knowledge about the various principles of communication.
CO36ET6.2	Learn the importance of verbal and non-verbal communication in the professional world.
CO36ET6.3	Imbibe the knowledge of effective classroom speaking and presentation.
CO36ET6.4	Learning the nuances of effective writing by using short and crisp sentences.
CO36ET6.5	Synthesize and apply appropriate and effective conflict management strategies.

Year: Fourth Year	Semester: Seventh
Course Name: Data Communication Network	Course Code: CO47XT01
CO47XT01.1	Identify Different Types of Network & Their Functions, Topology & Protocol, Identify OSI & TCP/IP Layer & Their Task.
CO47XT01.2	Discuss the data link layer & Protocol, Issues related to framing flow & error control, solution to delivery & Forwarding of Packets.
CO47XT01.3	Explain Wired LAN, Virtual LAN & Ethernet, and IEEE Standard of LAN
CO47XT01.4	Solve Problem Associated with Delivery & Forwarding of Packets. Differentiate between unicast & Multicast routing Protocol in Transport Layer.

CO47XT01.5	Delve in to the requirement for resolving access to shared Media.
CO47XT01.6	Define Network Layer & Describe its Function, Interpret logical Address and compare IPv4 & IPv6, Discuss UDP & TCP Protocol.

Course Name: Microcontroller & Applications.	Course Code: CO47XT02
CO47XT02.1	To illustrate significance of 8051 microcontroller architecture.
CO47XT02.2	To develop logic for assembly language programming and apply programming techniques for solving simple problems by using instruction sets of microcontroller
CO47XT02.3	To construct assembly language code using ADC/DAC and analog sensors for controlling applications.
CO47XT02.4	To demonstrate interfacing of LCD, keyboard, DC and stepper motors
CO47XT02.5	To set up serial communication with microcontroller and its interfacing for real time clock.
CO47XT02.6	To develop logic of C programming for microcontroller and its interfacing

Course Name: Digital Signal Processing	Course Code: CO47XT03
CO47XT03.1	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.
CO47XT03.2	To analyze the applicability of Z-transform and Inverse Z-transform in determination of filter coefficient and solution of difference equation.
CO47XT03.3	To interpret the use of Fourier transforms of discrete time signals and its different algorithm for signal processing
CO47XT03.4	To review realization of digital filter using different type of structure and design of FIR filter.
CO47XT03.5	To evaluate the analog filter design approximations and different methods for conversion of analog filter into digital filter
CO47XT03.6	To diagnose multirate signal processing to design the practical rate converter and its use in filter bank. Understand DSP processor TMS 320.

Course Name: VLSI Design	Course Code: CO47XT04(1)
CO47XT04(1).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.
CO47XT04(1).2	To apply VHDL constructs and modelling styles for combinational and sequential Circuits.
CO47XT04(1).3	To employ the elements of VHDL on various digital circuits and compare Hardware Description Languages
CO47XT04(1).4	To utilize FPGA/CPLD as controller/ platform for implementing digital circuits by recognizing the architecture of Altera / Xilinx made FPGA and CPLD.
CO47XT04(1).5	To recognize behaviour of MOS transistor and CMOS as inverter for developing digital circuits using CMOS
CO47XT04(1).6	To utilize CMOS layout and design rules for various CMOS fabrication process.

Course Name: COMPUTER ORGANIZATION	Course Code: CO47XT04(2)
CO47XT04(2).1	Understand Organization and architecture, structure and function, Computer evolution and performance.
CO47XT04(2).2	Know the External devices I/O modules, I/O Channels and IOPs, SCSI and firewire interfaces, operating system overview, memory management, swapping, partitioning, paging, virtual memory.
CO47XT04(2).3	Design ALU Machine instruction characteristics, operand types, operation types, Addressing modes, instruction formats.
CO47XT04(2).4	Understand RISC machine, instruction execution characteristics, register, compiler based register optimization, RISC architecture, RISC pipelining, RISC vs CISC, case study of power PC 620.
CO47XT04(2).5	Know Control unit operation such as Micro operation, micro program control.
CO47XT04(2).6	Design Multiple processor organizations.

Course Name: ARTIFICIAL INTELLIGENCE	Course Code: CO47XT04(3)
CO47XT04(3).1	Detailing about Artificial Intelligence and current trends in applied AI.
CO47XT04(3).2	Knowledge Representation of issues in Artificial Intelligence.

CO47XT04(3).3	Search a problem-solving technique, techniques for heuristic search, hill climbing heuristic, best-first search, and application of search technique in game playing and planning.
CO47XT04(3).4	Know about Expert Systems, and difficulties in developing ES, applications of expert systems.
CO47XT04(3).5	Understand Various Artificial Neural Networks, basic terms and operations and hardware realization of the analog fuzzy controller.
CO47XT04(3).6	Know about Genetic Algorithms, working of evolutionary programming.

Course Name: SATELLITE AND OPTICAL FIBER COMMUNICATION	Course Code: CO47XT04(4)
CO47XT04(4).1	Analyse Satellite frequency bands, Satellite types-LEO, MEO, GEO, HEO, Kepler's laws, Satellite orbits, Geo-stationary Satellite and Orbital Aspects of Satellite Communication.
CO47XT04(4).2	Know about Electromagnetic field Propagation, Antennas, losses. Satellite system link model.
CO47XT04(4).3	Describe Very Small Aperture Satellite, Satellite Navigation and Global Positioning System.
CO47XT04(4).4	Analyse Ray Theory of Optical Fiber, Total internal reflection, Snell's law, Acceptance Angles, Numerical Aperture. Transmission Characteristics of Optical Fiber.
CO47XT04(4).5	Understand Optical Sources, Optical Detectors.
CO47XT04(4).6	Know about Optical Transmitter and Receiver.

Course Name: AUDIO & VIDEO ENGINEERING	Course Code: CO47XT04(5)
CO47XT04(5).1	Understand Principle of disc recording, principle of disc reproduction and Block diagram of disc reproduction system, Block diagram tape recording, Rumble, Hissing noise, Types of optical recording of sound, methods of optical recording of sound on films.
CO47XT04(5).2	Understand Multimedia Definition, Elements, need, compression, etc. Introduction to video system.
CO47XT04(5).3	Know Television, TV receivers and Video detectors.
CO47XT04(5).4	Understand Sound signal separation and Colour TV system.
CO47XT04(5).5	Analyse Digital TV, Compression of Frames, Compression of Moving Pictures and Basic blocks of MPEG2 and MPEG4.
CO47XT04(5).6	Analyse OFDM for Terrestrial Digital TV (DVB -T), Reception of Digital TV Signals and Display Technologies.

Year: Fourth Year	Semester: Eighth
Course Name: UHF & Microwaves	Course Code: CO48XT01
CO48XT01.1	Understand the limitations of conventional devices at high frequencies and working principles of Microwave Tubes.
CO48XT01.2	Understand the working of Microwave Solid State Devices such as Gun Diode, IMPATT, TRAPATT Diodes & MASER.
CO48XT01.3	Understand transmission of Microwaves in Rectangular, Circular Waveguide, microstrip lines & Find Characteristics Impedance & Losses.
CO48XT01.4	Understand Microwave resonator and find resonance frequency & Quality Factor.
CO48XT01.5	Understand various microwave passive components with scattering matrix formulations.
CO48XT01.6	Know various microwave measurement techniques.

Course Name: Electronic Circuit Design	Course Code: CO48XT02
CO48XT02.1	To develop transistor based Regulated power supply, employ the applications of operational amplifier to design summing amplifier, scaling amplifier, window detector and comparator
CO48XT02.2	To employ the applications of operational amplifier to design waveform generator and filters, develop IC based waveform generator.
CO48XT02.3	To design instrumentation amplifier for temperature controller /indicator using various Temperature sensors
CO48XT02.4	To analyze behaviour of MOS Transistor switch to construct universal gates & compound gates using MOS transistors & draw CMOS physical layout for simple logic gates.
CO48XT02.5	To apply VHDL elements and different modelling styles for various digital circuits and compare VHDL and Verilog
CO48XT02.6	To compose VHDL code for various combinational and sequential circuits.

Course Name: Wireless Communication	Course Code: CO48XT03
CO48XT03.1	To Know fundamentals of wireless communication technologies used in 1G, 2G, 3G and 4G, correlate basic cellular system, cell Shape, concept of frequency reuse, cellular system architecture
CO48XT03.2	To analyze cellular system spectrum, frequency assignments, channel assignment strategies & capacity of cellular system
CO48XT03.3	Understand mechanism of signal propagation, analyze & compare types of fading in wireless communication
CO48XT03.4	To know structure of GSM system, radio subsystem, channel types, GSM signalling protocols & analyze frame structure.
CO48XT03.5	To correlate forward & reverse link of CDMA system. Relate the theory of soft handoff, power control in CDMA
CO48XT03.6	To predict the communication using short range technologies & analyze structure of protocols used.

Course name: BIOMEDICAL ENGINEERING	Course Code: CO48XT04(1)
CO48XT04(1).1	Understand Physiological system of heart and Skin contact Theory.
CO48XT04(1).2	Designing of Biomedical Recorder And Measurement
CO48XT04(1).3	Examine Medical Imaging System Instrumentation for diagnostics X-ray and Ultrasonic imaging system.
CO48XT04(1).4	Understand Therapeutic Equipments Need Of Physiological And Electrotherapy Equipments.
CO48XT04(1).5	Understand Patient Care And Monitoring And Safety System concepts.
CO48XT04(1).6	Understand Computers In Biomedical Engineering Computerized Axial Tomography (CAT) Computerized Aided ECG analysis Computerized patient monitoring system. Computerized Catheterization.

Course Name: - Digital Image Processing	Course Code: CO48XT04(2)
CO48XT04(2).1	Recognize fundamentals of digital image processing in analyzing real world problems.
CO48XT04(2).2	Identify image transformation methods and apply them for feature extraction.
CO48XT04(2).3	Analyze 2D signals in the frequency domain and apply different pre-processing techniques for improving the image quality.
CO48XT04(2).4	Examine noise models & degradation processes for image restoration.
CO48XT04(2).5	Recognize image compression techniques and apply these techniques to real world problems.
CO48XT04(2).6	Recognize image segmentation techniques and apply these techniques to real world problems

Course Name: - ARM SYSTEM DEVELOPMENT AND DESIGN	Course Code: CO48XT04(3)
CO48XT04(3).1	Learn to Design a Processor, Instruction set, Processor trade-offs, To Reduce Instruction Set, Computer for low power consumption.
CO48XT04(3).2	Understand ARM Architecture, The ARM programmer's model, ARM development tools.
CO48XT04(3).3	Understand Assembly Language Programming for ARM.
CO48XT04(3).4	Know about ARM Organization and Implementation and The ARM coprocessor interface.
CO48XT04(3).5	Understand The Set -1 ARM Instruction, Single word & unsigned byte data transfer instructions, Halfword & signed byte data transfer instructions.
CO48XT04(3).6	Understand The ARM Instruction Set -2, Unused instruction, space Memory faults, ARM architecture variants.

Course Name: EMBEDDED AND REAL TIME SYSTEM	Course Code: CO48XT04(4)
CO48XT04(4).1	Know about an embedded systems design, Design cycle in the development phase for an embedded system & Use of software tools for development of an ES.
CO48XT04(4).2	Understand Real Time Operating System, semaphores and shared Data Operating system.
CO48XT04(4).3	Understand Services Message queues-Timer Function-Events-Memory Management, Interrupt Routines in an RTOS environment and basic design Using RTOS
CO48XT04(4).4	Understand Role Microcontroller for selection in Embedded System. PIC Microcontroller Architecture and basic assembly language programming concepts with Instruction set.

CO48XT04(4).5	Design Embedded system & evolution trends such as Round - Robin, Object Oriented Interfacing, Recursion, Debugging strategies, Simulators.
CO48XT04(4).6	Know Networks for Embedded Systems, Bluetooth and IEEE 11491 (JTAG) Testability.

Course Name: SMART SENSORS	Course Code: CO48XT04(5)
CO48XT04(5).1	Understand Smart Sensor and the Nature of Semiconductor Sensor Output.
CO48XT04(5).2	Design various Sensing Technologies and find combined Solution.
CO48XT04(5).3	Know about Amplification and Signal Conditioning, Instrumentation Amplifiers, Switched Capacitor Amplifier, Barometer Application Circuit.
CO48XT04(5).4	Understand MCUs/DSPs to Increase Sensor IQ.
CO48XT04(5).5	Analyse Control Techniques such as PID Control, State Machines, Fuzzy Logic, Neural Networks, Combined Fuzzy Logic and Neural Networks, Combined CISC, RISC, and DSP, The Impact of Artificial Intelligence.
CO48XT04(5).6	Know about Transceivers, Transponders and Telemetry.