K.L.N. College of Engineering, Pottapalayam.

Department of Electronics and Communication Engineering

Anna University – Regulation 2017

Course Outcomes (COs)

Course Code	Semester	Subject Code	Subject Name	Course Outcome
C101	I	HS8151	Communicative English	C101.1 Listen and recognize main ideas from different discourses in different accents.
				C101.2 Speak clearly, confidently, comprehensively, and communicate with one or many listeners using appropriate communicative strategies.
				C101.3 Read different genres of text adopting various reading strategies
				C101.4 Write cohesively and coherently by using a wide range of vocabulary and organize ideas logically on a topic without grammatical errors
				C101.5 Determine the main and subordinate ideas, draw conclusions and summarize information from written material
C102	I	MA8151	Engineering Mathematics – I	C102.1 Use both the limit definition and rules of differentiation to differentiate functions
				C102.2 Apply differentiation to solve maxima and minima problems.
				C102.3 Evaluate integrals both by using Reimann sums and by using the fundamental theorem of calculus and Determine the convergence /divergence of improper integrals and evaluate convergent improper integrals. Evaluate integrals using techniques of integration, such as substitution, partial Fractions, integration by parts and improper integrals.
				C102.4 Apply integration to compute multiple integrals, area, volume, integrals in polar Coordinates, in addition to change of order and change of variables.
				C102.5 Apply various techniques in solving differential equations.
C103	I	PH8151	Engineering Physics	C103.1 Demonstrate the properties of elasticity and measure the different moduli of elasticity
				C103.2 Examine the characteristics of waves, LASER and optical fiber
				C103.3 Illustrate different modes of heat transfer through objects
				C103.4 Explain the black body radiation, properties of matter waves and Schrodinger wave equations

				C103.5 Classify the Bravais lattices, different types of crystal structures, defects and crystal growth techniques.
C104	I	CY8151	Engineering Chemistry	C104.1 Explain the hardness of water, its types and estimation, boiler troubles and treatment of boiler feed water..
				C104.2 Explain adsorption, types and theories of adsorption isotherm and its application in pollution abatement, theories of catalysis and applications
				C104.3 Understand the basic concepts of phase rule and its application to one and two component systems, properties, significance and applications of alloys.
				C104.4 Relate the significance of solid, liquid and gaseous fuels and to calculate the calorific value of fuels.
				C104.5 Illustrate the methods of harvesting energy from non-conventional energy sources.
C105	I	GE8151	Problem Solving and Python Programming	C105.1 Develop algorithmic solutions to simple computational problems.
				C105.2 Demonstrate programs using simple Python statements and expressions.
				C105.3 Explain control flow and functions concept in Python for solving problems.
				C105.4 Use Python data structures – lists, tuples & dictionaries for representing compound data.
				C105.5 Explain files, exception, modules and packages in Python for solving problems.
C106	I	GE8152	Engineering Graphics	C106.1 Sketch the conic sections, special curves, and draw orthographic views from pictorial views and models.
				C106.2 Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.
				C106.3 Sketch the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.
				C106.4 Practice the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its lateral surfaces.

				C106.5 Sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.
C107	I	GE8161	Problem Solving and Python Programming Laboratory	C107.1 Develop solutions to simple computational problems using Python programs.
				C107.2 Solve problems using conditionals and loops in Python.
				C107.3 Develop Python programs by defining functions and calling them.
				C107.4 Use Python lists, tuples and dictionaries for representing compound data.
				C107.5 Develop Python programs using files..
C108	I	BS8161	Physics and Chemistry Laboratory	C108.1 To evaluate moment of inertia of disc and rigidity modulus for thin wire using Torsion pendulum and Determine and estimate the types of alkalinity & hardness of a given water sample.
				C108.2 To appraise Young's modulus of the beam by non-uniform bending method and Estimate the amount of copper content present in a given sample.
				C108.3 To measure the wavelength of LASER, particle size and basic parameters of optical fiber using semiconductor diode LASER and Determine the strength of an acid by using pH meter.
				C108.4 To examine the thermal conductivity of bad conductors using Lee's disc apparatus and Determine the strength of a pure acid and mixture of acids by using conductivity meter.
				C108.5 To determine the wavelength of the prominent spectral lines and Estimate the amount of iron content present in a given solution by means of potentiometric titration.
C109	II	HS8251	Technical English	C109.1 Read technical texts and write area- specific texts effortlessly
				C109.2 Listen and comprehend lectures and talks in their area of specialization successfully.

				C109.3 Speak appropriately and effectively in varied formal and informal contexts
				C109.4 Write reports and winning job applications.
				C109.5 Use appropriate technologies to organize, present, and communicate information to address a range of audiences, purposes, genres
C110	II	MA8251	Engineering Mathematics - II	C110.1 Calculate the Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
				C110.2 Evaluation of line, surface and volume integrals using Gauss, Stokes and Green‘s theorems and their verification.
				C110.3 Determine Analytic functions, conformal mapping and Bilinear transformation
				C110.4 Evaluation of Cauchy’s integrals, Taylor’s and Laurent’s and residue theorem for evaluation for real integrals using circular and semicircular, contour
				C110.5 Evaluate Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
C111	II	PH8253	Physics for Electronics Engineering	C111.1 Gain knowledge on classical and quantum electron theories and energy band structures.
				C111.2 Acquire knowledge on basis of semiconductor physics and its applications in various devices.
				C111.3 Get knowledge on magnetic and dielectric properties of materials
				C111.4 Have the necessary understanding on the functioning of optical materials for opto electronics.
				C111.5 Understand the basics of quantum structures and their applications in spintronics and carbon nanotubes.
C112	II	BE8254	Basic Electrical and Instrumentation Engineering	C112.1 Explain the operation of three phase electrical circuit and power measurement.
				C112.2 Explain the operation and circuit model of transformer.
				C112.3 Demonstrate the principle of operation, starting and speed control of D.C

				machines.
				C112.4 Describe the construction , principle of operation and performance of A.C machines
				C112.5 Explain the working principle of various measuring instruments and the classification of transducers
C113	II	EC8251	Circuit Analysis	C113.1 Analyze electrical circuits using Kirchhoff's law
				C113.2 Apply circuit theorems to evaluate AC & DC circuits.
				C113.3 Explain the concepts of resonance & coupled circuit.
				C113.4 Analyze the transient response for AC & DC circuits
				C113.5 Analyze the properties of Two port networks.
C114	II	EC8252	Electronic Devices	C114.1 Describe the theory, construction and operations of semiconductor diodes.
				C114.2 Explain the operation and characteristics of bipolar junction devices
				C114.3 Explain field effect transistor characteristics and their operations..
				C114.4 Illustrate working of various types of special semiconductor devices
				C114.5 Explain the construction, operation and applications of power and display devices.
C115	II	EC8261	Circuits and Devices Laboratory	C115.1 Estimate the characteristics of diodes and regulator using zener diode.
				C115.2 Calculate the input and output characteristics of BJT , FET and SCR
				C115.3 Infer the clipper, clamper & FWR circuits.
				C115.4 Solve the circuits using KVL, KCL, Thevinin, Norton, Superposition, maximum power transfer and reciprocity theorems to DC circuits.
				C115.5 Estimate the resonance frequency of series & parallel RLC Circuits and the transient response of RL and RC circuits.
C116	II	GE8261	Engineering	C116.1 Use wiring circuits for residential house, fluorescent lamp and stair case.

			Practices Laboratory	C116.2 Classify the electrical quantities of V, I & PF in RLC and energy with single phase energy meter.
				C116.3 Demonstrate the logic gates and electronic components
				C116.4 Manipulate PCB with electronic components, devices and circuits for general purposes.
				C116.5 Perform HWR & FWR with ripple factor and clock signal generation.
C201	III	MA8352	Linear Algebra and Partial Differential Equations	C117.1 Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts
				C117.2 Demonstrate accurate and efficient use of advanced algebraic techniques.
				C117.3 Demonstrate their mastery by solving non-trivial problem related to the concepts and by proving simple theorems about the statements proven by the text.
				C117.4 Able to solve various types of partial differential equations.
				C117.5 Able to solve engineering problems using Fourier series.
C202	III	EC8393	Fundamentals of Data Structures In C	C201.1 Implement linear and non-linear data structure operations using C
				C201.2 Suggest appropriate linear / non-linear data structure for any given data set.
				C201.3 Apply hashing concepts for a given problem
				C201.4 Modify or suggest new data structure for an application
				C201.5 Appropriately choose the sorting algorithm for an application
C203	III	EC8351	Electronic Circuits- I	C202.1 Explain various methods of transistor biasing.
				C202.2 Design of single stage and multistage BJT amplifiers.
				C202.3 Analyze the single stage FET, MOSFET amplifiers
				C202.4 Discuss the frequency of amplifiers.
				C202.5 Design and testing of power supplies.
C204	III	EC8352	Signals and	C203.1 determine if a given system is linear/causal/stable

			Systems	
				C203.2 Capable of determining the frequency components present in a deterministic signal
				C203.3 Capable of characterizing LTI systems frequency domain
				C203.4 Capable of characterizing LTI systems in the time domain
				C203.5 compute the output of an LTI system in the time and frequency domains
C205	III	EC8392	Digital Electronics	C204.1 Use digital electronics in the present contemporary world
				C204.2 Design various combinational digital circuits using logic gates
				C204.3 Do the analysis and design procedures for synchronous and asynchronous sequential circuits
				C204.4 Use the semiconductor memories and related technology
				C204.5 Use electronic circuits involved in the design of logic gates .
C206	III	EC8391	Control Systems Engineering	C205.1 Identify the various control system components and their representations.
				C205.2 Analyze the various time domain parameters.
				C205.3 Analysis the various frequency response plots and its system.
				C205.4 Apply the concepts of various system stability criterions.
				C205.5 Design various transfer functions of digital control system using state variable models.
C207	III	EC8381	Fundamentals of Data Structures in C Laboratory	C206.1 Write basic and advanced programs in C
				C206.2 Implement functions and recursive functions in C
				C206.3 Implement Linear data structures using C
				C206.4 Implement Non Linear data structures using C
				C206.5 Choose appropriate sorting algorithm for an application and implement it in a modularized way
C208	III	EC8361	Analog and Digital Circuits Laboratory	C207.1 Analyse the frequency response of CE/CB/CC/CS amplifiers and design of power supply.
				C207.2 Analyse the characteristics of Darlington and differential amplifier and bandwidth of multistage amplifiers

				C207.3 Analyze the circuits of BJT, FET and MOSFET using PSPICE simulation
				C207.4 Design combinational circuits for Arithmetic, Code conversions, data selection and distribution operations
				C207.5 Design Sequential circuits for Counter operations
C209	III	HS8381	Interpersonal Skills/Listening & Speaking	C209.1 Equip students with the English language skills required for the successful undertaking of academic studies.
				C209.2 To emphasis on academic speaking and listening skills
				C209.3 Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities
				C209.4 Improve general and academic listening skills
				C209.5 Make effective presentations.
C210	IV	MA8451	Probability and Random Processes	C210.1 Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distribution which can describe real life phenomenon
				C210.2 Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
				C210.3 Apply the concept random processes in engineering disciplines.
				C210.4 Understand and apply the concept of correlation and spectral densities.
				C210.5 The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable. Able to analyze the response of random inputs to linear time invariant systems.
C211	IV	EC8452	Electronic Circuits II	C211.1 Explain the concepts of feedback amplifiers
				C211.2 Classify the various types of oscillators.
				C211.3 Design different types of tuned amplifiers and analyze its performance.

				C211.4 Discuss wave shaping circuits and multivibrators
				C211.5 To study about Power amplifiers, Power MOSFET, MOSFET, buck boost r and DC-DC converter
C212	IV	EC8491	Communication Theory	C212.1 Describe the various types of amplitude modulation systems such as DSBSC, SSB and VSB.
				C212.2 Discuss the various types of angle modulation system such as narrow and wide band FM circuits
				C212.3 Apply the concepts of Random Process to the design of communication systems.
				C212.4 Classify the types of noise sources added in communication channel and to analyze the noise performance in AM and FM systems.
				C212.5 Describe sampling and quantization techniques and various pulse modulation techniques.
C213	IV	EC8451	Electromagnetic Fields	C213.1 Discuss fundamental electromagnetic laws and concepts
				C213.2 Explain field potentials due to static charges using theorems and laws such as Coulomb's Law, Gauss Law and discuss different boundary conditions for electric field
				C213.3 Explain field potentials due to charges in static magnetic fields
				C213.4 Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning
				C213.5 Explain electromagnetic wave propagation in lossy and in lossless media
C214	IV	EC8453	Linear Integrated Circuits	C214.1 Describe the performance characteristics of operational amplifier
				C214.2 Design linear and non-linear operational amplifier applications using OP-AMPS
				C214.3 Design applications using the analog multiplier & PLL.

				C214.4 Design ADC and DAC using OP-AMPS.
				C214.5 Analyze special function ICs
C215	IV	GE8291	Environmental Science and Engineering	C215.1 Explain the values, threats and conservation of biodiversity and classify various ecosystems
				C215.2 Identify and implement technological and economical solution to environmental pollution.
				C215.3 Develop the knowledge on various natural resources, their causes and their effects.
				C215.4 Explain various environmental acts and to explain various disaster management.
				C215.5 Relate population growth and environment and the role of IT in environment and human health.
C216	IV	EC8461	Circuits Design and Simulation Laboratory	C216.1 Analyze various types of feedback amplifiers.
				C216.2 Design of oscillators, tuned amplifiers, wave-shaping circuits and multivibrators.
				C216.3 Demonstrate the oscillators and tuned amplifiers using SPICE Tool.
				C216.4 Demonstrate the wave-shaping circuits and multivibrators using SPICE Tool.
				C216.5 Demonstrate the voltage and current time base circuits using SPICE Tool.
C217	IV	EC8462	Linear Integrated Circuits Laboratory	C217.1 Design amplifiers, oscillators, D-A converters using operational amplifiers
				C217.2 Design filters using op-amp and performs an experiment on frequency response.
				C217.3 Analyze the working of PLL and describe its application as a frequency multiplier
				C217.4 Design of DC power supply circuit using ICs.
				C217.5 Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using PSPICE..
C301	V	EC8501	Digital Communication	C301.1 Discuss about information theory and compute the Huffman and Shannon-fano encoding methods
				C301.2 Discuss about DPCM, DM, ADPCM and ADM techniques.
				C301.3 Design and implement base band transmission schemes
				C301.4 Design and Analyze the spectral characteristics of band pass signaling schemes and their noise performance
				C301.5 Apply error control coding techniques in digital communication system..
C302	V	EC8553	Discrete-Time Signal Processing	C302.1 Apply Discrete Fourier Transform (DFT) for the analysis of digital signals & systems

				C302.2 Design an analog to digital Infinite Impulse Response (IIR) filters and its realization.
				C302.3 Design of digital Finite Impulse Response (FIR) filters using the windowing technique & frequency sampling method and to realize their structure.
				Illustrate the finite word length effects on filters.
				C302.5 Explain the fundamentals of DSP Processor Architecture and its programming.
C303	V	EC8552	Computer Architecture and Organization	C303.1 Describe data representation, instruction formats and the operation of a digital computer
				C303.2 Illustrate the fixed point and floating-point arithmetic for ALU operation
				C303.3 Discuss about implementation schemes of control unit and pipeline performance
				C303.4 Explain the concept of various memories, interfacing and organization of multiple processors
				C303.5 Discuss parallel processing technique and unconventional architectures
C304	V	EC8551	Communication Networks	C304.1 Identify the components required to build different types of networks
				C304.2 Discuss the required functionality at data link layer for an application
				C304.3 Analyze the routing path of network
				C304.4 Identify solution for functionality for transport layer protocol
				C304.5 Discuss the protocols in the application layer
C305	V	EC8562	Digital Signal Processing Laboratory	C305.1 Demonstrate the simulation of DSP systems.
				C305.2 Demonstrate the abilities of digital signal processor based DSP systems implementation.
				C305.3 Analyze the finite word length effect on DSP systems.
				C305.4 Demonstrate the applications of FFT to DSP systems.
				C305.5 Apply the adaptive filters for various applications of DSP systems.
C306	V	EC8561	Communication	C306.1 Design and verify the sampling and TDM circuits.

			Systems Laboratory	C306.2 Design and verify the AM, FM and its demodulation circuits.
				C306.3 Demonstrate the working of PCM, DM and demodulation circuits.
				C306.4 Demonstrate band pass digital signaling schemes through simulation of FSK, PSK, DPSK, QPSK and QAM techniques.
				C306.5 Compute the line coding and simulate channel coding schemes to improve the noise performance of communication systems..
C307	V	EC8563	Communication Networks Laboratory	C307.1 Demonstrate the communication between two desktop computers
				C307.2 Implement the different OSI layers protocols
				C307.3 Implement and compare the various routing algorithms
				C307.4 Implement the cryptographic techniques.
				C307.5 Implement both wired and wireless Networks
C3PE1	V	CS8392	Object Oriented Programming	C3PE1.1 Develop Java programs using OOP principles
				C3PE1.2 Develop Java programs with the concepts inheritance and interfaces
				C3PE1.3 Build Java applications using exceptions and I/O streams
				C3PE1.4 Develop Java applications with threads and generics classes
				C3PE1.5 Develop interactive Java programs using swings
C3PE2	V	EC8073	Medical Electronics	C3PE2.1 Discuss the terminologies of electro-physiological and recording of bio-potential
				C3PE2.2 Comprehend the measurement techniques of bio-chemical and non-electrical parameters.
				C3PE2.3 Interpret the various types of assist devices.

				C3PE2.4 Comprehend the various diathermy and bio-telemetry techniques.
				C3PE2.5 Outline current trends in medical instrumentation.
C3PE3	V	CS8493	Operating Systems	C3PE3.1 Analyze various scheduling algorithms
				C3PE3.2 Understand deadlock, prevention and avoidance algorithms
				C3PE3.3 Compare and contrast various memory management schemes. (
				C3PE3.4 Understand the functionality of file systems
				C3PE3.5Perform administrative tasks on Linux Servers and compare iOS and Android Operating Systems
C3PE4	V	EC8074	Robotics and Automation	C3PE4.1 Explain the concepts of industrial robots in terms of classification, specifications and coordinate systems, along with the need and application of robots & automation.
				C3PE4.2 Examine different sensors and actuators for applications like maze solving and self driving cars.
				C3PE4.3 Design a 2R robot & an end-effector and solve the kinematics and dynamics of motion for robots.
				C3PE4.4Explain navigation and path planning techniques along with the control architectures adopted for robot motion planning.
				C3PE4.5 Describe the impact and progress in AI and other research trends in the field of robotics.
C3PE5	V	EC8075	Nano Technology and Applications	C3PE5.1 Describe the basic science behind the properties of materials..
				C3PE5.2 Interpret the creation, characterization, and manipulation of nanoscale materials.
				C3PE5.3 Describe the Properties and measurement of nano materials.
				C3PE5.4 Discuss the exciting applications of nanotechnology at the leading edge of

				scientific research
				C3PE5.5 Apply their knowledge of nanotechnology to identify how they can be exploited for new applications
C3PE6	V	GE8074	Human Rights	C3PE6.1 Explain the meaning and Development of Human Rights.
				C3PE6.2 Evaluation of the concept of Human Rights and Universal Declaration of HR.
				C3PE6.3 Explain the theories of UN Laws and UN Agencies
				C3PE6.4 Describe the concept of Human Rights in India
				C3PE6.5 Describe the Human Disadvantaged People and Role of NGO's
C3PE7	V	GE8077	Total Quality Management	C3PE7.1 Explain the importance of quality and Deming's philosophy.
				C3PE7.2 Describe the process of continuous improvement.
				C3PE7.3 Apply traditional and quality management tools and techniques to manufacture and service process**.**
				C3PE7.4 Develop Java applications with threads and generics classes
				C3PE7.5 Access the implementation of ISO 9000/9001-2008 , 14000 for manufacturing and service sector**.**
C308	VI	EC8691	Microprocessors and Microcontrollers	C308.1 To understand the Architecture of 8086 microprocessor
				C308.2 To learn the design aspects of I/O and Memory Interfacing circuits
				C308.3 To interface microprocessors with supporting chips
				C308.4 To study the Architecture of 8051 microcontroller.
				C308.5 To design a microcontroller based system.
C309	VI	EC8095	VLSI Design	C309.1 Realize the concepts of digital building blocks using MOS transistor.
				C309.2 Design combinational MOS circuits and power strategies
				C309.3 Design and construct Sequential Circuits and Timing systems
				C309.4 Design arithmetic building blocks and memory subsystems.
				C309.5 Apply and implement FPGA design flow and testing.

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C310	VI	EC8652	Wireless Communication	C310.1 Discuss the characterization of a wireless channel and evolve the system design specifications.
				C310.2 Describe a cellular system based on resource availability and traffic demands.
				C310.3 Analyze the various signaling for the wireless channels and systems..
				C310.4 Compare multipath mitigation techniques for the wireless channel and system under consideration.
				C310.5 Analyze Multiuser Systems, CDMA, WCDMA network planning and OFDM Concepts
C311	VI	MG8591	Principles of Management	C311.1 Explain the purpose of management & managerial roles in local and global organization.
				C311.2 describe the purpose of planning, decision making and their processes
				C311.3 Demonstrate the various organizational structures and staff selection procedure.
				C311.4 Classify the motivational theories and communication process.
				C311.5 Describe the scope of control and role of computer, IT in management control.
C312	VI	EC8651	Transmission Lines and RF Systems	C312.1 Explain the characteristics of transmission lines and its losses.
				C312.2 Explain the measurements of power, impedance, VSWR and wavelength.
				C312.3 Analyze impedance matching by stubs using smith charts.
				C312.4 Analyze the characteristics of TE and TM waves.
				C312.5 Design a RF transceiver system for wireless communication.
C313	VI	EC8681	Microprocessors and Microcontrollers Laboratory	C313.1 Implement the ALP Programs for fixed point arithmetic circuits
				C313.2 Demonstrate the interfacing circuits for different I/Os.
				C313.3 Compile the ALP for generating waveforms such as square wave and triangular

				wave using microprocessors.
				C313.4 Implement the programs in 8051 microcontroller.
				C313.5 Analyze the performance in simulator and emulator
C314	VI	EC8661	VLSI Design Laboratory	C314.1 Write HDL code for basic as well as advanced digital integrated circuit.
				C314.2 Import the logic modules into FPGA Boards.
				C314.3 Synthesize Place and Route the digital IPs
				C314.4 Design, Simulate and Extract the layouts of Digital IC Blocks using EDA tools.
				C314.5 Design, Simulate and Extract the layouts of Analog IC Blocks using EDA tools
C316	VI	HS8581	Professional Communication	C316.1 Develop adequate Soft Skills required for the workplace
				C316.2 Make effective presentations
				C316.3 Participate confidently in Group Discussions.
				C316.4 Attend job interviews and be successful in them.
				C316.5 Understanding career management & work in a team and groups
C3PE8	VI	CS8792	Cryptography and Network Security	C3PE8.1 Understand the fundamentals of networks security, security architecture, threats and vulnerabilities.
				C3PE8.2 Apply the different cryptographic operations of symmetric cryptographic algorithms.
				C3PE8.3 Apply the different cryptographic operations of public key cryptography.
				C3PE8.4 Apply the various Authentication schemes to simulate different applications.
				C3PE8.5 Understand various Security practices and System security standards.
C3PE9	VI	EC8091	Advanced Digital Signal Processing	C3PE9.1.articulate and apply the concepts of special random process in pratical applications.

				C3PE9.2 chooses appropriate spectrum estimation techniques for a given random process.
				C3PE9.3 Apply optimum filters appropriately for a given communication system
				C3PE9.4 Apply appropriate adaptive algorithm for processing non-stationary signals.
				C3PE9.5 Apply and analyse wavelet transforms for signal and image processing based applications
C3PE10	VI	EC8001	MEMS and NEMS	C3PE10.1 Interpret the basics of micro/nano electromechanical systems including their applications and advantages
				C3PE10.2 Recognize the use of materials in micro fabrication and describe the fabrication processes including surface micromachining, bulk micromachining and LIGA.
				C3PE10.3 Analyze the key performance aspects of electromechanical devices using sensors.
				C3PE10.4 Analyze the key performance aspects of electromechanical devices using actuators
				C3PE10.5 Comprehend the theoretical foundations of quantum mechanics and Nano systems
C3PE11	VI	EC8002	Multimedia Compression and Communication	C3PE11.1 Design audio compression techniques.
				C3PE11.2 Configure image and video compression techniques.
				C3PE11.3 Configure Text compression techniques.
				C3PE11.4 Select suitable service model for specific application.
				C3PE11.5 Configure multimedia communication network .
C3PE12	VI	EC8003	CMOS Analog IC Design	C3PE12.1 Realize the concepts of Analog MOS devices and current mirror circuits.
				C3PE12.2 Design different configuration of Amplifiers and feedback circuits.
				C3PE12.3 Analyze the characteristics of frequency response of the amplifier and its noise
				C3PE12.4 Analyze the performance of the stability and frequency compensation techniques of Op Amp Circuits.
				C3PE12.5 Construct switched capacitor circuits and PLLs
C3PE13	VI	EC8004	Wireless Networks	C3PE13.1 Explain the various protocols and standards of wireless LAN.

				C3PE13.2 Describe the protocols for mobile network layer and routing in mobile ad-hoc network.
				C3PE13.3 Illustrate the 3G Overview.
				C3PE13.4 Discuss about the different wireless WAN architectures.
				C3PE13.5 Explain the 4G technologies and its applications.
C3PE14	VI	GE8075	Intellectual Property Rights	C3PE14.1 understand the knowledge of the basic principles and sources of international intellectual property and human right.
				C3PE14.2 analyze the interaction between national and international Registration, Patents and designs
				C3PE14.3 Understand the knowledge of copy right, trademarks, designs and information Technology Act.
				C3PE14.4 Analyses and evaluate complicated international legal issues of intellectual property issues from a human right perspective and Digital Innovations.
				C3PE14.5 Discuss in a qualified manner, of intellectual property issues from a human right perspective.
C401	VII	EC8701	Antennas and Microwave Engineering	C401.1 To enable the student to understand the basic principles in antenna and microwave system design.
				C401.2 To enhance the student knowledge in the area of various antennas.
				C401.3 To enhance the student knowledge in the area of antenna arrays
				C401.4 To enhance the student knowledge in the area of microwave passive and active components.
				C401.5 To design a microwave system for a given specifications and its application.
C402	VII	EC8751	Optical Communication	C402.1 Recognize basic elements in optical fibers, different modes and configurations
				C402.2 Analyze the transmission characteristics associated with dispersion and polarization techniques.
				C402.3 Explain various optical sources and detectors.
				C402.4 Produce fiber optic receiver systems, measurements and coupling techniques.

				C402.5 Design optical communication systems and its networks.
C403	VII	EC8791	Embedded and Real Time Systems	C403.1 Outline the concepts of embedded systems..
				C403.2 Describe the architecture and programming of ARM processor
				C403.3 Explain the basic concepts of embedded programming
				C403.4 Explain the basic concepts of real time operating system design.
				C403.5 Model real-time applications using embedded-system concepts.
C404	VII	EC8702	Ad hoc and Wireless Sensor Networks	C404.1 Explain the various protocols of adhoc networks
				C404.2 Describe the Architecture of sensor based adhoc network.
				C404.3 Describe the Wireless Sensor Network concepts and protocol.
				C404.4 Discuss about the Network Security in Sensor based network.
				C404.5 Discuss about the sensor network software tools.
C405	VII	EC8711	Embedded Laboratory	C405.1 Write programs in ARM for a specific application
				C405.2 Interface memory, A/D and D/A convertors with ARM system.
				C405.3 Analyze the performance of interrupt..
				C405.4 Write program for interfacing keyboard, display, motor and sensor
				C405.5 Formulate a mini project using embedded system.
C406	VII	EC8761	Advanced Communication Laboratory	C406.1 To analyze the performance of simple optical link by measurement of losses and analyzing the mode characteristics of fiber.
				C406.2 To analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER
				C406.3 To estimate the Wireless Channel Characteristics and Analyze the performance of Wireless Communication System.
				C406.4 To understand the characteristics of active and passive microwave devices.
				C406.5 To Understand the intricacies in Microwave System design
C4PE1	VII	EC8092	Advanced Wireless Communication	C4PE1.1 Apply the knowledge about the importance of improving the data rate of wireless channel using MIMO
				C4PE1.2 Discuss about characteristics of wireless fading channels.
				C4PE1.3 Discuss the significance of channel impairment mitigation using space-time block codes.

				C4PE1.4 Discuss channel impairment mitigation using Trellis codes
				C4PE1.5 Discuss the knowledge of advanced MIMO system like layered space time codes, MU-MIMO System and MIMO-OFDM systems.
C4PE2	VII	EC8071	Cognitive Radio	C4PE2.1 Discuss the evolving software defined radio and cognitive radio techniques and their essential functionalities
				C4PE2.2 Describe the basic architecture and standard for cognitive radio.
				C4PE2.3 Develop the ability to design and implement algorithms for cognitive radio spectrum sensing and dynamic spectrum access.
				C4PE2.4 Design a speech recognition system.
				C4PE2.5 Use different speech synthesis techniques.
C4PE3	VII	GE8072	Foundation Skills in Integrated Product Development	C4PE3.1 Define, formulate and analyze a problem.
				C4PE3.2 Solve specific problems independently or as part of a team
				C4PE3.3 Gain knowledge of the Innovation & Product Development process in the Business Context
				C4PE3.4 Work independently as well as in teams
				C4PE3.5 Manage a project from start to finish.
C4PE4	VII	CS8082	Machine Learning Techniques	C4PE4.1 Differentiate between supervised, unsupervised, semi-supervised machine learning approaches.
				C4PE4.2 Apply specific supervised or unsupervised machine learning algorithm for a particular problem.
				C4PE4.3 Analyse and suggest the appropriate machine learning approach for the various types of problem.
				C4PE4.4 Design and make modifications to existing machine learning algorithms to suit an individual application.
				C4PE4.5 Provide useful case studies on the advanced machine learning algorithms.
C4PE5	VII	EC8005	Electronics Packaging and Testing	C4PE5.1 Discuss the various types of IC packaging.
				C4PE5.2 Identify the electrical issues, digital and RF issues
				C4PE5.3 Explain various IC technologies and bonding.
				C4PE5.4 Describe PCB/CAD tools for design, fabrication of SMT
				C4PE5.5 Discuss the IC packaging concepts

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Course Outcomes (COs)

C4PE6	VII	EC8006	Mixed Signal IC Design	C4PE6.1 Apply the concepts for mixed signal MOS circuit.
				C4PE6.2 Analyze the characteristics of IC based CMOS filters
				C4PE6.3 Design of various data converter architecture circuits.
				C4PE6.4 Analyze the signal to noise ratio and modeling of mixed signals.
				C4PE6.5 Design of oscillators and phase lock loop circuit.
C4PE7	VII	GE8071	Disaster Management	C4PE7.1 Discuss about disasters, their significance and types
				C4PE7.2 Explain the relation between vulnerability, disaster, disaster prevention and risk reduction
				C4PE7.3 Identify approaches of Disaster Risk Reduction (DRR).
				C4PE7.4 Create awareness of institutional process in India.
				C4PE7.5 Develop rudimentary ability to respond their surrounding with potential disaster response in living area.
C4PE8	VIII	EC8072	Electro Magnetic Interference and Compatibility	C4PE8.1 Identify the various types of electromagnetic interference.
				C4PE8.2 Explain the various types of coupling mechanism.
				C4PE8.3 Discuss suitable EMI mitigation technique.
				C4PE8.4 Discuss EMI free PCB layout design.
				C4PE8.5 Describe the various EMC standards and various methods
C4PE9	VIII	EC8007	Low power SoC Design	C4PE9.1 Identify sources of power in an IC.
				C4PE9.2 Understand basic principle of System on Chip design..
				C4PE9.3 Learn optimization of power in combinational and sequential logic machines for SoC Design
				C4PE9.4 Identify suitable techniques to reduce the power dissipation and design circuits with low power dissipation.
				C4PE9.5 Understand the floor planning concepts and its various issues & challenges.
C4PE10	VIII	EC8008	Photonic Networks	C4PE10.1 Explain functions of various optical network components.
				C4PE10.2 Discuss the broadcast-and-select and wavelength routing networks
				C4PE10.3 Explain the different optical network architectures.
				C4PE10.4 Explain photonic packet switching concepts and access networks
				C4PE10.5 Discuss the different network management functions

Course Outcomes (COs)

C4PE11	VIII	EC8009	Compressive Sensing	C4PE11.1 Explain the necessity of compressive sensing technology
				C4PE11.2 Discuss the basic theory to reconstruct sparse or nearly sparse signals from under sampled data
				C4PE11.3 Use recent ideas in modern convex optimization allowing rapid signal recovery.
				C4PE11.4 Design a new algorithm or modify an existing algorithm for different application areas in wireless sensor network
				C4PE11.5 Apply compressive techniques in real world
C4PE12	VIII	EC8093	Digital Image Processing	C4PE12.1 Explain the fundamentals of digital image processing techniques
				C4PE12.2 Explain the various image enhancement techniques in spatial and frequency domain.
				C4PE12.3 Analyze the various filtering methods for image restoration.
				C4PE12.4 Learn the basics of segmentation, features extraction and different segmentation techniques.
				C4PE12.5 Use various coding techniques for image compression and image Recognition
C4PE13	VIII	GE8076	Professional Ethics in Engineering	C4PE13.1 Describe an awareness of human values to appreciate the rights of others and stress management.
				C4PE13.2 Illustrate the moral issues and models of professional roles.
				C4PE13.3 Discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.
				C4PE13.4 Describe the responsibilities, rights and assesses of the safety and risk.
				C4PE13.5 Apply the social responsibility on multinational corporations related to engineering.
C4PE14	VIII	EC8010	Video Analytics	C4PE14.1 Explain the need for video Analytics and video analytic components.
				C4PE14.2 Explain the various foreground extraction techniques OR Design custom made video analytics system for the given target application.
				C4PE14.3 Explain the different classifiers used for image classification applications.
				C4PE14.4 Design video analytic algorithms for security applications.
				C4PE14.5 Design video analytic algorithms for business intelligence and traffic monitoring and assistance.

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Course Outcomes (COs)

C4PE15	VIII	EC8011	DSP Architecture and Programming	C4PE15.1 Analyze the concepts of Digital Signal Processors
				C4PE15.2 Discuss the Programmable DSP‘s Architecture, On-chip Peripherals and Instruction set.
				C4PE15.3 Demonstrate their ability to program the DSP processor for signal processing applications
				C4PE15.4 Analyze the concepts of Advanced Programmable DSP Processors.
				C4PE15.5 Analyze various Advanced DSP Processors for real-time signal processing applications
C4PE16	VIII	EC8094	Satellite Communication	C4PE16.1 Describe about satellite orbits.
				C4PE16.2 Discuss the satellite segment and earth segment.
				C4PE16.3 Describes the concepts satellite access.
				C4PE16.4 Explains the applications of satellite.
				C4PE16.5 Apply the concept to satellite network
C4PE17	VIII	CS8086	Soft Computing	C4PE17.1 Apply various soft computing frame works.
				C4PE17.2 Distinguish various neural networks.
				C4PE17.3 Use fuzzy logic
				C4PE17.4 Apply genetic programming
				C4PE17.5 Discuss hybrid soft computing.
C4PE18	VIII	IT8006	Principles of Speech Processing	C4PE18.1 To analyze and to study the speech signal Characteristics.
				C4PE18.2 Design speech compression techniques.
				C4PE18.3 Configure speech recognition techniques.
				C4PE18.4 Design speaker recognition systems.
				C4PE18.5 Design text to speech synthesis systems
C4PE19	VIII	GE8073	Fundamentals of Nano Science	C4PE19.1 Discuss about the basics of nano material science with its classification.
				C4PE19.2 Demonstrate the preparation of nanomaterials.
				C4PE19.3 Develop knowledge in characteristic nanomaterials.
				C4PE19.4 Explain about the various characterization technique.
				C4PE19.5 Discuss the exciting applications of nanotechnology at the leading edge of scientific research.

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Course Outcomes (COs)

C4P1	VIII	EC8811	Project Work	C4P1.1 Identify challenging practical problems, solutions to cope up with present scenario of Electronics and Communication Engineering field.
				C4P1.2 Analyze the various methodologies and technologies and discuss with team for solving the problem.
				C4P1.3 Apply technical knowledge and project management skills for solving the problem.
				C4P1.4 Design and develop hardware and/or software for their project specific problem.
				C4P1.5 Prepare the project reports and give proper explanation during the presentation and demonstration.