SREE NARAYANA GURU COLLEGE OF ENGINEERING AND TECHNOLOGY,PAYYANUR

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATION	SEMESTER	UNIVERSITY CODE	SUBJECT NAME	CO CODE	COURSE OUTCOME
	S2	EST130	BASIS OF ELECTRICAL AND ELECTRONICS ENGINEERING	CO1	Apply fundamental concepts and circuit laws to solve simple DC electric circuits
				CO2	Develop and solve models of magnetic circuits
				CO3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
				CO4	Outline the basic concepts and principles of semiconductor devices
				CO5	Outline the principle of an electronic instrumentation system
				CO6	Explain the principle of radio and cellular communication
		ESL130	ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP	CO4	The student will be able to identify and test various electronic components
				CO5	The student will be able to draw circuit schematics with EDA tools
				CO6	The student will be able to aassemble and test electronic circuits on boards
				CO7	The student will be able to work in a team with good interpersonal skills
	S3	ECT201	SOLID STATE DEVICES	CO1	Apply Fermi-Dirac Distribution function and Compute carrier concentration at equilibrium and the parameters associated with generation, recombination and transport mechanism
				CO2	Explain drift and diffusion currents in extrinsic semiconductors and Compute current density due to these effects
				CO3	Define the current components and derive the current equation in a pn junction diode and bipolar junction transistor
				CO4	Explain the basic MOS physics and derive the expressions for drain current in linear and saturation regions
				CO5	Discuss scaling of MOSFETs and short channel effects
		ECT203	LOGIC CIRCUIT DESIGN	CO1	Explain the elements of digital system abstractions such as digital representations of information, digital logic and Boolean algebra.
				CO2	Create an implementation of a combinational logic function described by a truth table using and/or/inv gates/ muxes.
				CO3	Compare different types of logic families with respect to performance and efficiency.
				CO4	Design a sequential logic circuit using the basic building blocks like flip-flops.
				CO5	Design and analyse combinational and sequential logic circuits through gate level Verilog models
		ECT205	NETWORK THEORY	CO1	Apply Mesh / Node analysis or Network Theorems to obtain steady state response of the linear time invariant networks
				CO2	Apply Laplace Transforms to determine the transient behaviour of RLC networks
				CO3	Apply Network functions and Network Parameters to analyse the single port and two port networks
		ECL201	SCIENTIFIC COMPUTING LAB	CO1	Describe the needs and requirements of scientific computing and to familiarize one programming language for scientific computing and data visualization.
				CO2	Approximate an array/matrix with matrix decomposition.
				CO3	Implement numerical integration and differentiation.
				CO4	CO 4- Solve ordinary differential equations for engineering applications

				CO5	Compute with exported data from instruments
				CO6	Realize how periodic functions are constituted by sinusoids
				CO7	Simulate random processes and understand their statistics
		ECL203	LOGIC DESIGN LAB	CO1	Design and demonstrate the functioning of various combinational and sequential circuits using ICs.
				CO2	Apply an industry compatible hardware description language to implement digital circuits.
				CO3	Implement digital circuits on FPGA boards and connect external hardware to the boards.
S4		ECT202	ANALOG CIRCUITS	CO1	Design analog signal processing circuits using diodes and first order RC circuit
				CO2	Analyse basic amplifiers using BJT
				CO3	Analyse basic amplifiers using MOSFET.
				CO4	Analyse basic amplifiers using BJT and MOSFET and apply the principle of oscillator
		ECT204	SIGNALS AND SYSTEMS	CO1	Apply properties of signals and systems to classify them
				CO2	Represent signals with the help of series and transforms
				CO3	Describe orthogonality of signals and convolution integral
				CO4	Apply transfer function to compute the LTI response to input signals
				CO5	Apply sampling theorem to discretize continuous time signals
		ECT206	COMPUTER ARCHITECTURE AND MICROCONTROLLERS	CO1	Explain the functional units, I/O and memory management w.r.t a typical computer architecture
				CO2	Distinguish between microprocessor and microcontroller
				CO3	Develop simple programs using assembly language programming.
				CO4	Interface 8051 microcontroller with peripheral devices using ALP/Embedded C
				CO5	Familiarize system software and Advanced RISC Machine Architecture
		ECL202	ANALOG CIRCUITS AND SIMULATION LAB	CO1	Design and demonstrate the functioning of basic analog circuits using discrete components.
				CO2	Design and simulate the functioning of basic analog circuits using simulation tools.
				CO3	Function effectively as an individual and in a team to accomplish the given task
		ECL204	MICROCONTROLLER LAB	CO1	Write an Assembly language program/Embedded C program for performing data manipulation.
				CO2	Develop ALP/Embedded C Programs to interface microcontroller with peripherals
				CO3	Perform programming/interfacing experiments with IDE for modern microcontrollers
		ECT301	LINEAR INTEGRATED CIRCUITS	CO1	The students will be able to understand Op Amp fundamentals and differential amplifier configurations
				CO2	The students will be able to design operational amplifier circuits for various applications.
				CO3	The students will be able design oscillators and active filters using op amps.
				CO4	The students will be able to explain the working and applications of timer, VCO and PLL ICs.
				CO5	The students will be able to outline the working of Voltage regulator IC's and Data converters
				CO1	State and prove the fundamental properties and relations relevant to DFT and solve basic problems involving DFT based filtering methods.

S5	ECT303	DIGITAL SIGNAL PROCESSING	CO2	Compute DFT and IDFT using DIT and DIF radix-2 FFT algorithms.
			CO3	Design linear phase FIR filters and IIR filters for a given specification & basic multi-rate DSP operations decimation and interpolation in both time and frequency domains using supported mathematical equations
			CO4	Illustrate the various FIR and IIR filter structures for the realization of the given system function.
			CO5	Explain the architecture of DSP processor (TMS320C67xx) and the finite word length effects
	ECT305	ANALOG AND DIGITAL COMMUNICATION	CO1	Explain the existent analog communication systems.
			CO2	Apply the concepts of random processes to LTI systems.
			CO3	Apply waveform coding techniques in digital transmission..
			CO4	Apply GS procedure to develop digital receivers and Apply equalizer design to counteract ISI.
			CO5	Apply digital modulation techniques in signal transmission
	ECT307	CONTROL SYSTEMS	CO1	Analyse electromechanical systems by mathematical modelling and derive their transfer functions
			CO2	Determine Transient and Steady State behaviour of systems using standard test signals
			CO3	Determine absolute stability and relative stability of a system
			CO4	Apply frequency domain techniques to assess the system performance and to design a control system with suitable compensation techniques
			CO5	Analyse system Controllability and Observability using state space representation
	ECL331	ANALOG INTEGRATED CIRCUITS AND SIMULATION LAB	CO1	Use data sheets of basic Analog Integrated Circuits and design and implement application circuits using Analog ICs.
			CO2	Design and simulate the application circuits with Analog Integrated Circuits using simulation tools
			CO3	Function effectively as an individual and in a team to accomplish the given task
	ECL333	DIGITAL SIGNAL PROCESSING LAB	CO1	Simulate digital signals.
			CO2	Verify the properties of DFT computationally
			CO3	Familiarize the DSP hardware and interface with computer
			CO4	Implement LTI systems with linear convolution.
			CO5	Implement FFT and IFFT and use it on real time signals.
			CO6	Implement FIR low pass filter.
			CO7	Implement real time LTI systems with block convolution and FFT
	ECT302	ELECTROMAGNETICS	CO1	To summarize the basic mathematical concepts related to electromagnetic vector fields.
			CO2	Analyse Maxwell's equation in different forms and apply them to diverse engineering problems.
			CO3	To analyse electromagnetic wave propagation and wave polarization
			CO4	To analyse the characteristics of transmission lines and solve the transmission line
			CO5	To analyse and evaluate the propagation of EM waves in Wave guides
	ECT304	VLSI CIRCUIT DESIGN	CO1	Students will be able to explain the various methodologies in ASIC and FPGA design.
			CO2	Students will be able to design VLSI Logic circuits with various MOSFET logic families.
			CO3	Students can compare different types of memory elements.

			CO4	Data path elements such as Adders and multipliers can be designed and analysed.
			CO5	Students will be able to explain MOSFET fabrication techniques and layout design rules.
S6	ECT306	INFORMATION THEORY AND CODING	CO1	Explain measures of information – entropy, conditional entropy, mutual information
			CO2	Apply Shannon's source coding theorem for data compression.
			CO3	Apply the concept of channel capacity for characterize limits of error-free transmission.
			CO4	Apply linear block codes for error detection and correction
			CO5	Apply algebraic codes with reduced structural complexity for error correction
			CO6	Understand encoding and decoding of convolution and LDPC codes
	ECT352	DIGITAL IMAGE PROCESSING	CO1	The students will be able to distinguish / analyse the various concepts and mathematical transforms necessary for image processing
			CO2	The students will be able to understand transforms & compression techniques.
			CO3	The students will be able to differentiate and interpret the various image enhancement techniques.
			CO4	The students will be able to illustrate image restoration.
			CO5	The students will be able to illustrate image segmentation algorithm
	ECT308	COMPREHENSIVE COURSE WORK	CO1	Apply the knowledge of circuit theorems and solid state physics to solve the problems in electronic Circuits
			CO2	Design a logic circuit for a specific application
			CO3	Design linear IC circuits for linear and non-linear circuit applications.
			CO4	Explain basic signal processing operations and Filter designs
			CO5	Explain existent analog and digital communication systems
	ECL332	COMMUNICATION LAB	CO1	Setup simple prototype circuits for waveform coding and digial modulation techniques working in a team.
			CO2	Simulate the error performance of a digital communication system using standard binary and M -ary modulation schemes.
			CO3	Develop hands-on skills to emulate a communication system with software-designed-radio working in a team
	ECD334	MINIRPOJECT	CO1	The students will be able to Be able to practice acquired knowledge within the selected area of technology for project development.
			CO2	The students will be able to identify, discuss and justify the technical aspects and design aspects of the project with a systematic approach.
			CO3	The students will be able to Reproduce, improve and refine technical aspects for engineering projects
			CO4	The students will be able to work as a team in development of technical projects
			CO5	The students will be able to communicate and report effectively project related activities and findings
	ECT401	MICROWAVES AND ANTENNAS	CO1	Understand the basic concept of antennas and its parameters.
			CO2	Analyze the far filed pattern of Short dipole and Half wave dipole antenna.
			CO3	Design of various broad band antennas, arrays and its radiation patterns.
			CO4	Illustrate the principle of operation of cavity resonators and various microwave sources.
			CO5	Explain various microwave hybrid circuits and microwave semiconductor devices
			CO1	Understand the working and classification of optical fibers in terms of propagation modes

S7	ECT413	OPTICAL FIBRE COMUNICATION	CO2	Solve problems of transmission characteristics and losses in optical fiber
			CO3	Explain the constructional features and the characteristics of optical sources and detectors
			CO4	Describe the operations of optical amplifiers
			CO5	Understand the concept of WDM, FSO and LiFi
	ECL411	ELECTROMAGNETICS LAB	CO1	Familiarize the basic Microwave components and to analyse few microwave measurements and its parameters.
			CO2	Understand the principles of fiber-optic communications and the different kind of losses, signal distortion and other signal degradation factors.
			CO3	Design and simulate basic antenna experiments with simulation tools
	ECD415	PROJECT PHASE I	CO1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze)
			CO2	Prepare a presentation about an academic document (Cognitive knowledge level: Create). Give a presentation about an academic document (Cognitive knowledge level: Apply)
			CO3	Prepare a technical report (Cognitive knowledge level: Create
			CO1	Model and solve real world problems by applying knowledge across domains
			CO2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
			CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
			CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
			CO5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
			CO6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply)
S8	ECT402	WIRELESS COMMUNICATION	CO1	Summarize the basics of cellular system and cellular design fundamentals.
			CO2	Describe the wireless channel models and discuss capacity of wireless channels.
			CO3	Analyze the performance of the modulation techniques for flat-fading channels and multicarrier modulation and Illustrate how receiver performance can be enhanced by various diversity techniques
			CO4	Identify advantages of various equalization techniques and multiple-access techniques in wireless communication.
			CO5	Calculate system parameters such antenna height, range, maximum usable frequency in different modes of radio wave propagation
	ECT424	SATELLITE COMMUNICATION	CO1	Define satellite communications& possible satellite orbits.
			CO2	Describe satellite communication subsystems& launching mechanisms of satellites.
			CO3	Calculate link budgets. Provide an in-depth treatment of satellite communication systems operation and planning
			CO4	Analyze the various methods of satellite access.
			CO5	Discuss various applications of satellite communications
	ECT446	MICROWAVE DEVICES AND CIRCUITS	CO1	CO1: Understand the limitation of conventional solid state devices at Microwave, Gunn–effect diodes, Microwave generation and amplification, IMPATT and TRAPATT diodes
			CO2	CO2: Design of Bipolar transistors, MESFET, Microwave amplifiers and oscillators
			CO3	CO3: Analysis of Microwave Network Analysis and the corresponding signal flow graphs
			CO4	CO4: Design of Microwave filters, Filter design by image parameter method, Filter transformation and implementation
			CO5	CO5: Understand different MICs, Distributed and lumped elements of integrated circuits, Diode control devices.
			CO1	Understand the IoT fundamentals and architecture modelling (K1)

		ECT458	INTERNET OF THINGS	CO2	Understand the smart things in IoT and functional blocks (K2)
				CO3	To understand the communication networks and protocols used in IoT. (K2)
				CO4	To understand the cloud resources, data analysis and applications. (K3)
				CO5	To apply the IoT processes in embedded applications. (K3)
		ECD416	PROJECT PHASE II	CO1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
				CO2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
				CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
				CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
				CO5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
				CO6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).