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## TERNA ENGINEERING COLLEGE ELECTRONICS & TELECOMMUNICATION ENGINEERING

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	SUBJECT	Subject	_	
Sr. No.	CODE	Gubjeet	CONO	CO Statements
				SEMESTER III
1	ECC301	Engineering	CO1	Understand the concept of Laplace transform and its application to solve the real integrals in engineering problems
		Mathematics-	CO2	Understand the concept of inverse Laplace transform of various functions and its applications in engineering problems
		III	CO3	Expand the periodic function by using Fourier series for real life problems and complex engineering problems.
			CO4	Understand complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic function
			CO5	Use matrix algebra to solve the engineering problems
			CO6	Apply the concepts of vector calculus in real life problems.
2	ECC302	Electronic	CO1	Know functionality and applications of various electronic devices.
		Devices &	CO2	Explain working of various electronics devices with the help of V-I characteristics.
		Circuits	CO3	Derive expressions for performance parameters of BJT and MOSFET circuits.
			CO4	Evaluate performance of Electronic circuits (BJT and MOSFET based).
			CO5	
			CO6	Design electronic circuit (BJT, MOSFET based) circuits for given specifications.
3	ECC303	Digital System	CO1	Understand types of digital logic, digital circuits and logic families.
		Design	CO2	Analyze, design and implement combinational logic circuits
			CO3	Analyze, design and implement sequential logic circuits.
			CO4	Develop a digital logic and apply it to solve real life problems
			CO5	Classify different types of memories and PLDs.
			CO6	Simulate and implement basic combinational and sequential circuits using VHDL/Verilog.
4	ECC304	Network	CO1	Apply their knowledge in analyzing Circuits by using network theorems.
		Theory	CO2	Apply the time and frequency method of analysis.
			CO3	Evaluate circuit using graph theory
			CO4	Find the various parameters of two port network.
			CO5	Apply network topology for analyzing the circuit
			CO6	Synthesize the network using passive elements
			CO1	Identify various sensors, transducers and their brief performance specification.
		Electronic	C02	Understand the principle of working of various transducer used to measure temperature, displacement, level, pressure and
_		Instrumenta		their application in industry
5	ECC305	tion &	CO3	Determine the models of physical systems in forms suitable for use in the analysis and design of control systems.
		Control	CO4	Obtain the transfer functions for a given Control system
		Systems	CO5	Understand the analysis of systems in time domain and frequency domain
			CO6	Predict stability of given system using appropriate criteria.
6	ECL301	Electronic	CO1	Know various equipments, electronics devices and components, and measuring instruments used to perform laboratory work
		Devices &		Students will be able to explain functionality of various equipment's, electronics devices and components and neasu6 instruments used to
		Circuits Lab	CO2	perform laboratory work.
				Students will be able connect various equipments, devices, components and measuring devices using bread board as per the circuit diagram for
			<u>CO3</u>	experiment to be performed.
			CO4	Students will able to perform experiment to gather appropriate data.
			CO5	Students will able to analyze data obtained from experiment to relate theory with experiment results
7	ECI 202	Disital Custom	006	Students will able to prepare laboratory report (Journal) to summarise the outcome each experiment.
,		Digital System	001	Identity various objections and basic bolicities of digital system design
		Design Lab	CO3	Design and implement combination of various types of film flores and their inter conversions
			CO4	Design and implement basic sequential circuits such as counters, registers etc
			CO5	Acquire basic knowledge of VHDL/Verilog basic programming.
8	ECL303	Electronic	CO1	Plot and validate the performance characteristics of transducers.
		Instrumentati	CO2	Validate the characteristics of various temperature, pressure and level transducers.
		on & Control	CO3	Plot frequency response of first-order electrical system
		Systems Lab.	CO4	Plot time response of second-order electrical system and calculate the steady-state error.
			CO5	Validate the effect of damping factor on the response of second order system.
				Inspect the frequency response specifications of systems by using bode-plot, Polar plot, Nyquist-plot techniques, and comment on the stability of
	501.004		CO6	system
9	ECL304	SKIII Lab: C++	001	To use and implement fundamental concepts or object oriented programming
		and Java	002	To instruct the concept of control structure in object oriented languages
		Programming	000	no implement die concepts of metrico, constructors, DestructorsmArrays, inneritance top
			CO3	understand randamental reduites of all object of refined (angladage.
			C05	To study and implement inheritance and polymorphism
			CO6	To develop Applet for any user friendly social legal ethical applications
10	ECM301	Mini Proiect	CO1	Create the electronics circuit for particular application/experiment.
	2011001	1A	CO2	Design and simulate the circuits by putting together the analog and digital components
			CO3	Learn the technique of soldering and circuit implementation on general purpose printed circuit board (GPP).
			CO4	Realize the PCB design process and gain up-to-date knowledge of PCB design software.
			CO5	Unize the basic electronic tools and equipments (line Drivin, CRO, DSO etc. Analysis of hardware fault (Fault detection and correction)
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Sr No		Subject	ubject Co	CO Statemente
51. NO.		Subject		SEMESTER IV
1	ECC401	Engineering	CO1	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
		Mathematics-	CO2	Apply the concept of Correlation and Regression to the engineering problems in data science, machine learning and Al.
		IV	CO3	Apply the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
			CO4	Apply the concept of vector spaces and orthogonalization process in Engineering Problems.
			CO5	. Use the concept of Quadratic forms and Singular value decomposition which are very useful tools in various Engineering applications.
		ļ	CO6	Find the extremals of the functional using the concept of Calculus of variation.
2	ECC402	Microcontroll	CO1	Understand Computer and its memory System
		ers	CO2	Understand the detailed architecture of 8051 and ARM7 Core.
1	1	1	1003	Write programs for 8051 microcontrollers

	1	1	CO4	Design an applications using microcontroller
3	ECC403	Lincor	CO1	Outline and classifical tange intercontroller
	200400	Lined	001	Understand the fundamentation and ensure of enablications for the integrated signific
		Integrated		Understand the fundamentals and areas of applications for the integrated circuits
		Circuits	CO3	Develop the ability to design practical circuits that perform the desired operations
			CO4	Understand the differences between theoretical & practical results in integrated circuits.
			CO5	Identify the appropriate integrated circuit modules for designing engineering application
4	ECC404	Signals and	CO1	Classify and Analyze different types of signals and systems
		Systems	CO2	Analyze continuous time LTI signals and systems in transform domain
		,	CO3	Analyze and realize discrete time LTI signals and systems in transform domain
			C:04	Represent signals using Fourier Series and Analyze the systems using the Fourier Transform
			CO5	Demonstrate the concentre learning in the state of concentration will be a state of the state of
F	FCC405	During studies of		Demonstrate the concepts learnt in signals and systems course using the modern engineering cools.
5	ECC405	Principles of		Understand the basic components and types of noises in communication system
		Communicati	CO2	Analyze the concepts of amplitude modulation and demodulation.
		on	CO3	Analyze the concepts of angle modulation and demodulation.
		Engineering	CO4	Compare the performance of AM and FM receivers
			CO5	Describe analog and digital pulse modulation techniques
			CO6	Illustrate the principles of multiplexing and demultiplexing techniques.
6	ECL401	Microcontroll	CO1	Understand different development tools required to develop microcontroller based systems
		ers Lab	CO2	Write assembly language programs for arithmetic and logical operations, code conversion & data transfer operations
			CO3	Write assembly language programs for general nurnose I/O Timers & Interrupts
			CO4	Interface Survice programs for penetral purpose (10, miles & interface
			004	Interface & write programs for high and output devices
	501.400		005	Develop microcontroller based Applications
	ECL402	Linear	CO1	Understand the differences between theoretical, practical and simulated results in integrated circuits.
		Integrated	CO2	Apply the knowledge to do simple mathematical operations
		Circuits Lab	CO3	Apply knowledge of op-amp, timer and voltage regulator ICs to design simple applications
8	ECL403	Principles of	CO1	Analyze analog modulation techniques
		Communicati	CO2	Analyze the waveforms of Radio receivers
		on	CO3	Implement analog oulse modulation and demodulation circuits
		Engineering	CO4	Demonstrate digital pulse modulation and demodulation techniques
		Lish	COF	Varifie the operate of TDM and EDM
	501 404	LaD	005	
9	ECL404	Skill Lab:	C01	Describe syntax and semantics in Python
		Python	CO2	Illustrate different file handling operations
		Programming	CO3	Interpret object oriented programming in Python
			CO4	Design GUI Applications in Python
			CO5	Express proficiency in the handling Python libraries for data science
			CO6	Develop machine learning applications using Python
10	ECM401	1 Mini-Project	CO1	Write basic codes for the Arduino board using the IDE for utilizing the onboard resources
		1B: Arduino &	CO2	Apply the knowledge of interfacing different devices to the Arduino board to accomplish a given task
		Raspberry Pi	CO3	Design Arduino based projects for a given problem
		based	CO4	Write code using python language using IDE for utilizing the onboard resources.
		Projects	CO5	Apply the knowledge of interfacing different devices to raspberry Pi board to accomplish a given task
			10.06	Design Pashberry Di based projects for a given problem
			1000	Design Raspuerty Fribased projects for a given problem.
Sr No		Subject	ubject Co	
Sr. No.		Subject	ubject Co	CO Statements SEMESTER V
Sr. No.	ECC501	Subject	ubject Co	CO Statements  CO Statements  SEMESTER V  Apply the concepts of information theory in source coding.
<b>Sr. No.</b>	ECC501	Subject Digital communicatio	ubject Co	CO Statements  CO Statements  SEMESTER V  Apply the concepts of information theory in source coding.  Compare different error control systems and apply various error detection codes.
<b>Sr. No.</b>	ECC501	Subject Digital communicatio n	<b>bject Co</b> CO1 CO2 CO3	CO Statements CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error correction codes.
Sr. No.	ECC501	Subject Digital communicatio n	<b>ubject Co</b> CO1 CO2 CO3 CO4	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error correction codes. Compare various baseband transmission methods for digital signals.
Sr. No.	ECC501	Subject Digital communicatio n	Los Lbject Co CO1 CO2 CO3 CO4 CO5	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error correction codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise.
Sr. No. 1	ECC501	Subject Digital communicatio n	Los Los Los CO1 CO2 CO3 CO4 CO5 CO6	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error correction codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare the performances of different digital modulation techniques
Sr. No.	ECC501 ECC502	Subject Digital communicatio n Discrete-Time	Libject Co CO1 CO2 CO3 CO4 CO5 CO6 CO1	CO Statements  CO Statements  SEMESTER V  Apply the concepts of information theory in source coding.  Compare different error control systems and apply various error detection codes.  Analyze different error correction codes.  Compare various baseband transmission methods for digital signals.  Evaluate the performance of optimum baseband detection in the presence of white noise.  Compare the performances of different digital modulation techniques  Recall the system representations and understand the relation between different transforms
5r. No. 1	ECC501 ECC502	Subject Digital communicatio n Discrete-Time Signal	Log Lbject Co CO1 CO2 CO3 CO4 CO5 CO6 CO1 CO2	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error correction codes. Compare various baseband transmission methods for digital signals. Evaluate the performances of optimum baseband detection in the presence of white noise. Compare the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.
<b>Sr. No.</b> 1 2	ECC501 ECC502	Subject Digital communicatio n Discrete-Time Signal Processing	<b>Jbject Co</b> CO1 CO2 CO3 CO4 CO5 CO6 CO1 CO2 CO2	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error control systems and apply various error detection codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare the performances of different endigital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis. Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a continuer filter for the owner applications.
<b>Sr. No.</b> 1	ECC501 ECC502	Subject Digital communicatio n Discrete-Time Signal Processing	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error correction codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis. Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application. Intermet the different trealization structures of Dinital IIR and FIR filters
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5r. No. 1 2	ECC501 ECC502	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI	Ibject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO4           CO5           CO6	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error correction codes. Compare various baseband transmission methods for digital signals. Evaluate the performances of otifmum baseband detection in the presence of white noise. Compare the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis. Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application. Interpret the different realization structures of Digital IIR and FIR filters. Analyze the impact of hardware limitations on the performance of digital filters. Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing. Know various tools and processes used in VLSI Design.
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Sr. No. 1 2 3	ECC501 ECC502 ECC503	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO5           CO6           CO1           CO2           CO3	CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performance of optimum baseband detection in the presence of white noise.           Compare the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various colos and processes used in VLSI Design.           Explain working of various CMOS combinational and sequential circuits used in VLSI Design.           Explain working of various CMOS combinational and sequential circuits used in VLSI Design.
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Sr. No.           1           2           3	ECC501 ECC502 ECC503	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI	Ibject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4           CO5	CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performance of optimum baseband detection in the presence of white noise.           Compare the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Explain working of various CMOS combinational and sequential circuits used in VLSI Design.           Derive expressions for performance parameters of VLSI circuits.           Select suitable circuit and design style for given application.
Sr. No.	ECC501 ECC502 ECC503	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI	Ibject Co           Lbject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO4           CO5           CO4           CO5           CO6	CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performance of optimum baseband detection in the presence of white noise.           Compare the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Explain working of various CMOS combinational and sequential circuits used in VLSI Design           Derive expressions for performance parameters of VLSI circuits.           Select suitable circuit and design parameters of VLSI circuits.           Select suitable circuit and design parameters of VLSI circuits.           Selet sui
Sr. No. 1 2 3	ECC501 ECC502 ECC503 ECC504	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO4           CO5           CO6           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO5           CO6           CO1           CO5           CO6           CO1	CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performance of optimum baseband detection in the presence of white noise.           Compare the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various Colos combinational and sequential circuits used in VLSI Design           Explain working of various CMOS combinational and sequential circuits for given specifications.           Select suitable circuit and design staremeters of VLSI circuits.           Select suitable circuit and design staremeters of VLSI circuits.           Select suitable circuit and design staremeters of VLSI circuits.
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Sr. No.	ECC501 ECC502 ECC503 ECC504	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Digital VLSI Random Signal Analysis	Libect Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO2           CO3           CO4	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error control systems and apply various error detection codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis. Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application. Interpret the different realization structures of Digital IIR and FIR filters. Analyze the impact of hardware limitations on the performance of digital filters. Analyze the impact of various CMOS combinational and sequential circuits used in VLSI Design Derive expressions for performance parameters of VLSI circuits. Select suitable circuit and design style for given application Design and realize various combinational and sequential circuits for given specifications. Apply theory of probability in identifying and solving relevant problems. Differentiate continuous and discrete random variables and functions of random variables Analyze the continuous and distribution function of random variables and functions of random variables
Sr. No.	ECC501 ECC502 ECC503 ECC504	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis	Ibject Co           Lbject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO3           CO4           CO5	Co Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Explain working of various combinational and sequential circuits used in VLSI Design           Derive expressions for performance parameters of basic building blocks like CMOS inverter.           Relate performance parameters with design parameters of VLSI circuits.           Select suitable cincuit and designest by englication.
Sr. No.	ECC501 ECC502 ECC503 ECC504	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO4	CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error control systems and apply various error detection codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performance of optimum baseband detection in the presence of white noise.           Compare the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Explain working of various CMOS combinational and sequential circuits used in VLSI Design           Derive expressions for performance parameters of VLSI circuits.           Select suitable circuit and design style for given application.           Design and realize various combinational and sequential circuits for g
Sr. No. 1 2 3 4 8	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Aleorithm	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO4           CO5           CO1           CO2           CO3           CO4           CO5           CO1           CO2	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error correction codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis. Design digital IR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application. Interpret the different realization structures of Digital IIR and FIR filters. Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing. Know various tools and processes used in VLSI Design. Explain working of various CMOS combinational and sequential circuits used in VLSI Design Derive expressions for performance parameters of basic building blocks like CMOS inverter. Relate performance parameters with design parameters of VLSI circuits. Select suitable circuit and design style for given application Design and realize various combinational and sequential circuits or given specifications. Apply theory of probability in identifying and solving relevant problems. Differentiate continuous and discrete random variables and their distributions. Analyze theory of process determine the type of the process and find the response of LTI system for WSS process Explain linear regression algorithms and apply for predictive applications. Compare functions using asymptotic analysis and describe the relative merits of worst, average-, and best-case analysis Abely reaving on spatic analysis and describe the relative merits of worst, average-, and be
Sr. No.	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO1           CO2           CO3           CO4           CO5           CO1           CO2           CO3	CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error control systems and apply various error detection codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performance of optimum baseband detection in the presence of white noise.           Compare the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transform and apply in system analysis.           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in application structures of VLSI circuits.           Select suitable circuit and design parameters of VLSI circuits.           Select suitable circuit and design parameters of VLSI circuits.           Select suitable circuit and design style for given application.           Design and realize varional and sequential circuits prosense diffactent.
Sr. No.	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm	Ibject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO1           CO2           CO3           CO4           CO2           CO3           CO4	CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error control systems and apply various error detection codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performance of optimum baseband detection in the presence of white noise.           Compare the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different relization structures of Digital IIR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Explain working of various CMOS combinational and sequential circuits used in VLSI Design.           Relate performance parameters of basic building blocks like CMOS inverter.           Relate performance parameters of VLSI cin
Sr. No.           1           2           3           4           8	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm	Ibject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO3           CO4           CO3           CO4           CO5           CO3           CO4           CO5           CO3           CO4	Design Responsible           CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-lime Fourier transform, fast Fourier transforms           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Explain working of various CMOS combinational and sequential circuits used in VLSI Design           Derive expressions for performance parameters of VLSI circuits.           Select suitable circuit and design style for given application.           . Design and realize various combinational and sequential circuits for given specificat
Sr. No. 1 2 3 4 8	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO3           CO4           CO5           CO6	Design Respective Processes           CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error correction codes.           Analyze different error correction codes.           Compare different error correction codes.           Compare the performances of optimum baseband detection in the presence of white noise.           Compare visus baseband transmission methods for digital signals.           Evaluate the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform fast Fourier transform and apply in system analysis.           Design digital IR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Apply tignal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Explain working of various CMOS combinational and sequential circuits used in VLSI Design.           Derive expressions for performance parameters of basic building blocks like CMOS inverter.           Relate performance parameters of basic building blocks like CMOS inverter.
Sr. No. 1 2 3 4 8 10	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014 ECCDLO 5014	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO4           CO5           CO4           CO5           CO4	Design Responsibility Products for a given problem.           CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error correction codes.           Analyze different error correction codes.           Compare the performances of optimum baseband detection in the presence of white noise.           Compare the performances of different digital modulation techniques           Recall the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IIR and FIR filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Derive expressions for performance or basic building blocks like CMOS inverter.           Relate performance parameters with design parameters of VLSI circuits.           Select suitable circuit and design style for given application.           . Design and realize various combinational and sequential circuits used in VLSI Design.           Differentiate continuous and discrete rand
Sr. No.           1           2           3           4           8           10	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu	Ibject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO6 <td>Design Responsible Process           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error correction codes.           Compare different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performances of optimum baseband detection in the presence of white noise.           Compare various baseband transmission methods for digital signals.           Evaluate the performances of different digital modulation techniques           Recail the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various codes and processes used in VLSI Design.           Explain working of various combinational and sequential circuits used in VLSI Design.           Explain intera, variance, and distribution funct</td>	Design Responsible Process           Apply the concepts of information theory in source coding.           Compare different error control systems and apply various error detection codes.           Analyze different error correction codes.           Compare different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performances of optimum baseband detection in the presence of white noise.           Compare various baseband transmission methods for digital signals.           Evaluate the performances of different digital modulation techniques           Recail the system representations and understand the relation between different transforms           Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis.           Design digital IR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realization structures of Digital IR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various codes and processes used in VLSI Design.           Explain working of various combinational and sequential circuits used in VLSI Design.           Explain intera, variance, and distribution funct
Sr. No.           1           2           3           4           8           10	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu	Ibject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO2           CO3           CO4           CO2 <td>CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error correction codes.           Compare different error correction codes.           Compare different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performance of optimum baseband detection in the presence of white noise.           Compare various baseband detection in the presence of white noise.           Compare various baseband detection in the presence of white noise.           Compare various baseband detection in the presence of white noise.           Compare various baseband detection in the presence of white noise.           Compare various baseband detection reasons and apply in system analysis.           Design digital ling and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realizion structures of Digital IIR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Explain working of various CMOS combinational and sequential cincuits used in VLSI Design</td>	CO Statements           SEMESTER V           Apply the concepts of information theory in source coding.           Compare different error correction codes.           Compare different error correction codes.           Compare different error correction codes.           Compare various baseband transmission methods for digital signals.           Evaluate the performance of optimum baseband detection in the presence of white noise.           Compare various baseband detection in the presence of white noise.           Compare various baseband detection in the presence of white noise.           Compare various baseband detection in the presence of white noise.           Compare various baseband detection in the presence of white noise.           Compare various baseband detection reasons and apply in system analysis.           Design digital ling and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application.           Interpret the different realizion structures of Digital IIR and FIR filters.           Analyze the impact of hardware limitations on the performance of digital filters.           Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing.           Know various tools and processes used in VLSI Design.           Explain working of various CMOS combinational and sequential cincuits used in VLSI Design
Sr. No. 1 2 3 4 8 10	ECC501 ECC502 ECC503 ECC504 ECC504 ECCDLO 5014 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO1           CO2           CO3           CO4           CO5           CO1           CO2           CO3           CO4           CO5           CO1           CO2           CO3           CO4           CO3	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error correction codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of while noise. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of while noise. Compare various baseband transmission methods for digital signals. Evaluate the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transforms and publy in system analysis. Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application. Interpret the different realization structures of Digital IIR and FIR filters. Analyze the impact of hardware limitations on the performance of digital filters. Analyze the impact of hardware limitations on the performance of digital filters. Analyze to KONS combinational and sequential circuits used in VLSI Design. Explain working of various CMOS combinational and sequential circuits used in VLSI Design. Derive expressions for performance parameters of VLSI circuits. Select suitable circuit and design style for given application Design and realize various combinational and sequential circuits or given specifications. Apply various op robability in identifying and solving relevant problems. Differentiate continuous and discrete random variables and fluct distributions. Analyze margerssion algoritims end applications. Compare various combinational and secure the relative merits of worst-, average-, and best-case analysis Define a random process, determine the type of the process and find the response of LTI system for WSS process Explain informations of anad
Sr. No. 1 2 3 4 8 10	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error correction codes. Analyze different error correction codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare various baseband different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of different digital signals. Design digital IIR and FIR filters to salisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application. Interpret the different relization structures of Digital IIR and FIR filters. Analyze the impact of hardware limitations on the performance of digital filters. Analyze the impact of hardware limitations on the performance of signal filters. Analyze the impact of hardware limitations on the performance of signal filters. Analyze the impact of various CMOS combinational and sequential circuits used in VLSI Design Explain working of various combinational and sequential circuits used in VLSI Design Derive expressions for performance parameters of Dusis building blocks like CMOS inverter. Relate performances and disting they or given application Design and realize various combinational and sequential circuits for given specifications. Analyze mean, variance, and distribution function of random variables and functions of random variables Define a random process, algorithms and apply for predictive applications. Analyze mean, variance, and distribution function of random variables and functions of random variables Define a random procession algorithms and apply for predictive applications. Apply various operations on Stack and Queue. Ability to dem
Sr. No. 1 2 3 4 8 10	ECC501 ECC502 ECC503 ECC504 ECCDLO 5014 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO4           CO5           CO6           CO4           CO5           CO6	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error control systems and apply various error detection codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare various baseband transmission methods for digital signals. Evaluate the performance of odifferent digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of different digital modulation transforms and popy in system analysis. Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application. Interpret the different realization structures of Digital IIR and FIR filters. Analyze the impact of hardware limitations on the performance of digital filters. Analyze the impact of Nardware limitations on the performance of digital filters. Explain working of various CMOS combinational and sequential circuits used in VLSI Design Derive expressions for performance parameters of VLSI circuits. Select suitable circuit and design style for given application. Design and realize various combinational and sequential circuits used in VLSI Design Derive approxes, determine the type of the process and find the response of LTI system for WSS process Explain working of avoitous CMOS combinational on describe the relative torics. Analyze the regression algorithms and apply for performance parameters of approxes. Compare functions using asymptotic analysis and describe the relative more so of random variables Define a random process, determine the type of the process and find the response of LTI system for WSS process Explain liner tergression algorithms and apply for perforitive applications. Compare functions using asympt
Sr. No.           1           2           3           4           8           10           11	ECC501 ECC502 ECC503 ECC504 ECC504 ECCDLO 5014 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu Discrete-Time	Image: constraint of the second sec	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error control systems and apply various error detection codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare the performance of optimum baseband detection in the presence of white noise. Compare the performance of optimum baseband detection in the presence of white noise. Compare the performance of optimum baseband detection in the presence of white noise. Compare the performance of discrete-time Fourier transform, fast Fourier transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transforms Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter the given application. Therpret the different realization structures of Digital IIR and FIR filters. Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing. Know various tools and processes used in VLSI Design. Explain working of various CMOS combinational and sequential circuits used in VLSI Design. Explain working of various CMOS combinational and sequential circuits used in VLSI Design. Derive expressions for performance parameters of basic building blocks like CMOS inverter. Relate performance parameters with design parameters of VLSI circuits. Select suitable circuit and design style or given applications. Apply theory of probability in identifying and solving relevant problems. Differentiate continuous and discrete random variables and functions of random variables Define a random process, determine the type of the process and find the response of LTI system for WSS process Explain
Sr. No.           1           2           3           4           8           10           11	ECC501 ECC502 ECC503 ECC504 ECC504 ECCDLO 5014 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu Discrete-Time Signal Processing	Ibject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO5 <td>CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error control systems and apply various error detection codes. Compare the performances of optimum baseband datection in the presence of while noise. Compare various baseband transmission methods for digital signals. Evaluate the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of different digital modulation techniques Recall the system representations and understand the relation between different transform and apply in system analysis. Design digital IR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter to the given application. Interpret the different realization structures of Digital IR and FIR filters. Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing. Know various lools and processes used in VLSI Design. Explain working of various CMOS combinational and sequential circuits used in VLSI Design Derive expressions for performance parameters of basic building blocks like CMOS Inverter. Relate performance parameters and sequential circuits for given specifications. Apply theory of probability in identifying and solving relevant problems. Differentiate continuous and discrete random variables and functions of random variables Define a random processe, determine the type of the process and functions of random variables Define a random process, determine the type of the process and functions of random variables Define a random process, determine the type of the process and functions of random variables Define a random process, determine the type of the process and functions of random variables Define a random process, determine the type of the pr</td>	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error control systems and apply various error detection codes. Compare the performances of optimum baseband datection in the presence of while noise. Compare various baseband transmission methods for digital signals. Evaluate the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of different digital modulation techniques Recall the system representations and understand the relation between different transform and apply in system analysis. Design digital IR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter to the given application. Interpret the different realization structures of Digital IR and FIR filters. Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing. Know various lools and processes used in VLSI Design. Explain working of various CMOS combinational and sequential circuits used in VLSI Design Derive expressions for performance parameters of basic building blocks like CMOS Inverter. Relate performance parameters and sequential circuits for given specifications. Apply theory of probability in identifying and solving relevant problems. Differentiate continuous and discrete random variables and functions of random variables Define a random processe, determine the type of the process and functions of random variables Define a random process, determine the type of the process and functions of random variables Define a random process, determine the type of the process and functions of random variables Define a random process, determine the type of the process and functions of random variables Define a random process, determine the type of the pr
Sr. No.           1           2           3           4           8           10           11	ECC501 ECC502 ECC503 ECC504 ECC504 ECC504 ECL501	Subject Digital communicatio n Discrete-Time Signal Analysis Data Structure & Algorithm Digital Commu Discrete-Time Signal Analysis	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3	Co Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error control codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of polymum baseband detection in the presence of white noise. Compare the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms and apply in system analysis. Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application. Interpret the different realization structures of Digital IIR and FIR filters. Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing. Know various tools and processes used in VLSI Design. Explain working of various CMOS combinational and sequential circuits used in VLSI Design Derive expressions for performance parameters of bkls building blocks like CMOS inverter. Relate performance parameters with design parameters of VLSI circuits. Select suitable circuit and design style for given application. Design and realize various combinational and sequential circuits for given specifications. Apply theory of probability in identifying and solving relevant problems. Differentiat continuous and discrete random variables and functions of random variables Define a random process, determine the type of the process and find the response of LTI system for WSS process Explain linear regression algorithms and apply for predictive applications. Apply theory of probability in identifying and solving relevant problems. Differentiat continuous and discrete random variables and functions of random variables Define a random process, determine the type of the process and find the response of LTI system for WSS process Explain linear regr
Sr. No.           1           2           3           4           8           10           11	ECC501 ECC502 ECC503 ECC504 ECC504 ECC504 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu Discrete-Time Signal Processing Laboratory	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO5           CO6	Conserved and the server of t
Sr. No.           1           2           3           4           8           10           11           12	ECC501 ECC502 ECC503 ECC504 ECC504 ECC504 ECL501 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu Discrete-Time Signal Processing Laboratory Digital VI SI Le	bject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO2           CO3           CO4           CO2	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error correction codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis. Design digital IR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given application. Interpret the different realization structures of Digital IIR and FIR filters. Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing. Know various tools and processes used in VLSI Design Derive expressions for performance parameters of basic building blocks like CMOS inverter. Relate performance parameters with design parameters of VLSI circuits. Papian morking of various cMOS combinational and sequential circuits used in VLSI Design Derive expressions for performance parameters of basic building blocks like CMOS inverter. Relate performance parameters of basic building blocks like CMOS inverter. Relate performance, and distribution function of the process and functions of random variables Define a random variables and their distributions. Analyze mean, variance, and distribution and apply for predictive applications. Compare functions using asymptotic analysis and describe the relative merits of worst, average-, and best-case analysis Apply various operations on Stack and Queue. Ability to demonstrate the operation of Linke distributions. Compare various source coding Acteming they application. Design and implement different error
Sr. No.           1           2           3           4           8           10           11           12	ECC501 ECC502 ECC503 ECC504 ECC504 ECC504 ECL501 ECL501	Subject Digital communicatio n Discrete-Time Signal Processing Digital VLSI Random Signal Analysis Data Structure & Algorithm Digital Commu Discrete-Time Signal Processing Laboratory Digital VLSI La	Ibject Co           CO1           CO2           CO3           CO4           CO5           CO6           CO1           CO2           CO3           CO4           CO3           CO4           CO2      CO3	CO Statements SEMESTER V Apply the concepts of information theory in source coding. Compare different error control systems and apply various error detection codes. Analyze different error control oxystems and apply various error detection codes. Compare various baseband transmission methods for digital signals. Evaluate the performance of optimum baseband detection in the presence of white noise. Compare the performances of different digital modulation techniques Recall the system representations and understand the relation between different transforms Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis. Design digital IR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations to choose a particular filter for the given applications on the performance of digital filters. Analyze the impact of hardware limitations on the performance of digital filters. Apply signal processing concepts, algorithms in applications related to the field of biomedical and audio signal processing. Know various bools and processes used in VLSI Design. Explain working of various CMOS combinational and sequential circuits used in VLSI Design Derive expressions for performance parameters of basic building blocks like CMOS inverter. Relate performance parameters of basic building blocks like CMOS inverter. Relate performance parameters of basic building blocks like CMOS inverter. Relate performance parameters of basic building blocks like CMOS inverter. Relate performance parameters of basic building blocks like CMOS inverter. Relate performance parameters of basic building blocks like CMOS inverter. Relate performance parameters of basic building blocks like CMOS inverter. Relate performance parameters of basic building blocks like CMOS inverter. Relate performance parameters with design parameters of usic building blocks like CMOS inverter. Relate performance parameters with design parameters of basic building blocks

1	1		CO4	Draw layout of given CMOS circuit and also able extract various parasitic using open source layout tool like Magic
			CO5	Design, simulate, and verify CMOS circuit for given specifications.
13	ECL504	Professional	CO1	plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles
		Communicatio	CO2	strategize their personal and professional skills to build a professional image and meet the demands of the industry
		n & Ethics-II	CO3	emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
			C04 C05	Univer persuasive and professional presentations. develop creative thinking and interpersonal skills required for effective professional communication
			CO6	apply codes of ethical conduct, personal integrity and norms of organizational behaviour.
14	ECM501	Mini Project	CO1	Understand the embedded systems with design metrics.
		2A:	CO2	Understand microcontrollers and programming in Embedded C
		Embedded	CO3	Implementation of Embedded systems with different sensors and peripherals as IoT.
		System	CO4	Implementation of Embedded systems with different communication protocols as Io1.
		FIOJECI	CO6	Analyze concepts of Near anie operating systems. Design embedded system applications using sensors, peripherals and RTOS
				—
			1.1.1.0	
Sr. No.		Subject	ubject Co	
1	FCC601	Flectromagne	CO1	Students will be able to describe electromagnetics field including static and dynamic in terms of Maxwell's equations
	1	tics and		Students will be able to cample accellence in the solve various electromagnetic phenomenon such as electromagnetic wave propagation in
		Antenna	CO2	different medium nower in FM wave
	1			Students will derive the field equations for the basic radiating elements and describe basic antenna parameters like radiation pattern, directivity
			CO3	an etr
	1		CO4	Students will be able to implement different types of the antenna structures such as Antenna arrays, Microstrip antenna and reflector antenna etc.
2	ECC602	Computer	CO1	Analyze network topologies, hardware devices, addressing schemes and the protocol stacks
		Communicati	CO2	Compare various transmission media and broadband technologies
		on Networks	CO3	Analyze the flow control, error control and the medium access control techniques
			CO4	Judge network layer addressing and routing schemes
			CO5	Analyze connection oriented and connectionless services
			CO6	Apply the knowledge of application layer protocols
3	ECC603	Digital Image	CO1	Understand fundamentals of image processing and machine vision
		Processing	CO2	Enhance the quality of image using spatial and frequency domain techniques for image enhancement
		and Machine	CO3	Learn image morphology and restoration techniques
		Vision	CO4	Learn image segmentation techniques based on principle of discontinuity and similarity using various algorithms
			CO5	Represent boundaries and shapes using standard techniques.
			CO6	Classify the object using different classification methods
4	ECC604	Artificial	CO1	Comprehend the concepts of biological neurons and artificial neurons
		Neural	CO2	Analyze the feed-forward and feedback neural networks and their learning algorithms
		Networks and	CO3	Comprehend the neural network training and design concepts
		Fuzzy Logic	CO4	Build a simple CNN model and apply in image classification
			CO5	Analyze the application of neural networks and fuzzy logic to real world problems.
5	ECL601	Electromagne	CO1	Students will be able to describe electromagnetics field including static and dynamic in terms of Maxwell's equations.
		tics		Students will be able to apply Maxwell's equation to solve various electromagnetic phenomenon such as electromagnetic wave propagation in
		and Antenna	CO2	different medium, power in EM wave.
		Lab		Students will derive the field equations for the basic radiating elements and describe basic antenna parameters like radiation pattern, directivity,
			CO3	gan etc
			0.01	Students will be able to implement different types of the antenna structures such as Antenna arrays, Microstrip antenna and reflector antenna
6	FCI 602	Commutan	CO4	
		Computer	CO1	Design a small of medium sized computer network including media types, end devices, and interconnecting devices that meets a customer's coartific neards
		Communicati	CO2	Derform configurations on routers and Ethernet switches
		on	CO3	Terrorm comparations on rotaters and effect owneries.
		Network	CO4	Seminate computer programme for heaving compared by the simulation results.
		Laboratory	CO5	Troubleshoot connectivity problems in a host occurring at multiple layers of the OSI model
			CO6	Develop knowledge and skills necessary to gain employment as computer network engineer and network administrator
7	ECCDLO 6013	Digital	CO1	Study the various cybercrimes and its prevention methods.
		Forensic	CO2	Discuss the phases of Digital Forensics and methodology to handle the computer security incident.
			CO3	Understand the process of collection, analysis and recovery of the digital evidence.
			CO4	Explore various tools to perform the investigation of the crime scenario.
			CO5	Investigate the process of monitoring and analysis of computer network traffic for network investigation
			CO6	Discuss the legal issues associated with the cyber laws.
8	ECCDLO 6014	Database	CO1	Describe the fundamentals of database systems, different data models and design issues in database
		Management		
		System	CO2	Understand the basics model of relational Algebra, calculus, transaction management, concurrency control, database security and privacy
			CO3	Design ER diagram, relational schemas, apply concepts of normalization to relational database design.
			CO4	Implement views, triggers and querying the database using SQL.
9	ECL603	Image	CO1	perform enhancement of digital images in spatial and frequency domain
		Processing	CO2	perform edge detection and morphological operations on digital images
		and	CO3	classify patterns using standard Machine vision classification techniques like SVM
		Machine	CO4	apply theoretical knowledge in image processing and machine vision to practical case studies
10	ECL604	Skill	CO1	Install Linux using different platform and execute standard Linux commands
		Laboratory:	CO2	Describe the basic knowledge of Linux Operating System
		Linux &	003	Juepioy the system administrative functionality
		Networking &	004	Solve the problems using shell script programming
		Server	005	uevelop network based applications
11	ECM601	Configuration	006	Appry une unux commanus using programming skin to deploy amerent servers like rtp, teinet etc.
''			001	Understand various FPGA families and method of FPGA synchesis and implementation
		EDGA based	CO2	Learn the working of basic EDA tools like Allinx, hiddelism Cadence , etc
		Project	CO4	noise to program, simulate and synthesize circuits in vehillog HDL.
			0.05	Learn the reconciled of internet and seven segment with FPGA.
			C06	Learn are project opening the financing techniques Analysis of PPAG fault detection and verification principles
			- 550	
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Sr. No.		Subject	ubject Co	CO Statements
1	ECC701	Microwave	CO1	Describe the types of waveguides rectangular waveguides and field equations
	200701	Engineering	CO2	Inderstand the counting mechanisms in waveguides and analyze the waveguide multinort junctions
			CO3	Explore the microwave linear tubes and analyze with microwave cross field tubes
			CO4	Understand the microwave solid state devices and avalanche transit time devices
			CO5	Demonstrate the microwave bench set up and conducting measurements of different parameter
2	ECC702	Mobile	CO1	Explain the cellular fundamentals and estimate the coverage and capacity of cellular systems
		Communicatio	CO2	Classify different types of propagation models and analyse the link budget.
		n System	CO3	Compare and contrast GSM, GPRS, HSCSD, EDGE and IS-95 Technologies
			CO4	Apply the concepts of 3G technologies for UM Is and CDMA 2000.
			CO6	Discuss the emerginate technologies for upcoming mobile communication systems.
3	ECCDLO	Cloud	CO1	Explain the fundamentals of cloud computin
	7013	Computing	CO2	Interpret the significance of virtualization in the context of cloud computing
		and Security	CO3	Describe cloud computing services working on AWS, Azure and Google cloud platforms
			C04	Explain application design aspects or cloud compluing
			CO6	Explain advances in cloud computing in terms of multimedia cloud, fog, edge computing and real applications of cloud.
4	ECCDLO	Big Data	CO1	Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.
	7014	Analytics	CO2	Acquire fundamental enabling techniques and scalable algorithms like Hadoop, MapReduce and NoSQL in big data analytics.
			<u>CO3</u>	Interpret business models and scientific computing paradigms, and apply software tools for big data analytic
			C04	Achieve adequate perspectives or big data analytics in various applications like recommender systems, social media applications etc Davalon applications for Bin Data analysis, using Hadoon and NoSOL atc.
5	ECL701	Microwave	CO1	Develop applications of big Data analysis using nadoop and hooge cito.
		Engineering	CO2	Able to understand microwave measurements and test the characteristics of microwave components
		Laboratory	CO3	Able to understand Wave guide and transmission line measurements
			CO4	Demonstrate working of microwave semiconductor devices
			CO5	Demonstrate the microwave bench set up and conducting measurements of different parameters
			CO6	
6	ECL702	Mobile	CO1	Demonstrate the effect of cellular system design parameters on system capacity and quality of service
		Communicatio	CO2	Compare and contrast trunking radio systems
		n System	CO3	Examine the effect of small-scale fading parameters on the performance of radio channel characteristics
		Laboratory	C04	Analyze link budget for various propagation path-loss models Summarize the attributes of CEDM MIMO and Comitive radio.
			CO6	Summarize the earlormance of of Dive, while a cognitive radio
7	ECCDLO	Internet	CO1	Compare the protocols at each layer of TCP/IP protocol suite.
	7023	Communicatio	CO2	Explain the internet security aspects of protocols at various layers of TCP/IP protocol suite
		n	CO3	Apply the various compression algorithms for audio, image & video coding.
		Engineering	CO4	Categorize and design simple networked multimedia systems.
			CO6	Explain a software defined Network.
8	ILO 7013	Management	CO1	Explain how information systems Transform Business
		Information	CO2	Identify the impact information systems have on an organization
		System	CO3	Describe IT infrastructure and its components and its current trend
			CO4	Inderstand the principal tools and technologies for accessing information from databases to improve business performance and decision making
			CO5	Identify the two software water and the two software and the two softwar
9	ECP701	Major Project-1	CO1	Identifying Societal and Research oriented problems
			CO2	Researching Litrature connected to the identified problem
			CO3	Finding the latest and innovative solutions
			CO4	Identifying modern tools & techniques for the solution
			CO5	Creating Block Diagram and flow charts of the solution
Sr No		Subject	ubject Co	CO Statements
01.110.		Gubject		SEMESTER VIII
1	ECC801	Optical	CO1	Understand optical networks at large by identifying the types of fibers, cables and deployment.
		Communicatio	CO2	Design point to point optical fiber communication links using appropriate optical fibers, light sources, couplers, detectors, and multiplexers
		n and Naturatio	CO3	Uesign a short haul or long-haul optical network with repeater by incorporating suitable amplifiers
		ATTU INELWORKS	CO5	Explore opens, i of tark where the implementation is the implementation by the second se
			CO6	Apply the knowledge acquired to design the next generation fiber and FSO networks for indoor and outdoor applications
2	ECCDLO8012	Natural	CO1	Have a broad understanding of the field of natural language processing.
		Language	CO2	Understand the mathematical and linguistic preliminaries necessary for various processes in NLP
		Frocessing	CO4	De aue to besign, implement and test algorithms for NLP problems Perform Word-I evel S what - level and Semantic-I evel Analysis
			CO5	Develop basic understanding of Pragmatics in NLP
	L		CO6	Be able to apply NLP techniques to design real world NLP applications
3	ECCDLOC801	Wireless	CO1	Explain fundamental architecture, design issues and standards of wireless networks
		Networks	CO2	Compare different types of Personal Area Network (PAN) technologies such as ZigBee, Bluetooth, UWB, NFC and 6LoWPAN.
			CO3	Analyze dimerent LAN topologiles and technologies and ac noc networks Compare various types of network protocols, ad hoc vehicle networks and Wireless MANs
			CO5	Evaluate the planning and design of performance of GSM and CDMA system in Wireless WANs.
	L		CO6	Understand the basic network architecture of Wireless sensor networks concepts to develop an IoT applications.
4	ECCDLO8022	Satellite and	CO1	Understand the basic concepts of satellite communication system and orbital parameters.
		Nano Satellite	CO2	Explain various satellite sub-systems, earth station technologies and launching mechanisms
		n	CO4	prinaryze and evaluate linit budget and various periorinance parameters of satelline signal for proper communication. Understand Nano satellitie's structure design, pavloads. Thermal control system and snace sement
5	ECCDLOC802	Network		sateme e execute ecoge, periodee, mennai control system and optice cognont
		Management	CO1	Explain the need for interoperable network management and analyze the trends and development of the Telecommunications Network Management.
		in	CO2	Demonstrate broad knowledge of fundamental principles and technical standards underlying NMT.
	1	I elecommunic	1003	Uescribe the concepts and architecture behind standards-based network management associated with SNMP and CMIP.
		lation	CO4	LANNIN PRESS OF IMPROVIDED IN THE MARKEN OF THE
		ation	CO4 CO5	Apply basics of elecommunication, networking and information recinitologies and architect and implement networked informative systems. Continuously improve their knowledge of technology and communication skills
6		ation Project	CO4 CO5 CO1	Apply basics of elecommunication, networking and minimation recinitologies and architect and implement networked minimative systems. Continuously improve their knowledge of technology and communication skills. Apply selection criteria and select an appropriate project from different options.
6		ation Project Management	CO4 CO5 CO1 CO2	Apply basics of telecommunication, networking and minimation rechnologies and architect and implement networked minimative systems. Continuously improve their knowledge of technology and communication skills. Apply selection criteria and select an appropriate project from different options. Write work break down structure for a project and develop a schedule based on it.
6		ation Project Management	CO4 CO5 CO1 CO2 CO3	Apply basics of telecommunication, networking and minimation recinitologies and architect and implement networked minimative systems. Continuously improve their knowledge of technology and communication skills. Apply selection criteria and select an appropriate project from different options. Write work break down structure for a project and develop a schedule based on it. Identify opportunities and threats to the project and decide an approach to deal with them strategically
6		ation Project Management	CO4 CO5 CO1 CO2 CO3 CO4 CO5	Apply basics of lefecommunication, networking and minimation rechnologies and architect and implement networked minimative systems. Continuously improve their knowledge of technology and communication skills. Apply selection criteria and select an appropriate project from different options. Write work break down structure for a project and develop a schedule based on it. Identify opportunities and threats to the project and devide an approach to deal with them strategically Use Earned value technique and determine & predict status of the project Canture lessons learned during project project themes and document them to future reference.
6	ILO 8019	ation Project Management	CO4 CO5 CO1 CO2 CO3 CO4 CO5 CO1	Apply basics of telecommunication, networking and minimation rechnologies and architect and implement networked minimative systems. Continuously improve their knowledge of technology and communication skills. Apply selection criteria and select an appropriate project from different options. Write work break down structure for a project and develop a schedule based on it. Identify opportunities and threats to the project and devide an approach to deal with them strategically Use Earned value technique and determine & predict status of the project Capture lessons learned during project phases and document them for future reference Understand the concept of environmental management

		Management	CO2	Understand ecosystem and interdependence, food chain etc.
		-	CO3	Understand and interpret environment related legislations
8	ECL801	Optical	CO1	Acquire proficiency in identifying the different types of fibers and understanding their properties
		Communicatio n	CO2	To measure the losses, dispersion and compensation techniques in all optical network.
			CO3	. Learn to design all optical network with amplifiers and modern lasers for error free transmission.
		and Networks	CO4	To design or implement point to point optical fiber network, WDM or DWDM Network
		Laboratory	CO5	To design free space optical system with atmospheric impairments and propose mitigation technique for minimum BER.
9	ECP 801	Major	CO1	Implementing the identified Societal and Research oriented problems
		Project-II	CO2	Design the solution
			CO3	Developing innovative solutions with modern tools
			CO4	To measure and compare the desired output
			CO5	Creating working prototype of desired solution