PRIST
DEEMED TO BE UNIVERSITY
NAAC ACCREDITED
THANJAVUR – 613 403 – TAMILNADU
School: ENGINEERINGAND TECHNOLOGY

Dept: ECE- BTech (FT)
Mapping of COs and Pos
Regulation-2021

Sem	Subject code	Subject name	COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I-SEM	21147S11	Professional English - I	CO1:To use appropriate words in a professional context	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
			CO2:To gain understanding of basic grammatic structures and use them in right context.	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
			CO3:To read and infer the denotative and connotative meanings of technical texts	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
			CO4:To write definitions, descriptions, narrations and essays on various topics	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
			AVG	1.6	2.2	1.8	2.2	1.5	3	3	3	1.6	3	3	3	-	-	-
	21148S12	Matrices and Calculus	CO1:Use the matrix algebra methods for solving practical problems.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
			CO2:Apply differential calculus tools in solving various application problems.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
			CO3:Able to use differential calculus ideas on several variable functions.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
			CO4:Apply different methods of integration in solving practical problems.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
			CO5:Apply multiple integral ideas in solving areas, volumes and other practical problems.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
			AVG	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
	21149S13	Engineering Physics	CO1:Understand the importance of mechanics.	3	3	2	1	1	1	-	-	-	-	-	-	-	-	-
			CO2:Express their knowledge in electromagnetic waves.	3	3	2	1	2	- 1	-	-	-	-	-	-	-	-	-
			CO3:Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	3	3	2	2	2	1	-	-	-	-	-	1	-	-	-
			CO4:Understand the importance of quantum physics.	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
			CO5:Comprehend and apply quantum mechanical principles towards the formation of energy bands.	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
			AVG	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-	-	-
	21149S14	Engineering Chemistry	CO1:To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-
			CO2:To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	2	-	-	1	-	2	2	-	-	-	-	-	-	-	-
			CO3:To apply the knowledge of phase rule and composites for material selection requirements.	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4:To recommend suitable fuels for engineering processes and applications.	3	1	1	-	-	- 1	2	-	-	-	-	-	-	-	-
			CO5:To recognize different forms of energy resources and apply them for suitable applications in energy sectors	3	1	2	1	-	2	2	-	-	-	-	2	-	-	-
			AVG	2.8	1.3	1.6	1	-	1.5	1.8	-	-	-	-	1.5	-	-	-
	21150S15	Problem Solving and Python Programming	CO1: Develop algorithmic solutions to simple computational problems.	3	3	3	3	2	-	-	-	-	-	2	2	3	3	
			CO2: Develop and execute simple Python programs.	3	3	3	3	2	-	-	-	-	-	2	2	3	-	
			CO3: Write simple Python programs using conditionals and loops for solving problems.	3	3	3	3	2	-	-	-	-	-	2	-	3	-	
			CO4: Decompose a Python program into functions.	2	2	-	2	2	-	-	-	-	-	1	-	3	-	
			CO5: Represent compound data using Python lists, tuples, dictionaries etc.	1	2	-	-	1	-	-	-	-	-	1	-	2	-	
			CO6: Read and write data from/to files in Python programs	2	2	-	-	2	-	-	-	-	-	1	-	2	-	
			AVG	2	3	3	3	2	-	-	-	-	-	2	2	3	3	
	21150L16	Problem Solving and Python Programming Laboratory	CO1: Develop algorithmic solutions to simple computational problems	3	3	3	3	3	-	-	-	-	-	3	2	3	3	
			CO2: Develop and execute simple Python programs.	3	3	3	3	3	-	-	-	-	-	3	2	3	-	
			CO3: Implement programs in Python using conditionals and loops for solving problems.	3	3	3	3	2	- -	-	-	-	-	3	-	3	-	
			CO4: Deploy functions to decompose a Python program.	3	2	-	2	2	-	-	-	-	-	1	-	3	-	
			CO5: Process compound data using Python data structures.	1	2	-	-	1	-	-	-	-	-	1	-	2	-	
			CO6: Utilize Python packages in developing software applications.	2	-	-	-	2	-	-	-	-	-	1	-	2	-	
			AVG	2	3	3	3	2	-	-	-	-	-	2	2	3	3	

	Course Code	Course	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	21149L17	Physics and Chemistry Laboratory	CO1:Understand the functioning of various physics laboratory equipment.	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
			CO2:Use graphical models to analyze laboratory data.	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
			CO3:Use mathematical models as a medium for quantitative reasoning and describing physical reality.	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
			CO4:Access, process and analyze scientific information.	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
			CO5:Solve problems individually and collaboratively.	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
			AVG	3	2.4	2.6	1	1										
	21147L18	Communication Lab – I	CO1:To listen to and comprehend general as well as complex academic information	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
			CO2:To listen to and understand different points of view in a discussion	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
			CO3:To speak fluently and accurately in formal and informal communicative contexts	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
			CO4:To describe products and processes and explain their uses and purposes clearly and accurately	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
			CO5:To express their opinions effectively in both formal and informal discussions	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
			AVG	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
	21147S21	Professional English – II	CO1:To compare and contrast products and ideas in technical texts.	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
			CO2:To identify and report cause and effects in events, industrial processes through technical texts	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
			CO3:To analyse problems in order to arrive at feasible solutions and communicate them in the written format	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
			CO4:To present their ideas and opinions in a planned and logical manner	3	3	3	3	2	3	3	3	2	3	3	3	-	-	-
			CO5:To draft effective resumes in the context of job search.	-	-	-	-	-	-	-	-	3	3	3	3	-	-	-
			AVG	3	3	3	3	2.75	3	3	3	2.2	3	3	3	-	-	-
	21148S22	Statistics and Numerical Methods	CO1:Apply the concept of testing of hypothesis for small and large samples in real life problems.	3	3	1	1	1	0	0	0	2	0	2	3			
			CO2:Apply the basic concepts of classifications of design of experiments in the field of agriculture.	3	3	1	1	1	0	0	0	2	0	2	3			
			CO3:Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	3	3	1	1	1	0	0	0	2	0	2	3			
			CO4:Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	3	3	1	1	1	0	0	0	2	0	2	3			
			CO5:Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	3	3	1	1	1	0	0	0	2	0	2	3			
			AVG	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
	21149S23B	Physics for Electronics Engineering	CO1:know basics of crystallography and its importance for varied materials properties	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-
			CO2:gain knowledge on the electrical and magnetic properties of materials and their applications	3	2	1	2	-	2	-	-	-	-	-	-	-	-	-
			CO3:understand clearly of semiconductor physics and functioning of semiconductor devices	3	2	2	-	2	-	-	-	-	-	-	-	-	-	-
			CO4:understand the optical properties of materials and working principles of various optical devices	3	-	1	-	3	2	3	-	-	-	-	1	-	-	-
			CO5:appreciate the importance of nanotechnology and nanodevices	3	-	2	1	-	2	-	-	-	-	-	1	-	-	-
			AVG	3	2	1.4	1.5	2.5	2	3					1			
	21154S24	Engineering Graphics	CO1:Use BIS conventions and specifications for engineering drawing.	3	1	2	-	2	-	-	-	-	3	-	2	2	2	
			CO2:Construct the conic curves, involutes and cycloid.	3	1	2	-	2	-	-	-	-	3	-	2	2	2	
			CO3:Solve practical problems involving projection of lines.	3	1	2	-	2	-	-	-	-	3	-	2	2	2	
			CO4:Draw the orthographic, isometric and perspective projections of simple solids.	3	1	2	-	2	-	-	-	-	3	-	2	2	2	
			CO5:Draw the development of simple solids	3	1	2	-	2	-	-	-	-	3	-	2	2	2	
			AVG	3	1	2	-	2	-	-	-	-	3	-	2	2	2	
II - Sem	21153S25B	Electrical and Instrumentation Engineering	CO1:Use BIS conventions and specifications for engineering drawing.															
			CO2:Construct the conic curves, involutes and cycloid.															
			CO3:Solve practical problems involving projection of lines.															
			CO4:Draw the orthographic, isometric and perspective projections of simple solids.															
			CO5:Draw the development of simple solids															
			AVG															
	21153S26A	Circuit Analysis	CO1:Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits.	3	2	1	1	-	-	-	1		1					
			CO2: Apply suitable network theorems and analyze AC and DC circuits	3	3	2	2	-	-	-	1		1					
			CO3: Analyze steady state response of any R, L and C circuits	3	3	3	3	-	-	-	1		1					
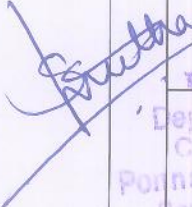
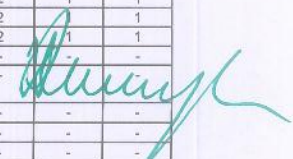| Course Code	Course Name	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
		CO4: Analyze the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits.	3	3	3	3	-	-	-	1		1	-	-	-	-	-
		CO5: Analyze the coupled circuits and network topologies	3	3	3	2	-	-	-	1		1	-	-	-	-	-
		AVG	3	3	3	2	-	-	-	1		1	-	-	-	-	-
21154L27	Engineering Practices Laboratory	CO1:Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
		CO2:Wire various electrical joints in common household electrical wire work.	3	2			1	1	1	-	-	-	-	2	2	1	1
		CO3:Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
		CO4:Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
		AVG															
21153L28A	Circuits Analysis Laboratory	Design RL and RC circuits.	3	2	1	1	-	-	-	1	-	1	-	-	-	-	-
		Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems	3	3	2	2	-	-	-	1	-	1	-	-	-	-	-
		To gain hands- on experience in Thevinin & Norton theorem, KVL & KCL, and Superposition Theorems.	3	3	3	3	-	-	-	1	-	1	-	-	-	-	-
		To understand the working of RL,RC and RLC circuits	3	3	3	3	-	-	-	1	-	1	-	-	-	-	-
		AVG	3	3	3	2	-	-	-	1	-	1	-	-	-	-	-
21147L29	Communication Lab – II	CO1:Speak effectively in group discussions held in formal/semi formal contexts.	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
		CO2:Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
		CO3:Write emails, letters and effective job applications.	2	2	3	3	1	3	3	3	3	3	3	3	-	-	-
		CO4:Write critical reports to convey data and information with clarity and precision	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
		CO5:Give appropriate instructions and recommendations for safe execution of tasks	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
		AVG	2.4	2.8	3	3	1.8	3	3	3	3	3	3	3	-	-	-
21148S31B	Random Processes and Linear Algebra	CO1:Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
		CO2:Demonstrate accurate and efficient use of advanced algebraic techniques.	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
		CO3:Apply the concept of random processes in engineering disciplines.	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
		CO4:Understand the fundamental concepts of probability with a thorough knowledge of standard distributions that can describe certain real-life phenomenon.	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
		CO5: Understand the basic concepts of one and two dimensional random variables and	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
		AVG	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
21152S32	Control Systems	CO1: Compute the transfer function of different physical systems.	3	3	3	2	2	2	-	-	-	-	2	3	3	3	3
		CO2: Analyse the time domain specification and calculate the steady state error.	3	3	3	3	2	3	-	-	-	-	2	2	3	3	3
		CO3: Illustrate the frequency response characteristics of open loop and closed loop system response.	3	2	3	3	2	2	-	-	-	-	2	3	3	2	3
		CO4: Analyse the stability using Routh and root locus techniques.	3	3	3	2	2	2	-	-	-	-	2	2	3	3	3
		CO5: Illustrate the state space model of a physical system and discuss the concepts of sampled data control system	2	2	3	3	2	3	-	-	-	-	2	3	2	2	3
		AVG	3	3	3	3	2	2	-	-	-	-	2	3	3	3	3
21152S33	C Programming and Data Structures	CO1:Develop C programs for any real world/technical application.	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3
		CO2:Apply advanced features of C in solving problems.	1	2	1	2	2	-	-	-	1	1	1	2	2	2	2
		CO3:Write functions to implement linear and non–linear data structure operations.	2	3	1	2	3	-	-	-	1	1	1	2	2	1	2
		CO4:Suggest and use appropriate linear/non–linear data structure operations for solving a given problem.	1	2	1	2	2	1	1	-	1	2	1	3	2	2	2
		CO5:Appropriately use sort and search algorithms for a given application.	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
		CO6:Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
		AVG	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
21152C34	Digital Systems Design	CO1: Use Boolean algebra and simplification procedures relevant to digital logic.	3	2	2	2	-	2								2	2	2
		CO2:Design various combinational digital circuits using logic gates.	-	-	-	-	-	-										
		CO3:Analyse and design synchronous sequential circuits.	-	3	3	2	-	2										

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			CO4: Analyse and design asynchronous sequential circuits. .	-	-	-	-	-	-	-	-	-	-	3	2	2	3	1
			CO5: Build logic gates and use programmable devices	-	3	3	3	-	-	-	-	-	-	2	2	3	3	2
			AVG	3	2.6	2.6	2.3	-	2	-	-	-	-	2	2	3	3	2
III - Sem	21152C35	Signals and Systems	CO1: determine if a given system is linear/causal/stable	3	-	3	-	3	2	-	-	-	-	-	3	-	-	1
			CO2: determine the frequency components present in a deterministic signal .	3	-	3	-	-	2	-	-	-	-	-	3	-	3	-
			CO3: characterize continuous LTI systems in the time domain and frequency domain	3	3	-	-	3	2	-	-	-	-	-	3	2	-	-
			CO4: characterize discrete LTI systems in the time domain and frequency domain	3	3	-	-	3	2	-	-	-	-	-	3	-	3	1
			CO5: compute the output of an LTI system in the time and frequency domains	3	3	-	3	3	2	-	-	-	-	-	3	-	3	1
			AVG	3	3	3	3	3	2	-	-	-	-	-	3	2	3	1
	21152C36	Electronic Devices and Circuits	CO1: Explain the structure and working operation of basic electronic devices.	3	3	3	3	2	1	-	-	-	-	-	1	2	1	1
			CO2: Design and analyze amplifiers.	3	2	2	3	2	2	-	-	-	-	-	1	2	1	1
			CO3: Analyze frequency response of BJT and MOSFET amplifiers	3	3	3	2	1	2	-	-	-	-	-	1	2	1	1
			CO4: Design and analyze feedback amplifiers and oscillator principles.	3	3	2	3	2	2	-	-	-	-	-	1	2	1	1
			CO5: Design and analyze power amplifiers and supply circuits	3	2	3	2	2	1	-	-	-	-	-	1	2	1	1
			AVG	3	3	3	3	2	2	-	-	-	-	-	1	2	1	1
	21152L37	C Programming and Data Structures Lab	CO1: Use different constructs of C and develop applications	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3
			CO2: Write functions to implement linear and non-linear data structure operations	1	2	1	2	2	-	-	-	1	1	1	2	2	2	2
			CO3: Suggest and use the appropriate linear / non-linear data structure operations for a given problem	2	3	1	2	3	-	-	-	1	1	1	2	2	1	2
			CO4: Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1
			CO5: Implement Sorting and searching algorithms for a given application	1	2	1	2	2	1	1	-	1	2	1	3	2	2	3
			AVG	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
	21152L38	Electronic Devices and Circuits Lab	CO1: Characteristics of PN Junction Diode and Zener diode.	2	2	3	3	2	1	-	-	-	-	-	1	2	1	1
			CO2: Design and Testing of BJT and MOSFET amplifiers.	2	2	3	3	2	1	-	-	-	-	-	1	2	1	1
			CO3: Operation of power amplifiers.	2	-	2	-	1	1	-	-	-	-	-	1	2	1	1
			CO4: Design and analyze feedback amplifiers and oscillator principles.	-	-	-	-	3	1	-	-	-	-	-	1	2	1	1
			CO5: Design and analyze power amplifiers and supply circuits	-	-	-	-	2	1	-	-	-	-	-	1	2	1	1
			AVG	2	2	2.6	3	2	1	-	-	-	-	-	1	2	1	1
	21152L39	Professional Development	CO1: Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2: Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3: Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21152C41	Electromagnetic Fields	CO1: Relate the fundamentals of vector, coordinate system to electromagnetic concepts	2	1	1	1	-	-	2	1	-	-	1	-	2	-	-
			CO2: Analyze the characteristics of Electrostatic field	2	2	3	3	2	2	2	-	-	1	1	2	-	-	-
			CO3: Interpret the concepts of Electric field in material space and solve the boundary conditions	2	2	3	2	2	2	1	-	-	1	1	2	-	-	-
			CO4: Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions	2	2	3	2	2	2	1	-	-	1	1	2	-	-	-
			CO5: Determine the significance of time varying fields	2	2	2	2	2	2	1	-	-	2	2	1	-	-	-
			AVG	2	2	2	2	2	2	1	-	-	1	1	2	-	-	-
	21152C42	Linear Integrated Circuits	CO1 : Design linear and nonlinear applications of OP – AMPS	2	-	-	-	-	-	-	-	-	-	-	1	-	2	1	1
			CO2 : Design applications using analog multiplier and PLL	2	3	3	2	-	-	-	-	-	-	-	-	-	2	1	1
			CO3 : Design ADC and DAC using OP – AMPS	1	-	-	2	-	-	-	-	-	-	-	-	-	2	1	1
			CO4 : Generate waveforms using OP – AMP Circuits	1	-	-	2	-	-	-	-	-	-	-	-	-	2	1	1
			CO5 : Analyze special function ICs	1	2	3	3	-	-	-	-	-	-	-	-	3	2	-	-
			AVG	1.4	2.5	3	2.2	-	-	-	-	-	-	-	1	3	2	1	1
	21152C43	Communication Systems	CO1: Gain knowledge in amplitude modulation techniques	3	3	3	3	2	1	1	-	-	-	-	1	1	1	-
			CO2: Understand the concepts of Random Process to the design of communication systems	3	3	3	3	2	1	1	-	-	-	-	1	1	-	-
			CO3: Gain knowledge in digital techniques	3	3	3	3	3	1	1	-	-	-	-	1	1	-	-
			CO4: Gain knowledge in sampling and quantization	3	3	3	3	3	1	1	-	-	-	-	1	1	-	-
			CO5: Understand the importance of demodulation techniques	3	3	3	3	2	1	1	-	-	-	-	1	1	-	-
			AVG	3	3	3	3	2.5	1	1	-	-	-	-	1	1	-	-
		Digital Signal Processing	CO1: Apply DFT for the analysis of digital signals and systems	3	3	3	3	2	2	-	-	-	-	-	1	1	3	2
			CO2: Design IIR and FIR filters	3	3	3	3	2	2	-	-	-	-	-	1	1	3	2
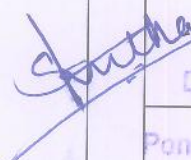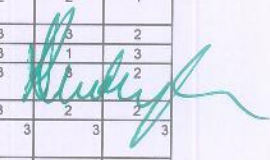
Sem	Code	Course	CO															
	21152C44		CO3: Characterize the effects of finite precision representation on digital filters	3	3	2	2	2	2	-	-	-	-	1	1	1	2	2
			CO4:Design multirate filters	3	3	2	2	3	1	-	-	-	-	1	1	2	2	3
			CO5:Apply adaptive filters appropriately in communication systems	3	2	2	2	3	2	-	-	-	-	1	1	2	2	1
			AVG	3	3	2	2	2	2	-	-	-	-	1	1	2	2	2
IV - Sem	21152C45	*Networks and Security*	CO1: Explain the Network Models, layers and functions.	3	3	3	3	2	2	-	-	-	-	1	1	3	3	2
			CO2: Categorize and classify the routing protocols.	3	3	3	3	2	2	-	-	-	-	1	1	2	2	2
			CO3: List the functions of the transport and application layer.	3	3	2	2	2	2	-	-	-	-	1	1	1	2	2
			CO4: Evaluate and choose the network security mechanisms.	3	3	2	2	3	- 1	-	-	-	-	1	1	2	2	3
			CO5: Discuss the hardware security attacks and countermeasures.	3	2	2	2	3	2	-	-	-	-	1	1	2	2	1
			AVG	3	3	2	2	2	2	-	-	-	-	1	1	2	2	2
	21149S46	Environmental Sciences and Sustainablity	CO1:To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	2	1	-		-	2	3	-	-		-	2	-	-	-
			CO2:To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	3	2	-		-	3	3	-	-		-	2	-	-	-
			CO3:To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	3	-	1		-	2	2	-	-		-	2	-	-	-
			CO4:To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	3	2	1	1	-	2	2	-	-		-	2	-	-	-
			CO5:To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	3	2	1		-	2	2	-	-		-	1	-	-	-
			AVG	2.8	1.8	1	1	-	2.2	2.4	-	-		-	1.8	-	-	-
	21152L47	Linear Integrated Circuits Laboratory	CO1 : Design linear and nonlinear applications of OP – AMPS	2	-	-	-	-	-	-	-	-	-	1	-	2	1	1
			CO2 : Design applications using analog multiplier and PLL	2	3	3	2	-	-	-	-	-	-	-	-	2	1	1
			CO3 : Design ADC and DAC using OP – AMPS	1	-	-	2	-	-	-	-	-	-	-	-	2	1	1
			CO4 : Generate waveforms using OP – AMP Circuits	1	-	-	2	-	-	-	-	-	-	-	-	2	1	1
			CO5 : Analyze special function ICs	1	2	3	3	-	-	-	-	-	-	-	3	2	1	1
			AVG	1.4	2.5	3	2.2	-	-	-	-	-	-	1	3	2	1	1
	21152L48	Communication Systems Laboratory	CO1: Gain knowledge in amplitude modulation techniques	3	3	3	3	3	3	-	-	-	1	1	1	-	-	-
			CO2: Understand the concepts of Random Process to the design of communication systems	3	3	3	3	3	2	-	-	-	1	1	1	-	-	-
			CO3: Gain knowledge in digital techniques	3	3	3	3	3	2	-	-	-	1	1	1	-	-	-
			CO4: Gain knowledge in sampling and quantization	3	3	3	3	3	3	-	-	-	1	1	1	-	-	-
			CO5: Understand the importance of demodulation techniques	3	3	3	3	3	2	-	-	-	1	1	1	-	-	-
			AVG	3	3	3	3	3	2.5	-	-	-	1	1	1	-	-	-
V - sem	21152C51	*Wireless Communication *	CO1:Understand The Concept And Design Of A Cellular System.	3	2	2	3	3	1	-	-	-	-	-	1	3	1	1
			CO2:Understand Mobile Radio Propagation And Various Digital Modulation Techniques.	3	3	2	1	3	2	-	-	-	-	-	-	3	1	2
			CO3:Understand The Concepts Of Multiple Access Techniques And Wireless Networks .	3	3	3	3	2	2	-	-	-	-	-	1	3	1	2
			CO4:Characterize a wireless channel and evolve the system design specifications	2	3	2	2	2	2	-	-	-	-	-	1	2	1	1
			CO5:Design a cellular system based on resource availability and traffic demands.	2	-	3	3	2	1	-	-	-	-	-	1	2	2	2
			AVG	3	3	2	2	2	2	-	-	-	-	-	1	3	1	2
	21152C52	VLSI and Chip Design	CO1: In depth knowledge of MOS technology	1	1	-	-	-	-	-	-	-	-	-	3	3	3
			CO2: Understand Combinational Logic Circuits and Design Principles .	3	2	3	2	-	-	-	-	-	-	1	3	3	3
			CO3: Understand Sequential Logic Circuits and Clocking Strategies	2	3	2	3	1	-	-	-	-	-	2	3	2	3
			CO4: Understand Memory architecture and building blocks	-	-	1	1	-	-	-	-	-	-	3	3	3	2
			CO5: Understand the ASIC Design Process and Testing.	-	-	-	-	-	2	-	-	-	-	1	-	3	2	2
			AVG	2	2	2	2	1	1.5	-	-	-	-	1	2	3	3	3
	21152C53	Transmission Lines and RF Systems	CO1: Explain the characteristics of transmission lines and its losses.		3	3	3	3	2	1	-	-	-	1	-	1	2	1	1
			CO2: Calculate the standing wave ratio and input impedance in high frequency transmission lines.		3	2	2	3	2	1	-	-	-	1	-	1	2	1	1
			CO3: Analyze impedance matching by stubs using Smith Charts.		3	3	3	2	1	2	-	-	-	1	-	1	2	1	1
			CO4: Comprehend the characteristics of TE and TM waves.		3	3	2	3	2	1	-	-	-	1	-	1	2	1	1
			CO5: Design a RF transceiver system for wireless communication		3	2	3	2	2	1	-	-	-	1	-	1	2	1	1
			AVG		3	3	3	3	2	1	-	-	-	1	-	1	2	1	1
	21152L58	VLSI Laboratory	CO1: Write HDL code for basic as well as advanced digital integrated circuit	2	-	-	-	-	-	-	-	-	-	-	-	2	3	2
			CO2: Import the logic modules into FPGA Boards	3	3	1	1	-	-	-	-	-	-	-	-	2	1	2
			CO3: Synthesize Place and Route the digital Ips	1	2	2	2	-	-	-	-	-	-	1	1	2	2	2
			CO4: Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools	-	1	3	3	1	-	-	-	-	-	1	1	2	2	2
			CO5: Test and Verification of IC design	3	3	3	3	1	-	-	-	-	-	-	1	2	2	2
			AVG	2.2	2.2	2.2	2.2	1	-	-	-	-	-	1	1	2	2	2
		Embedded Systems	CO1: Explain the architecture and features of 8051.	3	3	3	2	2	-	-	-	-	-	-	1	3	2	2

Sem	Code	Course	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VI - sem	21152S61	and IOT Design*	CO2: Develop a model of an embedded system.	3	3	3	2	2	-	-	-	-	-	-	-	3	2	1
			CO3: List the concepts of real time operating systems.	3	3	2	2	2	-	-	-	-	-	-	-	2	1	1
			CO4: Learn the architecture and protocols of IoT.	3	3	2	2	2	-	-	-	-	-	-	-	3	3	2
			CO5: Design an IoT based system for any application.	3	3	3	3	3	-	-	-	-	-	-	-	3	3	2
			AVG	3	3	2.6	2.2	2.2	-	-	-	-	-	-	-	2.8	2.2	1.4
	21152S62	*Artificial Intelligence and Machine Learning*	CO1: Use appropriate search algorithms for problem solving	3	2	2	3	1	3	2	-	-	-	-	1	3	3	3
			CO2: Apply reasoning under uncertainty	3	2	2	3	1	3	2	-	-	-	-	1	3	3	3
			CO3: Build supervised learning models	1	2	1	3	2	3	2	-	-	-	-	1	3	3	3
			CO4: Build ensembling and unsupervised models	1	2	3	1	3	3	2	-	-	-	-	1	3	3	3
			CO5: Build deep learning neural network models	2	2	2	-	3	3	2	-	-	-	-	1	3	3	3
			AVG	2	2	2	2	2	3	2	-	-	-	-	1	3	3	3
VII - sem	211_S71	Human Values and Ethics	CO1 : Identify the importance of democratic, secular and scientific values in harmonious functioning of social life	3	2	2	3	2	1	-	-	-	1	-	1	2	1	1
			CO2 : Practice democratic and scientific values in both their personal and professional life.	3	3	3	2	1	2	-	-	-	1	-	1	2	1	1
			CO3 : Find rational solutions to social problems.	3	3	2	3	2	1	-	-	-	1	-	1	2	1	1
			CO4 : Behave in an ethical manner in society	3	2	3	2	2	1	-	-	-	1	-	1	2	1	1
			CO5 : Practice critical thinking and the pursuit of truth.	3	3	3	3	2	1	-	-	-	1	-	1	2	1	1
			AVG	2	-	-	-	-	-	-	-	-	-	-	-	2	3	2
	21152INT76	Summer Internship	CO1: System-level design processes, verification and validation techniques, manufacturing and production processes in the firm or research facilities in the laboratory/research institute	1	1	-	-	-	-	-	-	-	-	-	-	3	3	3
			CO2: Analysis of industrial / research problems and their solutions	3	2	3	2	-	-	-	-	-	-	-	-	3	3	3
			CO3: Documentation of system specifications, design methodologies, process parameters, testing parameters and results	2	3	2	3	1	1	-	-	-	-	-	2	3	2	3
			CO4: Preparing of technical report and presentation	-	-	1	1	-	2	-	-	-	-	1	-	3	3	2
			AVG	2	2	2	2	1	1.5	-	-	-	-	1	2	3	3	3
VIII- Se,	21152P81	Project Work	CO1: Formulate and analyze problem / create a new product/ process.	3	2	2	3	1	3	2	-	-	-	-	1	3	3	3
			CO2: Design and conduct experiments to find solution	3	2	2	3	1	3	2	-	-	-	-	1	3	3	3
			CO3: Analyze the results and provide solution for the identified problem, prepare project report and make presentation.	1	2	1	3	2	3	2	-	-	-	-	1	3	3	3
			AVG	2	-	-	-	-	-	-	-	-	-	-	-	2	3	2
	21152E54A	Optical Communication Networks	CO1: Realize Basic Elements In Optical Fibers, Different Modes And Configurations.	3	3	2	3	3	1	-	-	-	-	-	1	2	1	2
			CO2: Analyze The Transmission Characteristics Associated With Dispersion And Polarization Techniques.	3	3	2	1	3	2	-	-	-	-	-	2	2	2	2
			CO3: Design Optical Sources And Detectors With Their Use In Optical Communication System.	3	3	3	3	2	1	-	-	-	-	-	1	2	2	2
			CO4: Construct Fiber Optic Receiver Systems, Measurements And Techniques.	3	3	2	2	2	1	-	-	-	-	-	1	2	1	2
			CO5: Design Optical Communication Systems And Its Networks.	3	3	3	3	2	1	-	-	-	-	-	1	2	2	2
			AVG	3	3	2	3	3	1	-	-	-	-	-	1	2	2	2
	21152E54B	4G /5G Communication Networks	CO1: To understand the evolution of wireless networks.	3	3	2	3	2	-	-	-	-	-	-	-	1	1	3
			CO2: To learn the concepts of 5G networks.	3	3	3	2	2	-	-	-	-	-	-	-	1	1	2
			CO3: To comprehend the 5G architecture and protocols.	3	3	2	2	2	-	-	-	-	-	-	-	2	2	2
			CO4: To understand the dynamic spectrum management.	3	3	3	3	2	-	-	-	-	-	-	-	3	2	2
			CO5: To learn the security aspects in 5G networks	3	2	3	3	2	-	-	-	-	-	-	-	2	2	2
			AVG	3	2.8	2.6	2.6	2	-	-	-	-	-	-	-	1.8	1.6	2.2
	21152E55A	Software Defined Networks	CO1: Describe the motivation behind SDN and its data plane (K2)	3	3	3	3	3	2	-	-	-	-	3	-	3	3	2
			CO2: Identify the functions of control plane (K3)	3	3	3	2	2	2	-	-	-	-	3	-	3	2	2
			CO3: Apply SDN to networking applications (K3)	3	3	3	3	1	2	-	-	-	-	3	-	2	3	2
			CO4: Apply various operations of network function virtualization	2	3	3	2	2	1	-	-	-	-	2	-	2	1	2
			CO5: Explain various use cases of SDN	3	3	2	2	2	1	-	-	-	-	2	-	2	2	2
			AVG	3	3	3	2	2	2	-	-	-	-	2	-	2	2	2
	21152E64C	Massive MIMO Networks	CO1: Understand and explain massive MIMO networks.	3	2	1	1	2	2	-	-	-	-	2	-	3	1	2
			CO2: Analyze massive MIMO propagation channels and their capacity bounds	3	3	2	2	2	2	-	-	-	-	1	-	2	2	1
			CO3: Examine channel estimation techniques for single cell system.	3	2	2	2	2	2	-	-	-	-	1	-	3	3	3
			CO4: Analyze channel estimation techniques for multi cell system.	3	3	2	2	2	2	-	-	-	-	1	-	3	1	3
			CO5: Explain the concepts underlining the deployment of single and multicell massive MIMO systems.	3	2	2	2	2	2	-	-	-	-	2	-	3	3	3
			AVG	3	2.4	1.8	1.8	2	2	-	-	-	-	1.4	-	3	2	2
		Advanced Wireless Communication Techniques	CO1: The student would be able to appreciate the necessity and the design aspects of cooperative communication	3	3	3	2	1	1	-	-	-	-	2	-	3	3	3
			CO2: The student would be able to appreciate the necessity and the design aspects of green wireless communication.	3	3	3	2	2	1	-	-	-	-	2	-	3	2	3

Category	Course Code	Course Name	CO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Elective course	21152E65A		CO3: The student would be able to evolve new techniques in wireless communication	3	2	2	1	2	1	-	-	-	-	-	2	2	1	1
			CO4: The students would be able to demonstrate the feasibility of using mathematical models using simulation tools.	3	3	3	3	2	1	-	-	-	-	-	2	3	1	2
			CO5: The student would be able to demonstrate the impact of the green engineering solutions in a global, economic, environmental and societal context.	3	3	3	2	1	2	-	-	-	-	-	2	2	3	1
			AVG	3	2.8	2.8	2	1.6	1.2	-	-	-	-	-	2	3	2	2
	21160S72A	Principles of Management	CO1: Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling.	3			-	-	-		1	-	-	-	-	2	1	1
			CO2: Have same basic knowledge on international aspect of management.	-	1	1	-	-	-	-	-	-	-	-	-	2	1	-
			CO3: Ability to understand management concept of organizing.	1		-	2	-	-	1	-	2	-	1	1	-	-	2
			CO5: Ability to understand management concept of CONTROLLING	-	1	1	1	2	-	-	1	2	-	-	-	1	1	1
			CO4: Ability to understand management concept of directing.	1		-	-	1	1	-	-	-	3	-	1	1	-	1
			AVG	1.66	1	1	1.5	1.5	1	1	1	2	3	1	1	1.5	1	1.25
	21160S72B	Total Quality Management	CO1: Ability to apply TQM concepts in a selected enterprise.		3										3	2		3
			CO2: Ability to apply TQM principles in a selected enterprise.						3						3			2
			CO3: Ability to understand Taguchi's Quality Loss Function, Performance Measures and applyQFD, TPM, COQ and BPR.		2			3	2	3	2				3	3	2	
			CO4: Ability to apply QMS and EMS in any organization.			3		3	3	2								
			AVG		2.5	3		3	2.6	3	2	3			3	2.5	2	3
	21160S72C	Human Resource Management	CO1: Students would have gained knowledge on the various aspects of HRM	2	2	1	2	2	2	1	1	2	1	1	1	1	1	1
			CO2: Students will gain knowledge needed for success as a human resources professional.	3	3	2	3	2	2	2	2	3	1	2	1	1	2	1
			CO3: Students will develop the skills needed for a successful HR manager.	3	3	3	3	3	3	2	2	3	1	2	1	1	2	1
			CO4: Students would be prepared to implement the concepts learned in the workplace.	3	3	2	3	3	2	2	2	2	1	1	1	1	1	1
			CO5: Students would be aware of the emerging concepts in the field of HRM	3	3	1	2	2	2	2	2	2	1	1	1	1	1	1
			AVG	2.8	2.8	1.8	2.6	2.6	2.2	1.8	1.8	2.4	1	1.4	1	1	1.4	1
	21147MC51B	Disaster Management	CO1: To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)	3	3	2	3	-	-	2	2	-	-	2	-	2	-	1
			CO2: To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction	3	3	3	3	-	-	2	1	-	-	2	-	2	-	1
			CO3: To develop disaster response skills by adopting relevant tools and technology	3	3	3	3	-	-	2	2	-	-	-	-	2	-	1
			CO4: Enhance awareness of institutional processes for Disaster response in the country and	3	3	2	3	-	-	2	1	-	-	2	-	2	-	1
			CO5: Develop rudimentary ability to respond to their surroundings with potential	3	3	2	3	-	-	2	2	-	-	2	-	3	-	1
			avg	3	3	3	3	-	-	2	2	-	-	2	-	2	-	1
		Well Being with Traditional Practices (Yoga, Ayurveda and	CO1: Learn the importance of different components of health	3	3	3	3	-	-	2	1	-	-	2	-	2	-	1
			CO2: Gain confidence to lead a healthy life	3	3	3	3	-	-	2	2	-	-	-	-	2	-	1
			CO3: Learn new techniques to prevent lifestyle health disorders	3	3	2	3	-	-	2	1	-	-	2	-	2	-	1
			CO4: Understand the importance of diet and workouts in maintaining health	3	3	2	3	-	-	2	1	-	-	2	-	3	-	1
	21147MC61E	Safety in Engineering industry	CO1: Understand the basic concept of safety.	3	3	3	3	-	-	2	2	-	-	2	-	2	-	1
			CO2: Obtain knowledge of Statutory Regulations and standards.	3	3	3	3	-	-	2	1	-	-	2	-	2	-	1
			CO3: Know about the safety Activities of the Working Place.	3	3	3	3	-	-	2	2	-	-	-	-	2	-	1
			CO4: Analyze on the impact of Occupational Exposures and their Remedies	3	3	2	3	-	-	2	1	-	-	2	-	2	-	1
			CO5: Obtain knowledge of Risk Assessment Techniques	3	3	2	3	-	-	2	2	-	-	2	-	3	-	1
			avg	3	3	3	3	-	-	2	2	-	-	2	-	2	-	1
	21152E64B	Satellite Communication	CO1: Identify the satellite orbits	3	3	3	3	2	3	1	1	-	1	-	1	3	3	3
			CO2: Analyze the satellite subsystems	3	2	2	3	2	3	-	-	-	-	-	1	3	3	3
			CO3: Evaluate the satellite link power budget	3	3	3	2	1	3	-	-	-	-	-	1	3	3	3
			CO4: Identify access technology for satellite	3	3	2	3	2	3	-	-	-	-	-	1	3	3	3
			CO5: Design various satellite applications	3	2	3	2	2	1	-	-	-	-	-	1	3	3	3
			avg	3	3	3	3	2	3	1	1	-	1	-	1	3	3	3
	21152E66A	Remote Sensing	CO1: To understand the principles of electromagnetic radiation.	3	2	2	3	1	3	2	-	-	-	-	1	3	3	3
			CO2: To learn the atmospheric radiation interactions.	3	2	2	3	1	3	2	-	-	-	-	1	3	3	3
			CO3: To study the laws of planetary motion.	1	2	1	3	2	3	2	-	-	-	-	1	3	3	3
			CO4: To classify the different types of resolution.	1	2	3	1	3	3	2	-	-	-	-	1	3	3	3
			CO5: To know the concepts of digital interpretation.	2	2	2	-	3	3	2	-	-	-	-	1	3	3	3
			avg	2	2	2	2	2	3	2	-	-	-	-	1	3	3	3
		Software Defined Radio	CO1: Describe the motivation behind SDN and its data plane (K2)	3	3	3	3	3	2	-	-	-	-	-		3	3	2
			CO2: Identify the functions of control plane (K3)	3	3	3	2	2	2	-	-	-	-	-		2	2	2

Course Code	Course	CO																
21152E64A		CO3: Apply SDN to networking applications (K3)	3	3	3	3	1	2	-	-	-	-	-	3	2	3	2
		CO4: Apply various operations of network function virtualization	2	3	3	2	2	1	-	-	-	-	-	2	2	1	2
		CO5: Explain various use cases of SDN	3	3	2	2	2	1	-	-	-	-	-	2	2	2	2
		avg	3	3	3	2	2	2	-	-	-	-	-	2	2	2	2
21152E65B	Wearable Devices	CO1: Describe the concepts of wearable system.	3	2	1	1	2	-	-	1	-	-	-	-	1	-	1
		CO2: Explain the energy harvestings in wearable device.	3	2	1	1	2	-	-	1	-	-	-	-	1	-	1
		CO3: Use the concepts of BAN in health care.	3	2	1	1	2	-	-	1	-	-	-	-	1	-	1
		CO4: Illustrate the concept of smart textile	3	2	1	1	2	-	-	1	-	-	-	-	1	-	1
		CO5: Compare the various wearable devices in healthcare system	3	2	1	1	2	-	-	1	-	-	-	-	1	-	1
		avg	3	2	1	1	2	-	-	1	-	-	-	-	1	-	1
21152E66B	Human Assist Devices	CO1: Explain the principles and construction of artificial heart	3	3	3	3	3	2	-	-	-	-	-	3	3	1	2
		CO2: Understand various mechanical techniques that improve therapeutic technology	3	3	3	2	2	3	-	-	-	-	-	2	2	2	2
		CO3: Explain the functioning of the membrane or filter that cleanses the blood.	3	3	3	3	3	2	-	-	-	-	-	3	3	3	2
		CO4: Describe the tests to assess the hearing loss and development of wearable devices for the same.	3	3	1	1	3	2	-	-	-	-	-	2	3	1	3
		CO5: Analyze and research on electrical stimulation and biofeedback techniques in rehabilitation and physiotherapy	3	3	3	3	3	3	-	-	-	-	-	2	3	3	2
		avg	3	3	2.6	2.4	2.8	2.4	-	-	-	-	-	2.4	2.8	2	2.2
21152E66C	MEMS Design	CO1: Understand the basics of MEMS design aspects.	3	3	2	2	2	2	-	-	-	-	-	1	3	2	2
		CO2: Apply the knowledge in the development of electro static sensors and actuators.	3	3	3	2	2	2	-	-	-	-	-	2	3	2	2
		CO3: Apply the knowledge in the development of thermal sensors and actuators.	3	3	3	2	2	2	-	-	-	-	-	2	3	2	2
		CO4: Apply the knowledge in the development of piezoelectric sensors and actuators.	3	3	3	2	2	2	-	-	-	-	-	2	3	2	2
		CO5: Apply the knowledge in the development of magnetic sensors and actuators.	3	3	3	2	2	2	-	-	-	-	-	2	3	2	2
		avg	3	3	2.8	2	2	2	-	-	-	-	-	1.8	3	2	2
21152E65C	Fundamentals of Nanoelectronics	CO1: Understand the basics of nano electronics including quantum wires, dots and wells	3	3	2	2	2	1	-	-	-	-	-	2	2	1	1
		CO2: Use the mechanism behind quantum electronic devices	3	3	3	2	2	2	-	-	-	-	-	2	3	1	1
		CO3 : Analyze the key performance aspects of tunneling and superconducting nano electronic devices	3	3	3	2	2	2	-	-	-	-	-	2	3	1	1
		CO4: Apply the knowledge in the development of nanotubes and nanostructure devices	3	3	3	3	3	3	-	-	-	-	-	2	3	1	2
		avg	3	3	2.6	2.2	2.2	2	-	-	-	-	-	2	2.8	1	1.2
21152E54C	Avionics Systems	CO1: Explain the principles and construction of artificial heart	3	3	3	3	3	2	-	-	-	-	-	3	3	1	2
		CO2: Understand various mechanical techniques that improve therapeutic technology	3	3	3	2	2	3	-	-	-	-	-	2	2	2	2
		CO3: Explain the functioning of the membrane or filter that cleanses the blood.	3	3	3	3	3	2	-	-	-	-	-	3	3	3	2
		CO4: Describe the tests to assess the hearing loss and development of wearable devices for the same.	3	3	1	1	3	2	-	-	-	-	-	2	3	1	3
		CO5: Analyze and research on electrical stimulation and biofeedback techniques in rehabilitation and physiotherapy	3	3	3	3	3	3	-	-	-	-	-	2	3	3	2
		avg	3	3	2.6	2.4	2.8	2.4	-	-	-	-	-	2.4	2.8	2	2.2

1 - low, 2 - medium, 3 - high, '-' - no correlation

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Mapping of COs and Pos

			magnetic fields • understand the relation between the fields under time varying situations • understand principles of prop														
	19152H13P	Digital Electronics	• introduce number systems and codes • introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions • introduce the methods for simplifying Boolean expressions • outline the formal procedures for the analysis and des	✓	✓	✓	✓	✓	✓						✓	✓
	19152H14P	Electronic Circuits - I	• The methods of biasing transistors • Design of simple	✓	✓	✓	✓	✓	✓						✓	✓

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		amplifier circuits • Mid – band analysis of amplifier circuits using small - signal equivalent circuits to determine gain input impedance and output impedance • Method of calculating cutoff fre													
19152H15P	Signals and Systems	• To study the properties and representation of discrete and continuous signals. • To study the sampling process and analysis of discrete systems using z-transforms. • To study the analysis and synthesis of discrete time	✓	✓	✓	✓	✓	✓					✓	✓

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			systems.• To study the properties												
II	19148S21P	Numerical Methods	• The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigenvalue problem of a matrix can be obtained numerically where analytical methods fail to give solution. • When huge amounts of experimen	✓	✓	✓	✓	✓						✓	✓
	19152S22P	Electrical Engineering and Control Systems	• To understand the operation of Electrical machines and transformers • To understand the open loop and closed loop	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos

			(feedback) systems • To understand time domain and frequency domain analysis of control systems required for stability analysis. • To unde												
19152H23P	Linear Integrated Circuits		• To introduce the basic building blocks of linear integrated circuits. • To teach the linear and non-linear applications of operational amplifiers. • To introduce the theory and applications of analog multipliers and PLL. • To teach the theory of ADC and	✓	✓	✓	✓	✓	✓					✓	✓
19152H24P	Electronic Circuits - II		• The advantages and method of analysis of feed	✓	✓	✓	✓	✓	✓					✓	✓

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			back amplifiers • Analysis and design of RC and LC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, blocking oscillators and time based generators. • The advantages and method of analysi												
	19152H25P	Transmission Lines and Waveguides	• To become familiar with propagation of signals through lines • Understand signal propagation at Radio frequencies• Understand radio propagation in guided systems• To become familiar with resonators • To become	✓	✓	✓	✓	✓	✓					✓	✓

Mapping of COs and Pos

			familiar with propagation of sig												
III	19148S31BP	Probability and Random Processes	• Have a fundamental knowledge of the basic probability concepts. • Have a well – founded knowledge of standard distributions which can describe real life phenomena. • Acquire skills in handling situations involving more than one random variable and funct	✓	✓	✓	✓	✓						✓	✓
	19152H32P	Microprocessor Interfacing and Applications	• To introduce the architecture and programming of 8085 microprocessor. • To introduce the interfacing of peripheral devices with 8085	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

Code	Course	Objectives														
		microprocessor. • To introduce the architecture and programming of 8086 microprocessor. • To introduce the applications,				●										
19152H33P	Digital Signal Processing	• To study DFT and its computation • To study the design techniques for digital filters • To study the finite word length effects in signal processing • To study the non-parametric methods of power spectrum estimations • To study the fundamentals of digit	✓	✓	✓	✓	✓	✓						✓	✓
19152H34P	Communication Theory	• To provide various Amplitude modulation and demodulation	✓	✓	✓	✓	✓	✓						✓	✓

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Mapping of COs and Pos

		systems. • To provide various Angle modulation and demodulation systems. • To provide some depth analysis in noise performance of various receiver. • To study some basic information theory with so												
19152L35P	Digital Signal Processing and Microprocessor Lab	• Carryout basic signal processing operations • Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals • Interface different I/Os with processor • Generate waveforms using	✓	✓	✓	✓	✓	✓				✓	✓

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				Microprocessors •												
IV	19152H41P	Digital Communication	• To study pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals. • To learn baseband pulse transmission, which deals with the transmission of pulse-amplitude, modu		✓	✓	✓	✓	✓	✓					✓	✓
	19152H42P	Antenna and Wave Propagation	• To study radiation from a current element. • To study antenna arrays • To study aperture antennas • To learn special antennas such as frequency		✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

		Course Code	Course Name	Objectives															
				independent and broad band antennas. • To study radio wave propagation. • To study radiation from a current e															
		19152H43P	Computer Networks	• To introduce the students the functions of different layers. • To introduce IEEE standard employed in computer networking. • To make students to get familiarized with different protocols and network components.• To introduce the students the functions o	✓	✓	✓	✓	✓	✓							✓	✓
		191__E44_P	Elective-I																

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Code	Course	Course Outcomes														
19152E44AP	High Speed Networks	• Students will get an introduction about ATM and Frame relay. • Students will be provided with an up-to-date survey of developments in High Speed Networks. • Enable the students to know techniques involved to support real-time traffic and congestion cont	✓	✓	✓	✓	✓	✓						✓	✓
19152E44BP	Advanced Digital Signal Processing	• To study the parametric methods for power spectrum estimation. • To study adaptive filtering techniques using LMS algorithm and to study the applications of adaptive filtering. • To study	✓	✓	✓	✓	✓	✓						✓	✓

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		multirate signal processing fundamentals. • To study the analysis														
19152E44CP	Speech Processing	• To introduce the models for speech production • To develop time and frequency domain techniques for estimating speech parameters • To introduce a predictive technique for speech compression • To understand speech recognition, synthesis and speaker ident	✓	✓	✓	✓	✓	✓								✓
19152E44DP	Fuzzy Logic and Neural Networks	• To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience • To become	✓	✓	✓	✓	✓	✓								✓

Mapping of COs and Pos

			familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems • To prov												
19152E44FP	Digital Audio Engineering	• Analyze the type of dither. • Analyze the recording and transmission principles in digital audio. • Analyze the various compression techniques. • Design and analyze the digital audio editing. • Analyze the various application of digital audio. • Analyze	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

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	19152L45P	Networks and Communication Lab	• Communicate between two desktop computers• Implement the different protocols• Implement and compare the various routing algorithms• Use the simulation tool.• Simulate & validate the various functional modules of a communication system• Apply variou	✓	✓	✓	✓	✓	✓					✓	✓
V	19152H51P	Optical Communication and Networks	• To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures. • To understand the different kind of losses, signal distortion in	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

Code	Course	Description												
		optical wave guides and other signal degradation factors. Design optimization o												
19152H52P	Microwave Engineering	• To study passive microwave components and their S-Parameters. • To study Microwave semiconductor devices & applications. • To study Microwave sources and amplifiers. • To study passive microwave components and their S-Parameters. • T	✓	✓	✓	✓	✓	✓					✓	✓
19152H53P	VLSI Design	• To learn the basic CMOS circuits. • To learn the CMOS process	✓	✓	✓	✓	✓	✓					✓	✓

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			technology. • To learn techniques of chip design using programmable devices. • To learn the concepts of designing VLSI subsystems. • To learn the concepts of modeling a digital system using H										
	191__E54_P	**Elective II**											
	19149E54AP	Environmental Science and Engineering	• Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in standard of living has lead to serious	✓	✓		✓		✓	✓	✓		✓	✓

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			environmental disasters• Public awareness of environmental is a														
19152E54BP	Optoelectronic Devices	• To know the basics of solid state physics and understand the nature and characteristics of light. • To understand different methods of luminescence, display devices and laser types and their applications. • To learn the principle of optical detection me	✓	✓	✓	✓	✓	✓							✓	✓
19152E54DP	Digital Image Processing	• To study the image fundamentals and mathematical transforms necessary for image processing. • To study the image enhancement	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓

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			techniques • To study image restoration procedures. • To study the image compression procedures. • To study the image segmentati				·							
19152E54EP	Engineering Acoustics		• To provide mathematical basis for acoustics waves • To introduce the concept of radiation reception absorption and attenuation of acoustic waves. • To present the characteristic behaviour of sound in pipes, resonators and filters. • To introduce the pro	✓	✓	✓	✓	✓	✓					✓	✓

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	Code	Course	Course Outcomes											
	19152E54FP	Software Engineering	• Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
	19152L55P	Optical Communication and Microwave Lab	• Analyze the performance of simple optical link. • Test microwave and optical components. • Analyse the mode characteristics of fiber • Analyse the	✓	✓	✓	✓	✓	✓				✓	✓

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			radiation of pattern of antenna.• Analyze the performance of simple optical link. • Test microwave and op				.									
VI	19152H61P	Mobile and Wireless Communication	• It deals with the fundamental cellular radio concepts such as frequency reuse and handoff. This also demonstrates the principle of trunking efficiency and how trunking and interference issues between mobile and base stations combine to affect the overal	✓	✓	✓	✓	✓	✓						✓	✓
	19152H62P	Medical Electronics	• To study the methods of recording various biopotentials • To study how to measure biochemical and	✓	✓	✓	✓	✓							✓	✓

Mapping of COs and Pos

			various physiological information • To understand the working of units which will help to restore normal functioning • To understand the use of radiation f													
19152H63P	Micro Controller and Embedded systems		• To study 8051 architecture • To write assembly language programming • To study the embedded architecture and real time applications. • To study 8051 architecture • To write assembly language programming • To study the embedded architecture and	✓	✓	✓	✓	✓	✓						✓	✓

			real time											
191__E64_P		**Elective III**												
19160E64AP		Principles Of Management	• Upon completion of the course, students will be able to have clear understanding• Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management• Upon completion of t					✓	✓	✓		✓	✓	✓
19152E64BP		Satellite Communication	• Overview of satellite systems in relation to other terrestrial systems. • Study of satellite orbits and	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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			launching. • Study of earth segment and space segment components • Study of satellite access by various users. • Study of DTH and compression standar														
	19152E64CP	Robotics	• The course has been so designed to give the students an overall view of the mechanical components and mathematics associated with the same. • Actuators and sensors necessary for the functioning of the robot. • The course has been so designed to give the	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓

Mapping of COs and Pos

	Code	Course	CO															
	19152E64DP	Remote sensing	• Principles of Remote Sensing and GIS • Analysis of RS and GIS data and interpreting the data for modeling applications • Principles of Remote Sensing and GIS • Analysis of RS and GIS data and interpreting the data for modeling applications	✓	✓	✓	✓	✓	✓								✓	✓
	19150E64FP	Transducer Engineering	• to model and analyze transducers	✓	✓	✓	✓	✓	✓								✓	✓
	19152L65P	VLSI and Embedded systems Lab	• Write HDL code for basic as well as advanced digital integrated circuit • Import the logic modules into FPGA Boards • Synthesize Place and Route the digital IPs • Write programs	✓	✓	✓	✓	✓	✓								✓	✓

Mapping of COs and Pos

			in ARM for a specific Application • Interface memory, A/D and D/A convertor												
VII	19160S71P	Total Quality Management	• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.					✓	✓	✓		✓	✓	✓
	19152H72P	Wireless Networks	• To understand physical as wireless MAC layer alternatives techniques. • To learn planning and operation of wireless networks. • To study various wireless LAN and WAN concepts. • To understand WPAN and geo-location systems.	✓	✓	✓	✓·	✓					✓	✓

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Code	Course	Objectives													
19152H73P	Telecommunication Switching and Networks	• To introduce the concepts of Frequency and Time division multiplexing. • To introduce digital multiplexing and digital hierarchy namely SONET / SDH • To introduce the concepts of space switching, time switching and combination switching, example of a sw	✓	✓	✓	✓	✓							✓	✓
191__E74_P	**Elective IV**														
19152E74AP	Power Electronics	• To study about power electronic circuits for voltage and current control and protection. • To learn the switching characteristics of transistors and	✓	✓	✓	✓	✓	✓						✓	✓

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			SCRs. Series and parallel functions of SCRs, Programmable triggering methods of SCR. • To learn controll						.							
	19152E74BP	Advanced Microprocessors	• To introduce the concepts in internal programming model of Intel family of microprocessors. • To introduce the programming techniques using MASM, DOS and BIOS function calls. • To introduce the basic architecture of Pentium family of processors. • To in	✓	✓	✓	✓	✓	✓						✓	✓
	19152E74CP	Electromagnetic Interference and Compatibility	• To understand EMI Sources, EMI problems and their solution methods in PCB level /	✓	✓	✓	✓	✓	✓						✓	✓

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			Subsystem and system level design. • To measure the emission. immunity level from different systems to couple with the prescribed EMC standards												
19152E74DP	Solid State Electronic Drives	• To learn crystal structures of elements used for fabrication of semiconductor devices. • To study energy band structure of semiconductor devices. • To understand fermi levels, movement of charge carriers, Diffusion current and Drift current. • To study	✓	✓	✓	✓	✓	✓					✓	✓

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Mapping of COs and Pos

19152E74FP	Space TimeWireless Communication	• Design and analyze the channel characterization. • Analyze the capacity of random MIMO channel. • Design and analyze the order diversity and channel variability. • Analyze the multiple antenna coding and receivers. • Analyze the MIMO multi user detectio	✓	✓	✓	✓	✓	✓					✓	✓
19152P75P	Project Work & Viva Voce	• apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study.•	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

			demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.•											

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Mapping of COs and POs

Sem	Course Code	Title of the Course	COs	POS											
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
I	19248S11B	Applied mathematics for Electronics Engineering	• Concepts on vector spaces, linear transformation, inner product spaces, eigen values and generalized eigenvectors. • Apply various methods in linear algebra to solve system of linear equations. • Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

			solving linear programming problems.													
19271H12	Statistical Signal Processing	• Formulate time domain and frequency domain description of Wide Sense Stationary process in terms of matrix algebra and relate to linear algebra concepts. • State Parseval's theorem, W-K theorem, principle of orthogonality, spectral factorization theorem, Widrow-Hoff LMS algorithm and Shannon's sampling theorem, and define linear prediction, linear estimation, sample auto-correlation, periodogram, bias and consistency.	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			

			• Explain various noise types, Yule-Walker algorithm, parametric and non-parametric methods, Wiener and Kalman filtering, LMS and RMS algorithms, Levinson Durbin algorithm, adaptive noise cancellation and adaptive echo cancellation, speed verses convergence issues, channel equalization, sampling rate change, subband coding and wavelet transform.												
	19271H13	Modern Digital Communication Systems	• Develop the ability to understand the concepts of signal space analysis for coherent and non-coherent receivers. • Conceptually appreciate different	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	

			Equalization techniques • Possess knowledge on different block codes and convolutional codes. • Comprehend the generation of OFDM signals and the techniques of multiuser detection.												
	19271S14	Communication Protocol Engineering	• Given the network and user requirements and the type of channel over which the network has to operate, the student would be in a position to apply his knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance. • The student would also be able to design a	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	

		new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.													
19271H15	Advanced Radiation Systems	• Ability to understand antenna concepts • Ability to design antenna for various applications • Knowledge of modern antenna design	✓	✓	✓	✓	✓	✓	✓		✓	✓		
ELECTIVE-I															
19271E16A	Internetworking and Multimedia	• Understand the state-of-art developments in Internet technologies and applications • Understand the development of next generation Internet • Appreciate the principles used in designing Internet protocols for multimedia applications, and	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Code	Course Name	Course Outcomes												
		so understand why standard protocols are designed the way that they are • Be able to solve problems for the design of multimedia applications on Internet.												
19271E16B	Digital Image Processing	• Explain the fundamentals digital image processing. • Describe image various segmentation and feature extraction techniques for image analysis. • Discuss the concepts of image registration and fusion.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271E16C	LASER Communication	Recognize and classify the structures of Optical fiber and types. • Discuss the channel impairments like losses and dispersion. • Analyze	✓	✓	✓	✓	✓	✓	✓	✓	✓			

		various coupling losses. • Classify the Optical sources and detectors and to discuss their principle. • Familiar with Design considerations of fiber optic systems. • To perform characteristics of optical fiber, sources and detectors, design as well as conduct experiments in software and hardware, analyze the results to provide valid conclusions.														
	19271E16D	MEMS and NEMS	Ability to understand the operation of micro devices, micro systems and their applications Ability to design the micro devices, micro systems using the	✔		✔		✔	✔	✔	✔	✔	✔	✔	✔

			MEMS fabrication process. Gain a knowledge of basic approaches for various sensor design Gain a knowledge of basic approaches for various actuator design Develop experience on micro/nano systems for photonics . Gain the technical knowledge required for computer-aided design, fabrication, analysis and characterization of nano-structured materials, micro- and nano-scale devices.														
	19271L19	Communication Systems Lab - I	• Measure and analyze various transmission line parameters.	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	

Sem	Code	Course	Outcomes															
			• Design Microstrip patch antennas. • Implement the adaptive filtering algorithms • To generate and detect digital communication signals of various modulation techniquesusing MATLAB.															
	19271CRS	Research Led Seminar	a. Exposure to various research domains b. Acquaintance with languages of research c. Development of research aptitude											✔				
SEMESTER-II																		
II	19271H21	Mobile Communication Networks	• Discuss cellular radio concepts.• Identify various propagation effects.• To have knowledge of the mobile system specifications.• Classify multiple access techniques in mobile	✔	✔	✔	✔	✔	✔	✔			✔	✔		

			communication. • Outline cellular mobile communication standards.Analyze various methodologies to improve the cellular capacity												
	19271H22	Advanced Microwave Systems	• Capability to design Microwave circuits. • To be able to analyze microwave integrated circuits.	✓	✓	✓	✓	✓		✓	✓	✓	✓		
	19271H23	Fiber Optic Networking	• Design and Analyze Network Components • Assess and Evaluate optical networks	✓	✓	✓	✓	✓ ✓	✓	✓	✓	✓			✓

ELECTIVE II

	19271E24A	High Speed Switching Architecture	• The student would be able to identify suitable switch architectures for a specified networking scenario and	✓	✓	✓	✓	✓	✓	✓	✓		✓		

			demonstrate its blocking performance. • The student would be in a position to apply his knowledge of switching technologies, architectures and buffering strategies for designing high speed communication networks and analyse their performance												
19271E24B	DSP Processor Architecture and Programming	• Become Digital Signal Processor specialized engineer • DSP based System Developer	✓	✓	✓	✓	✓	✓	✓	✓					
19271E24C	Digital Speech Processing	• Model speech production system and describe the fundamentals of speech. • Extract and compare different speech parameters. • Choose an	✓	✓	✓	✓	✓	✓	✓	✓		✓			

			appropriate statistical speech model for a given application. • Design a speech recognition system. • Use different text analysis and speech synthesis techniques.												
19271E24D	ASIC and FPGA Design	• Demonstrate VLSI tool-flow and appreciate FPGA architecture. • Understand the issues involved in ASIC design, including technology choice, design management, tool-flow, verification, debug and test, as well as the impact of technology scaling on ASIC design. • Understand the	✓	✓	✓	✓	✓	✓	✓	✓	✓			

			algorithms used for ASIC construction • Understand the basics of System on Chip, On chip communication architectures like AMBA,AXI and utilizing Platform based design. • Appreciate high performance algorithms available for ASICs													
	19271E25A	Digital Communicati on Receivers	• Apply basic principles of digital communication techniques. • Discuss on receivers for AWGN & Fading channel • Describe various synchronization techniques. • Design adaptive equalization	✓	✓	✓	✓	✓	✓	✓	✓	✓		

			algorithms to satisfy the evolving demands in digital communication.														
19271E25B	Soft Computing	• Knowledge on concepts of soft computational techniques. • Able to apply soft computational techniques to solve various problems. • Motivate to solve research oriented problems.		✓	✓	✓	✓	✓	✓	✓	✓	✓				
19271E25C	Communication Network Security	• Explain digital signature standards • Discuss authentication • Explain security at different layers	✓	✓	✓	✓	✓		✓	✓	✓	✓			
19271L26	Communication Systems Lab - II	• Apply knowledge to identify a suitable architecture and systematically design an RF system. •	✓	✓	✓	✓	✓	✓	✓	✓	✓				

			Comprehensively record and report the measured data, and would be capable of analyzing, interpreting the experimentally measured data and produce the meaningful conclusions. • Design and develop microstrip filters.															
	192TECWR	Technical Writing /Seminars	Selecting a subject, narrowing the subject into a topic 2. Stating an objective. 3. Collecting the relevant bibliography (atleast 15 journal papers) 4. Preparing a working outline. 5. Studying the papers and understanding the authors contributions and critically analysing each							✓	✓	✓	✓					

Code	Course	Description												
		paper. 6. Preparing a working outline 7. Linking the papers and preparing a draft of the paper. 8. Preparing conclusions based on the reading of all the papers. 9. Writing the Final Paper and giving final Presentation												
19271CRM	Research Methodology	a. Understanding research questions and tools b. Experience in scientific writings c. Practice in various aspects of scientific publications d. Inculcation of research ethics							✔	✔	✔	✔		
19271CBR	Participation in Bounded Research	a. Hands on exposure to problem solving tools in contemporary researchb. Evolution of research intuitiveness and orientationc.							✔	✔	✔	✔		

			Familiarity with cutting edge research trends												
III	19271H31	Wireless Sensor Networks	• Familiar with the latest 4G networks and LTE • Understand about the wireless IP architecture and LTE network architecture. • Familiar with the adaptive link layer and network layer graphs and protocol. • Understand about the mobility management and cellular network. • Understand about the wireless sensor network architecture and its concept.	✓	✓	✓	✓	✓	✓	✓	✓	✓		
			ELECTIVE IV												

19271E32A	Software Defined Radio	• Compare MAC and network layer design for software defined radio • Discuss cognitive radio for Internet of Things and M2Mtechnologies	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271E32B	Satellite Communication	• Discuss satellite navigation and global positioning system • Outline deep space networks and inter planetary missions	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	
19271E32C	CDMA Systems	• Analyze MIMO system. • Discuss millimeter wave communication. • Demonstrate software defined radio and cognitive radio.	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271E25D	Speech Processing and Synthesis	• Identify the various temporal, spectral and cepstral features required for identifying speech units – phoneme, syllable and word	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		

		• Determine and apply Mel-frequency cepstral coefficients for processing all types of signals • Justify the use of formant and concatenative approaches to speech synthesis • Identify the apt approach of speech synthesis depending on the language to be processed • Determine the various encoding techniques for representing speech.													
							ELECTIVE V								
19271E33A	Wavelets and Multi Resolution Processing	• The students will be able to apprehend the detailed knowledge about the Wavelet transforms& its applications.	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		

19271E33B	High performance Communication Networks	• Diagnose problems and make minor repairs to computer networks using appropriate diagnostics software • Demonstrate how to correctly maintain LAN computer systems • Maintain the network by performing routine maintenance tasks • Apply network management tools	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271E33C	Advanced Microprocessors and Microcontrollers	• The student will be able to work with suitable microprocessor / microcontroller for a specific real world application.	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
19271E33D	Reconfigurable computing	1. Identify the need for reconfigurable architectures 2. Discuss the architecture of FPGAs 3. Point out the	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

		salient features of different reconfigurable architectures 4. Build basic modules using any HDL 5. Develop applications using any HDL and appropriate tools 6. Design and build an SoPC for a particular application												

ELECTIVE VI

| 19271E34A | Simulation of Communication Networks | • Apply Monte Carlo simulation
• Discuss Lower Layer and Link Layer Wireless Modeling
• Compare channel modeling and mobility modeling | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |

19271E34B	Medical Imaging	• Explain computer aided tomography • Discuss ultrasonic systems • Outline magnetic resonance imaging	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271E34C	Mobile ADHOC networks	• Identify different issues in wireless ad hoc and sensor networks. • To analyze protocols developed for ad hoc and sensor networks. • To identify and address the security threats in ad hoc and sensor networks. • Establish a Sensor network environment for different type of applications.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271E34D	Ultra Wide Band Communication	radio technology that can use a very low energy level for short-range, high-	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	

		bandwidth communications over a large portion of the radio spectrum															
	Project Phase – I	The student should be able to: • Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study. • Use effectively oral, written and visual communication. • Identify, analyze, and solve problems creatively through sustained critical															
19271P35		investigation.							✔								

Code	Course	Outcomes															
		• Integrate information from multiple sources. • Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards. • Practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.															
19271CSR	Participation in Scaffolded Research(Design/Societal Project)	a. Sensitization of social needs for innovation b. Team work towards interdisciplinary synchronous research strategy c. Development of critical thinking and synergistic research approach.						✓									
SEM IV																	
19271P41	Project Phase – II	The student should be able to: • Apply						✓									

			fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study. • Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study. • Use effectively oral, written and visual communication. • Identify, analyze, and solve problems creatively through sustained critical investigation. • Integrate information from multiple sources. • Demonstrate an awareness and application of appropriate personal, societal,													

			and professional ethical standards. • Practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.													

Mapping of COs and POs

Sem	Course Code	Title of the Course	COs	POS											
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
								SEM-I							
I	19248S11BP	Applied mathematics for Electronics Engineering	• Concepts on vector spaces, linear transformation, inner product spaces, eigen values and generalized eigenvectors. • Apply various methods in linear algebra to solve system of linear equations. • Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for solving linear programming problems.	✔	✔		✔	✔	✔	✔	✔		✔	✔	✔

| | 19271C12 P | Statistical Signal Processing | • Formulate time domain and frequency domain description of Wide Sense Stationary process in terms of matrix algebra and relate to linear algebra concepts. • State Parseval's theorem, W-K theorem, principle of orthogonality, spectral factorization theorem, Widrow-Hoff LMS algorithm and Shannon's sampling theorem, and define linear prediction, linear estimation, sample auto-correlation, periodogram, bias and consistency. • Explain various noise types, Yule-Walker algorithm, parametric and non-parametric methods, Wiener and Kalman filtering, LMS and RMS algorithms, Levinson Durbin algorithm, adaptive noise cancellation and adaptive echo cancellation, speed verses convergence issues, channel equalization, sampling rate change, subband | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

			coding and wavelet transform.											
	19271C13P	Modern Digital Communication Systems	• Develop the ability to understand the concepts of signal space analysis for coherent and non-coherent receivers. • Conceptually appreciate different Equalization techniques • Possess knowledge on different block codes and convolutional codes. • Comprehend the	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	

Code	Course	Course Outcomes												
		generation of OFDM signals and the techniques of multiuser detection.												
19271L14 P	Communication Systems Lab - I	• Measure and analyze various transmission line parameters.• Design Microstrip patch antennas.• Implement the adaptive filtering algorithms• To generate and detect digital communication signals of various modulation techniquesusing MATLAB.	✔	✔		✔	✔	✔	✔		✔		✔	✔	✔
19271CRS P	Research Led Seminar	a. Exposure to various research domains b. Acquaintance with languages of research c. Development of research aptitude							✔				✔		
		SEM-II													

19271C21P	Mobile Communication Networks	• Discuss cellular radio concepts. • Identify various propagation effects. • To have knowledge of the mobile system specifications. • Classify multiple access techniques in mobile communication. • Outline cellular mobile communication standards. Analyze various methodologies to improve the cellular capacity	✔	✔	✔	✔	✔	✔	✔	✔	✔		
19271C22P	Advanced Microwave Systems	• Capability to design Microwave circuits. • To be able to analyze microwave integrated circuits.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	
19271L24P	Communication Systems Lab - II	• Apply knowledge to identify a suitable architecture and systematically design an RF system. • Comprehensively record and report the measured data, and would be capable of analyzing, interpreting the experimentally measured data and produce the meaningful conclusions.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	

			• Design and develop microstrip filters.														
	19271TEC WRP	Technical Writing /Seminars	Selecting a subject, narrowing the subject into a topic 2. Stating an objective. 3. Collecting the relevant bibliography (atleast 15 journal papers) 4. Preparing a working outline. 5. Studying the papers and understanding the authors contributions and critically analysing each paper. 6. Preparing a working outline 7. Linking the papers and preparing a draft of the paper. 8. Preparing conclusions based on the reading of all the papers.									✓					

		9. Writing the Final Paper and giving final Presentation												
19271CRMP	Research Methodology	a. Understanding research questions and tools b. Experience in scientific writings c. Practice in various aspects of scientific publications d. Inculcation of research ethics						✔						
19271CBRP	Participation in Bounded Research	a. Hands on exposure to problem solving tools in contemporary researchb. Evolution of research intuitiveness and orientationc. Familiarity						✔						

		with cutting edge research trends														
SEM-III																
19271C31 P	Communication Protocol Engineering	• Given the network and user requirements and the type of channel over which the network has to operate, the student would be in a position to apply his knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance. • The student would also be able to design a new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
19271C32 P	Advanced Radiation Systems	• Ability to understand antenna concepts • Ability to design antenna for various applications • Knowledge of modern antenna design	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

| 19271CSRP | Design/Socio technical Project | Sensitization of social needs for innovation b. Team work towards interdisciplinary synchronous research strategy c. Development of critical thinking and synergistic research approach. | | | | | | | | ✓ | | | ✓ | |

SEM-IV

| 19271C41P | Wireless Sensor Networks | • Familiar with the latest 4G networks and LTE • Understand about the wireless IP architecture and LTE network architecture. • Familiar with the adaptive link layer and network layer graphs and protocol. • Understand about the mobility management and cellular network. • Understand about the wireless sensor network architecture and its concept. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| 19271C42P | Fiber Optic Networking | • Design and Analyze Network Components • Assess and Evaluate optical networks | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |

	19271P44 P	Project Phase – I	The student should be able to:• Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study.• Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.• Use effectively oral, written and visual communication.• Identify, analyze, and solve problems creatively through sustained critical investigation.• Integrate information from multiple sources.• Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards.• Practice the skills, diligence, and commitment to excellence needed to engage in lifelong learning.									✓							
ELECTIVE-I																			

19271E23AP	High Speed Switching Architecture	• The student would be able to identify suitable switch architectures for a specified networking scenario and demonstrate its blocking performance. • The student would be in a position to apply his knowledge of switching technologies, architectures and buffering strategies for designing high speed communication networks and analyse their performance	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	
19271E23BP	DSP Processor Architecture and Programming	• Become Digital Signal Processor specialized engineer • DSP based System Developer	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	

19271E23CP	Digital Speech Processing	• Model speech production system and describe the fundamentals of speech. • Extract and compare different speech parameters. • Choose an appropriate statistical speech model for a given application. • Design a speech recognition system. • Use different text analysis and speech synthesis techniques.															
			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

19271E2 3DP	ASIC and FPGA Design	• Demonstrate VLSI tool-flow and appreciate FPGA architecture.• Understand the issues involved in ASIC design, including technology choice, design management, tool-flow, verification, debug and test, as well as the impact of technology scaling on ASIC design.• Understand the algorithms used for ASIC construction• Understand the basics of System on Chip, On chip communication architectures like AMBA,AXI and utilizing Platform based design.• Appreciate high performance algorithms available for ASICs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

ELECTIVE-II

	Code	Course	Outcomes													
	19271E33AP	Internetworking and Multimedia	• Understand the state-of-art developments in Internet technologies and applications • Understand the development of next generation Internet • Appreciate the principles used in designing Internet protocols for multimedia applications, and so understand why standard protocols are designed the way that they are • Be able to solve problems for the design of multimedia applications on Internet.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		
	19271E33BP	Digital Image Processing	• Explain the fundamentals digital image processing. • Describe image various segmentation and feature extraction techniques for image analysis. • Discuss the concepts of image registration and fusion.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		

	19271E33CP	LASER Communication	Recognize and classify the structures of Optical fiber and types. • Discuss the channel impairments like losses and dispersion. • Analyze various coupling losses. • Classify the Optical sources and detectors and to discuss their principle. • Familiar with Design considerations of fiber optic systems. • To perform characteristics of optical fiber, sources and detectors, design as well as conduct experiments in software and hardware, analyze the results to provide valid conclusions.													
				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

19271E33DP	MEMS and NEMS	Ability to understand the operation of micro devices, micro systems and their applications Ability to design the micro devices, micro systems using the MEMS fabrication process. Gain a knowledge of basic approaches for various sensor design Gain a knowledge of basic approaches for various actuator design Develop experience on micro/nano systems for photonics . Gain the technical knowledge required for computer-aided design, fabrication, analysis and characterization of nano-structured materials, micro- and nano-scale devices.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	

EELECTIVEIII

Code	Course	Outcomes										
19271E4 3AP	Digital Communication Receivers	• Apply basic principles of digital communication techniques. • Discuss on receivers for AWGN & Fading channel • Describe various synchronization techniques. • Design adaptive equalization algorithms to satisfy the evolving demands in digital communication.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
19271E4 3BP	Soft Computing	• Knowledge on concepts of soft computational techniques. • Able to apply soft computational techniques to solve various problems. • Motivate to solve research oriented problems.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
19271E4 3CP	Communication Network Security	• Explain digital signature standards • Discuss authentication • Explain security at different layers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

| 19271E4 3DP | Radar Signal Processing | • Know how a radar is built and understand the principles of behavior.
 • Have a basic understanding of how radar signals propagate through a medium, and the mechanisms for signal reflection from the target and unwanted reflections ("clutter").
 • Understand the basic principles of signal processing done in a radar.
 • Be able to estimate the performance of a radar based on parameters provided, for example at what distance the radar will be able to detect targets of a given size.
 • Be able to assess what type of radar is suitable for which task (choice of waveforms, frequency bands, etc..).
 • Be able to use numerical tools to calculate radar performance and to | ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔ |

		simulate the signal processing in a radar.												

ELECTIVE IV SEM-V														
19271E51AP	Software Defined Radio	• Compare MAC and network layer design for software defined radio• Discuss cognitive radio for Internet of Things and M2Mtechnologies												
19271E51BP	Satellite Communication	• Discuss satellite navigation and global positioning system • Outline deep space networks and inter planetary missions	✔	✔	✔	✔	✔	✔	✔	✔	✔	

19271E51CP	CDMA Systems	• Analyze MIMO system. • Discuss millimeter wave communication. • Demonstrate software defined radio and cognitive radio.	✔	✔	✔	✔	✔	✔	✔	✔	✔	
19271E51DP	Speech Processing and Synthesis	• Identify the various temporal, spectral and cepstral features required for identifying speech units – phoneme, syllable and word • Determine and apply Mel-frequency cepstral coefficients for processing all types of signals • Justify the use of formant and concatenative approaches to speech synthesis • Identify the apt approach of speech synthesis depending on the language to be processed • Determine the various encoding techniques for representing speech.	✔	✔	✔	✔	✔	✔	✔	✔	✔	
		ELECTIVE V										
19271E52AP	Wavelets and Multi Resolution	• The students will be able to apprehend the detailed knowledge about the Wavelet	✔	✔	✔	✔	✔	✔	✔	✔	✔	

Code	Subject	Course Outcomes											
	Processing	transforms& its applications.											
19271E52BP	High performance Communication Networks	• Diagnose problems and make minor repairs to computer networks using appropriate diagnostics software • Demonstrate how to correctly maintain LAN computer systems • Maintain the network by performing routine maintenance tasks • Apply network management tools	✓	✓	✓	✓	✓	✓	✓	✓	✓	
19271E52CP	Advanced Microprocessors and Microcontrollers	• The student will be able to work with suitable microprocessor / microcontroller for a specific real world application.	✓	✓	✓	✓	✓	✓	✓	✓	✓	
19271E52DP	Reconfigurable computing	1. Identify the need for reconfigurable architectures 2. Discuss the architecture of FPGAs 3. Point out the salient features of different reconfigurable architectures 4. Build basic	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Code	Course	Outcomes											
		modules using any HDL 5. Develop applications using any HDL and appropriate tools 6. Design and build an SoPC for a particular application											
		ELECTIVEVI											
19271E53AP	Simulation of Communication Networks	• Apply Monte Carlo simulation• Discuss Lower Layer and Link Layer Wireless Modeling• Compare channel modeling and mobility modeling	✔	✔	✔	✔	✔	✔	✔	✔	✔		
19271E53BP	Medical Imaging	• Explain computer aided tomography • Discuss ultrasonic systems • Outline magnetic resonance imaging	✔	✔	✔	✔	✔	✔	✔	✔	✔		

19271E5 3CP	Mobile ADHOC networks	• Identify different issues in wireless ad hoc and sensor networks. • To analyze protocols developed for ad hoc and sensor networks. • To identify and address the security threats in ad hoc and sensor networks. • Establish a Sensor network environment for different type of applications.	✔	✔	✔	✔	✔	✔	✔	✔	✔				
19271E5 3DP	Ultra Wide Band Communi cation	radio technology that can use a very low energy level for short-range, high-bandwidth communications over a large portion of the radio spectrum	✔	✔	✔	✔	✔		✔	✔	✔	✔		
			SEM VI												

| | 19271P61P | Project Phase – II | The student should be able to:
• Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal area of study.
• Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.
• Use effectively oral, written and visual communication.
• Identify, analyze, and solve problems creatively through sustained critical investigation.
• Integrate information from multiple sources.
• Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards.
• Practice the skills, diligence, and commitment to excellence needed to engage in lifelong | | | | | | | | ✔ | | | ✔ | | |

learning.