

VASIREDDY VENKATADRI INSTITUTE OF TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
R16 CO-PO-PSO GRAND MATRIX

By the end of the each course student will be able to

B,Tech Ist Year –Ist Semester

R161101	English	CO1	Read and comprehend English stories and texts														
		CO2	Write effectively using appropriate format														
		CO3	Listen and speak in English without inhibition														
		CO4	Expand vocabulary range to improve essential grammar necessary for effective communication														
		CO5	Transfer verbal information into nonverbal information and vice versa														
		CO6	critically respond in English to a real life situations and improve life skills and core skills necessary for effective communication														
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
		CO1	-	-	-	-	-	-	-	-	-	3	-	1	-	-	
		CO2	-	-	-	-	-	-	-	-	-	3	-	1	-	-	
		CO3	-	-	-	-	-	-	-	-	2	3	-	1	-	-	
		CO4	-	-	-	-	-	-	-	-	-	3	-	1	-	-	
		CO5	-	-	-	-	-	-	-	-	-	3	-	1	-	-	
		CO6	-	-	-	-	-	-	-	-	2	3	-	1	-	-	
R161102	Mathematics-I	CO1	Able to solve first order ordinary Differential equations and their applications.														
		CO2	Able to solve higher order ordinary differential equations														
		CO3	Able to learn Laplace transforms and solve initial value problems in ordinary differentialequations using Laplace transforms.														
		CO4	Able to learn Partial differentiation														
		CO5	Able to Solve first order partial differential equations														
		CO6	Able to Solve higher order partial differential equations.														
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
		CO1	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO2	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO3	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO4	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO5	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO6	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
R161110	Mathematics-II	CO1	Able to solve trancdential equations using numerical methods														
		CO2	Able to learn errors in polynomial interpolation using finite differences														
		CO3	Able to solve intimal value problems in ordinary differential equations using numerical methods														
		CO4	Able to learn expansion of a periodic function as fourier series and it's applications														
		CO5	Able to learn Fourier integration and Fourier transformations														
		CO6	Able to learn Z transformations and inverse Z transformations and it's properties they able to														
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
		CO1	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO2	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO3	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO4	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO5	3	2	-	-	-	-	-	-	-	-	-	1	-	-	
		CO6	3	2	-	-	-	-	-	-	-	-	-	1	-	-	

R161104	APPLIED PHYSICS	CO1	Students acquire the ability to apply knowledge of Interference concepts of light.											
		CO2	Students acquire the ability to apply knowledge of Diffraction concepts of light.											
		CO3	Students will be able to understand the applications of Lasers.											
		CO4	Knowledge of EM Wave propagation and its applications will be gained											
		CO5	Students will be able to develop scientific point of view in solving problems in Quantum mechanic											
		CO6	Students will be able to design and analyse Laws and principles of Semiconductor Physics and con											
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO1	3	2	-	-	-	-	-	-	-	-	1	-
		CO2	3	2	-	-	-	-	-	-	-	-	1	-
		CO3	3	2	-	-	-	-	-	-	-	-	1	-
		CO4	3	2	-	-	-	-	-	-	-	-	1	-
		CO5	3	2	-	-	-	-	-	-	-	-	1	-
		CO6	3	2	-	-	-	-	-	-	-	-	1	-
R161107	Computer Programming	CO1	Able to Design algorithmic solutions to problems and implementing algorithms inC.											
		CO2	Able to Design algorithmic solutions to problems and implementing algorithms inC.											
		CO3	Able to Illustrate branching, iteration and data representation using arrays.											
		CO4	Able to Implement modular programming and recursive solution formulation.											
		CO5	Able to Illustrate branching, iteration and data representation using arrays.											
		CO6	Able to Comprehend pointers and dynamic memory allocation.											
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO1	1	1	3	1	1	-	-	-	-	-	-	3
		CO2	1	1	3	1	1	-	-	-	-	-	-	3
		CO3	2	2	2	2	-	-	-	-	-	-	-	3
		CO4	2	2	3	2	2	-	-	-	-	-	-	3
		CO5	2	2	2	2	-	-	-	-	-	-	-	3
		CO6	2	2	2	3	2	-	-	-	-	-	-	3
R161113	Engineering Drawing	CO1	Able to understand different scales used in industry and draw various curves.											
		CO2	Able to recognize principles of projections to draw orthographic projections.											
		CO3	Able to interpret the projection principles to draw projections of straight lines.											
		CO4	Able to understand the various ways to draw projection of planes.											
		CO5	Able to draw projections of solids by applying principles of orthographic projections and isometric projections											
		CO6	Able to convert isometric views into orthographic views and orthographic views to isometric											
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO1	3	3	2	-	-	-	-	-	1	-	-	1
		CO2	3	2	2	-	-	-	-	-	1	-	-	1
		CO3	3	2	2	-	-	-	-	-	1	-	-	1
		CO4	2	2	2	-	-	-	-	-	1	-	-	1
		CO5	2	2	3	-	-	-	-	-	1	-	-	1
		CO6	2	2	3	-	-	-	-	-	1	-	-	1

English Lab	CO1	Elicit information in English and respond appropriately													
	CO2	Learn telephone etiquette and converse effectively													
	CO3	Use functional English as demanded by situations through role plays													
	CO4	Understand native and non-native accents of English													
	CO5	Learn Phonetics of English and transcribe given texts													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	-	-	-	-	-	-	-	-	1	3	-	1	-	-
	CO2	-	-	-	-	-	-	-	-	1	3	-	1	-	-
	CO3	-	-	-	-	-	-	-	-	1	3	-	1	-	-
	CO4	-	-	-	-	-	-	-	-	1	3	-	1	-	-
	CO5	-	-	-	-	-	-	-	-	1	3	-	1	-	-
Applied Physics Lab	CO1	Elicit information in English and respond appropriately													
	CO2	Learn telephone etiquette and converse effectively													
	CO3	Use functional English as demanded by situations through role plays													
	CO4	Understand native and non-native accents of English													
	CO5	Learn Phonetics of English and transcribe given texts													
	CO6	Able to understand electromagnetism and experimental experience.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	3	-	-	3	2	-	-	-	-	-	-	1	-	-
	CO2	3	-	-	3	2	-	-	-	-	-	-	1	-	-
	CO3	3	-	-	3	2	-	-	-	-	-	-	1	-	-
	CO4	3	-	-	3	2	-	-	-	-	-	-	1	-	-
	CO5	3	-	-	3	2	-	-	-	-	-	-	1	-	-
	CO6	3	-	-	3	2	-	-	-	-	-	-	1	-	-
ENGINEERING WORKSHOP & IT WORKSHOP	CO1	To select suitable carpentry tools to prepare different types of joints.													
	CO2	To identify tools required in the fitting operation to perform joint preparations.													
	CO3	To understand the process of making different objects with thin sheets using proper tinsmithy tools.													
	CO4	To differentiate single phase, 3 phase wiring connections.													
	CO5	Identify the basic computer peripheral and gain sufficient knowledge on assembling and disassembling a PC.													
	CO6	Learn the installation procedure of Windows and Linux OS, Acquire knowledge on basic													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	3	3	-	-	-	2	-	2	-	-	-	3	2	-
	CO2	3	3	-	-	-	2	-	2	-	-	-	3	3	2
	CO3	3	3	-	-	-	2	-	2	-	-	-	3	-	-
	CO4	3	3	-	-	-	2	-	2	-	-	-	3	-	2
	CO5	3	3	-	-	-	2	-	2	-	-	-	3	3	-
	CO6	3	3	-	-	-	2	-	2	-	-	-	3	2	1

B.Tech., I-Year II Semester

R161201	English II	CO1	Read and comprehend biographies and technical texts in English													
		CO2	Write letters, emails effectively using appropriate format for technical communication													
		CO3	Improve listening skills particularly related to Technical English and speak in English without inhibition													
		CO4	Improve word power and identify grammatical errors in sentences													
		CO5	Draft technical reports, summarize stories and articles													
		CO6	critically respond in English to a real life situations and improve life skills and core skills necessary for effective communication													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	-	-	-	-	-	-	-	-	3	-	1	-	-	
		CO2	-	-	-	-	-	-	-	-	3	-	1	-	-	
		CO3	-	-	-	-	-	-	-	2	3	-	1	-	-	
		CO4	-	-	-	-	-	-	-	-	3	-	1	-	-	
		CO5	-	-	-	-	-	-	-	-	3	-	1	-	-	
		CO6	-	-	-	-	-	-	-	-	2	3	-	1	-	
R161203	Mathematics III	CO1	Solve the system of linear equations and Analyse their applications.													
		CO2	Compute an Eigen values and eigen vectors													
		CO3	Evaluate double and Triple integrals and Apply to find surface area and volumes of solids.													
		CO4	Compare definite integral with special functions													
		CO5	Differentiate the scalar and vector functions.													
		CO6	Understand line, surface and volume integrals and Establish vector integral theorems.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3	2	-	-	-	-	-	-	-	-	1	-	-	
		CO2	3	2	-	-	-	-	-	-	-	-	1	-	-	
		CO3	3	2	-	-	-	-	-	-	-	-	1	-	-	
		CO4	3	2	-	-	-	-	-	-	-	-	1	-	-	
		CO5	3	2	-	-	-	-	-	-	-	-	1	-	-	
		CO6	3	2	-	-	-	-	-	-	-	-	1	-	-	
R161211	Applied Chemistry	CO1	Able to explain about synthesis, physical and mechanical properties, compounding and reframing & fabrication of polymers, plastics and elastomers and Applications of fibre reinforced polymers along with conducting polymers.													
		CO2	Recognize specific characteristic properties of fuels including calorific value determination ,Ranking and Analysis of coal by proximate and ultimate methods.													
		CO3	Understanding the principles, Construction and working of galvanic cells, electrode potentials, concentration cells , rechargeable batteries.													
		CO4	Illustrate the applications of cleaner and greener synthetic methods adapt in industries for healthy living.													
		CO5	Understanding the structures of solid crystalline structures, synthesis of ultra pure semiconductors													
		CO6	Recognize non conventional energy sources, construction & working of photovoltaic cell.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	2	3	-	-	-	-	-	-	-	2	-	-	-	
		CO2	3	3	-	-	-	-	-	-	-	2	2	-	-	
		CO3	2	2	-	-	-	-	-	-	-	1	3	-	-	
		CO4	3	2	-	-	-	-	-	-	-	1	3	-	-	

		CO5	2	1	-	-	-	-	-	-	-	1	1	-	-
		CO6	2	2	-	-	-	-	-	-	-	1	2	-	-

R161212	ENVIRONMENTAL STUDIES	CO1	Understand The concepts of the ecosystem													
		CO2	Understand The natural resources and their importance													
		CO3	Learn The biodiversity of India and the threats to biodiversity ,and Apply conservationpractices													
		CO4	Learn Various attributes of the pollution and their impacts													
		CO5	Understand Social issues both rural and urban environment													
		CO6	Understand About environmental Impact assessment and Evaluate the stages involved in													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3	-	-	3	2	--	3	3	--	--	3	2	2	-
		CO2	2	-	-	2	2	--	2	2	--	--	3	2	3	2
		CO3	3	-	-	3	2	--	2	2	--	--	3	3	-	-
		CO4	2	-	-	3	2	--	2	2	--	--	3	3	-	2
		CO5	3	-	-	1	3	--	3	3	--	--	3	2	3	-
		CO6	3	-	-	3	3	--	3	3	--	--	2	2	2	1

R1612135	DATA STRUCTURES	CO1	Define basic static and dynamic data structures and infer searching and sorting Algorithms.													
		CO2	Infer appropriate data structures like stacks or queues in simple programs or program parts.													
		CO3	Demonstrate usage of linked list in real world applications.													
		CO4	Illustrate binary trees with examples.													
		CO5	Apply algorithms for finding shortest path in graphs.													
		CO6	Understand sorting techniques													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	2	3	2	2	-	-	-	-	-	-	-	-	2	-
		CO2	2	2	3	-	-	-	-	-	-	-	-	-	-	2
		CO3	-	2	-	2	2	-	-	-	-	-	-	3	2	-
		CO4	2	2	-	-	2	-	-	-	-	-	-	2	-	-
		CO5	2	-	-	2	-	-	-	-	-	-	-	3	-	2
		CO6	2	-	-	2	-	-	-	-	-	-	-	3	-	2

R16	ENGLISH-COMMUNICATION SKILLS	CO1	Learn to make informed opinions considering pros and cons of a given situation or topic.													
		CO2	Understand group dynamics and participate in Group Discussions.													
		CO3	Make oral presentation using tools like MS PowerPoint.													
		CO4	Prepare for an interview with the help of FAQs.													
		CO5	Draft resume's and emails for career with effective expressions.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	-	-	-	-	-	-	-	-	1	3	-	1	-	-
		CO2	-	-	-	-	-	-	-	-	1	3	-	1	-	-
		CO3	-	-	-	-	-	-	-	-	1	3	-	1	-	-
		CO4	-	-	-	-	-	-	-	-	1	3	-	1	-	-
		CO5	-	-	-	-	-	-	-	-	1	3	-	1	-	-

R16	Applied Chemistry Lab	CO1	Use of chemicals in day to day life particularly in engineering is required to bring awareness in material chemistry (Nanomaterials , liquid crystals, spinels thermosetting plastics like Bakelite).													
		CO2	Knowledge about electro chemicals in pH metry, potentiometry and conductivity cells in conductometry													
		CO3	Knowledge about water quality analysis like pH turbidity(TDS),hardness, conductivity.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	-	3	2	-	-	-	-	1	2	-	-	2	-	-

		CO2	-	2	3	-	-	-	1	3	-	-	1	-	-	
		CO3	-	1	2	-	-	-	1	2	-	-	1	-	-	
C.PROGRAMMING LAB	CO1	Design solutions to the various problems in the field of computer science.														
	CO2	Implement the concepts of arrays and strings.														
	CO3	Analyze the concepts of modular programming and develop solutions.														
	CO4	Implement Programs with pointers and comprehend the dynamic memory allocation functions.														
	CO5	Develop programs that perform operations using derived data types														
	CO6	Implement programs for data transfers between files														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
CO1	1	1	3	1	1	-	-	-	-	-	-	-	-	3	3	
CO2	2	2	2	2	-	-	-	-	-	-	-	-	-	3	2	
CO3	2	2	3	2	2	-	-	-	-	-	-	-	-	3	2	
CO4	2	2	2	3	2	-	-	-	-	-	-	-	-	3	3	
CO5	1	2	3	2	2	-	-	-	-	-	-	-	-	3	2	
CO6	1	2	3	2	2	-	-	-	-	-	-	-	-	3	2	

B.Tech 2nd Year., I – semester

R162	1043	SIGN AIS	CO1	Describe signals mathematically and understand how to perform different operations on signals, understand principles of vector spaces, Concept of orthogonality.
			CO2	Analyse the continuous-time signals and continuous-time systems using Fourier series.

R1621044 NETWORK ANALYSIS	CO1	Use different circuit solving techniques like mesh analysis, nodal analysis, voltage division and current division methods.													
	CO2	Analyze and design series and parallel A.C. circuits using different design parameters													
	CO3	Analyze and design series and parallel A.C. circuits using different design parameters													
	CO4	Solve D.C. and A.C. circuits using different theorems like Thevinin's, Norton's, Maximum Power transfer theorems.													
	CO5	Create different two port networks using two port network parameters like Impedance.													
	CO6	Analyze the switching behavior of both inductor and capacitor in time and Laplace domains													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	3	2	-	-	-	-	-	-	-	-	-	3	2	3
	CO2	-	-	3	-	-	-	-	-	-	-	-	-	2	3
	CO3	-	-	3	-	-	-	-	-	-	-	-	-	3	2
	CO4	3	-	-	-	-	-	-	-	-	-	-	3	3	3
	CO5	-	2	3	-	-	-	-	-	-	-	-	-	3	3
	CO6	3	-	-	-	-	-	-	-	-	-	-	3	3	3

R1621045	RANDOM VARIABLES AND STOCHASTIC PROCESSES	CO1	Mathematically model the random phenomena and solve simple probabilistic problems													
		CO2	Identify different types of random variables and compute statistical averages of single random variables													
		CO3	Analyse various properties of different density and distribution functions for single and multiple random variables.													
		CO4	Characterise the time and frequency domain characteristics of Random Processes.													
		CO5	Design linear systems for random inputs.													
		CO6	Construct and analyse the mathematical modelling of noise sources. Apply these techniques to analyze the LTI systems in the presence of different types of noise													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	1	-	-	-	2	-	-	-	-	-	-	-	1	
		CO2	2	1	-	-	2	-	-	-	-	-	-	1	-	
		CO3	1	2	1		3	-	-	-	-	-	-	-	2	
		CO4	2	2	2	1	2	-	-	-	-	-	-	2	2	
		CO5	2	2	2	2	3	-	-	-	-	-	-	2	2	
		CO6	2	2	2	2	3	-	-	-	-	-	-	2	2	

R1621026 MANAGERIAL ECONOMICS &	CO1	Introduce Managerial Economics to engineering students, concepts of demand like law determinants
	CO2	Evaluate the student knowledge of production & cost estimation.
	CO3	Introduce markets, theory of the firm and pricing policies in different markets.
	CO4	Know the different forms of business organization and their merits and demerits
	CO5	Understand the different accounting systems preparation of financial statements.
	CO6	Understand the concepts of capital, capitalization techniques used to evaluate capital investment.

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	2	1	-	-	2	-	-	-	-	-	1	2	1	
	CO2	2	2	2	-	2	-	-	-	-	-	1	2	2	
	CO3	1	2	2	1	1	-	-	-	-	-	1	2	1	
	CO4	1	2	2	2	2	-	-	-	-	-	1	2	2	
	CO5	1	2	2	2	2	-	-	-	1	-	1	1	2	1
	CO6	1	2	2	2	2	-	-	-	1	-	1	1	2	2

B.Tech 2nd Year – II Semester

R1622043 EM WAVES AND TRANSMISSION LINES	CO1	Define primary electric quantities and the basic laws in static electric fields and applying them to different engineering situations.													
	CO2	Analyze the basic laws in static magnetic fields, Maxwell's equation in different forms and applying them to different engineering situations.													
	CO3	Understand the Electromagnetic wave characteristics in different mediums and derive the Wave equations in those mediums.													
	CO4	Analyze the EM wave propagation in different mediums by applying boundary conditions.													
	CO5	Understand the parameters, constants, types and characteristic impedance of transmission lines													
	CO6	Analyze electromagnetic wave propagation in generic transmission line geometries and to use smith chart for impedance measurements.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3	3	-	-	-	-	-	-	-	-	2	3	2
		CO2	3	3	-	-	-	-	-	-	-	-	2	3	2
		CO3	2	-	-	2	-	-	-	-	-	-	-	2	2
		CO4	2	-	-	2	-	-	-	-	-	-	-	2	2
		CO5	-	3	2	-	-	-	-	-	-	-	2	3	3
		CO6	-	3	-	3	-	-	-	-	-	-	2	3	3

R1622045	PULSE AND	CO1	Understand the working of linear wave shaping circuits and analyze the responses of RC, RLC circuits for various inputs.
		CO2	Develop nonlinear circuits like clippers and clampers using active and passive elements.
		CO3	Examine the concept of switching characteristics of diodes and transistors.
		CO4	Analyze various Multi-vibrator circuits and their applications..

R1622026	MANAGEMENT SCIENCE	CO1	Understanding basics of management & organization													
		CO2	Remembering principles of management and applying the concepts of work study													
		CO3	Analyze the functions of HRM and marketing.													
		CO4	Applying PERT & CPM techniques to solve project management problems.													
		CO5	Evaluating SWOT Analysis for formulating and implementing strategies.													
		CO6	Creating awareness about modern or contemporary management practices.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	-	-	-	-	-	-	-	-	2	2	2	2	-	-
		CO2	-	-	-	-	-	-	-	-	-	2	2	2	-	-
		CO3	-	-	-	-	-	-	-	-	2	3	2	2	-	-
		CO4	-	-	2	-	-	-	-	-	-	2	3	2	-	-
		CO5	-	-	-	-	-	-	-	-	-	2	2	2	-	-
		CO6	-	-	-	-	2	-	-	-	-	2	2	2	-	-

B.Tech 3rd Year., I – semester

CO6 3 2 3 - - - - - - - - - - - - - - 2 3 2

R1631045 ANTENNAS WAVE AND PROPAGATION	CO1	Understand & Remember the fundamentals of antenna theory for designing various Antennas													
	CO2	Evaluate the Electric and Magnetic Field Equations for basic antennas at Far Field conditions													
	CO3	Construct the basic array system in antennas and Draw the Radiation Mechanisms for different types of arrays.													
	CO4	Design different structures for Microstrip Antennas and helical antennas.													
	CO5	Analyze the operation of VHF, UHF and Microwave Antennas.													
	CO6	Identify and Explain the atmospheric and terrestrial effects on radio wave propagation.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	2	3	-	-	2	-	-	-	-	-	-	3	2
		CO2	3	2	-	-	3	2	1	-	-	-	-	3	3
		CO3	3	-	3	-	-	1	-	-	-	-	-	2	2
		CO4	-	-	3	-	-	-	-	-	-	-	-	3	3
		CO5	-	-	2	3	3	2	1	-	-	-	-	2	3
		CO6	2	-	-	3	3	1	-	-	-	-	-	2	3

PULSE AND DIGITAL	CO1	Understand the concept of Linear & Non-Linear wave shaping circuits
	CO2	Learn the Switching Characteristics of transistor
	CO3	Understand fundamentals of basic logic gates and design applications
	CO4	Understand Sampling Gates and to Design NAND and NOR gates using various logic families.
	CO5	Design and analyze various multivibrator circuits
	CO6	Design different Time-base circuits.

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	-	-	-	-	-	-	-	-	-	-	3	1
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	2	3
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	3	2
CO4	-	2	2	-	-	-	-	-	-	-	-	-	-	3	2
CO5	-	2	2	-	-	-	-	-	-	-	-	-	-	2	3
CO6	-	2	2	-	-	-	-	-	-	-	-	-	-	2	2

LINEAR IC APPLICATIONS LAB	CO1	Understand the basic Mathematical operations of Operational Amplifier													
	CO2	Design and Observe the frequency response of Active Filters.													
	CO3	Measure the theoretical and practical frequency of oscillations of oscillators using Operational Amplifier													
	CO4	Construct different Waveform Generators using Operational Amplifier and 555 Timer													
	CO5	Experiment with different Voltage Regulators IC's.													
	CO6	Build different Analog –Digital Converters and Digital – Analog Converters													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	3	2	-	-	-	-	-	-	-	-	-	-	3	2
	CO2	-	3	-	-	-	-	-	-	3	-	-	-	2	3
	CO3	-	-	-	3	-	-	-	-	3	-	-	-	2	3
	CO4	-	-	-	3	-	-	-	-	3	-	-	-	3	2
	CO5	-	-	2	-	-	-	-	-	-	-	-	-	3	2
	CO6	-	-	3	-	-	-	-	-	2	-	-	-	3	2

R1631044 DC	CO1	Demonstrate the role of different waveform coding techniques for the generation PCM signals.													
	CO2	Distinguish different pulse digital modulation techniques													
	CO3	Analyze various digital modulation techniques and calculate their error probabilities													
	CO4	Understand the concept of amount of information and entropy													
	CO5	Apply the concept of entropy to different source coding techniques													
	CO6	Evaluate different error control coding schemes for the reliable transmission of digital information over the channel													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	3	2	2				1						1	3
	CO2	3	2	1				1						1	3
	CO3	3	2	2				1						1	2
	CO4	3	2	2				1						2	3
	CO5	3	2	1				1						3	3
	CO6	3	2	1				1						3	3

DIGITAL IC APPLICATIONS LAB	CO1	Understand the internal logical structure of Digital Integrated Circuits													
	CO2	Learn the IEEE Standard Hardware Description Language.													
	CO3	Develop VHDL/Verilog HDL Source code for Digital Integrated Circuits at several levels of abstractions, behavioural, structural													
	CO4	Design and analyze basic digital circuits with combinatorial and sequential logic circuits using VHDL													
	CO5	Perform simulation and analyze synthesis results using Equivalent Industry Standard Software.													
	CO6	Verify and implement the logical operations on the latest FPGA Hardware.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	-	2	-	-	-	-	-	-	3	-	-	-	3	2
	CO2	-	3	-	-	-	-	-	-	3	-	-	-	3	2
	CO3	-	-	3	-	-	-	-	-	3	-	-	-	2	3
	CO4	-	-	3	-	-	-	-	-	3	-	-	-	3	2
	CO5	-	-	-	-	3	-	-	-	3	-	-	-	3	3
	CO6	-	-	3	-	2	-	-	-	2	-	-	-	3	2

R1632044	DSP	CO1	Analyze the Discrete Time Signals and systems.
		CO2	Illustrate the importance of FFT algorithms for computation of Discrete Fourier Transform.
		CO3	Compare the various digital filter structures.
		CO4	Design the FIR and IIR Filter design procedures.
		CO5	Construct multi-rate sampling conversion.

R1632046 MPMC LAB	CO1	Understand about basic Programming through MASM/TASM for 8086 microprocessor													
	CO2	Implement 8086 assembly language programs using software interrupts and various assembler directives of Arithmetic operation and Stack operations													
	CO3	Experiment programming through microprocessor for different interfacing with 8086 microprocessor													
	CO4	Understand assembly language programs using 8051 microcontroller.													
	CO5	Experiment assembly language programs for various applications using 8051 microcontroller													
	CO6	Examine Switches, 7- Segment Displays, Stepper motor Interfacing, Traffic light controller using 8051 microcontroller interfacing													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	3		2						2				3	1
	CO2	3		3						3				2	1
	CO3	3		3						3				2	1
	CO4	3		2						2				2	2
	CO5	3		3						3				3	1
	CO6	2		3						3				3	1

R1632047 VLSI LAB	CO1	Build the Logic gates using CMOS														
	CO2	Implement Combinational circuits using CMOS														
	CO3	Design and simulate Memory circuits like latch using CMOs														
	CO4	Analyze the behavior of Static RAM using CMOS														
	CO5	Design counters using CMOS														
	CO6	Study the behavior of R-2R DAC														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
	CO1			2		3								2	3	
	CO2			2		3								2	3	
	CO3			1		3								1	1	3
	CO4			2		3								2	2	3
	CO5		2	1		3								1	2	3
	CO6		2	3		3								2	3	3

B.Tech 4th Year., I– semester

R164104D EMBEDDED SYSTEMS	CO1	Describe the characteristics of embedded system and could classify them.													
	CO2	Understand the concepts of different embedded hardware units like timers and counting devices.													
	CO3	Differentiate various embedded firmware approaches for the design of embedded system.													
	CO4	Understand how to integrate hardware and firmware of on embedded.													
	CO5	Have knowledge about simulators used in the embedded system development.													
	CO6	Analyze the implementation of embedded systems by testing them.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3	3										2	3
		CO2			3		3							2	2
		CO3			2	3	3							3	3
		CO4			3		3							3	2
		CO5				3	3							3	3
		CO6				3	3							3	3

R1641047	MWEE & OPTICAL LAB	CO1	Understand the characteristics of Gunn diode and Reflex klystron and Microwave components.													
		CO2	Interpret Microwave measurements like VSWR, Attenuation, Waveguide parameters etc.													
		CO3	To measure the S-Parameters of Microwave Passive Components.													
		CO4	Analyze the characteristics of optical devices like LED and LASER.													
		CO5	Measurement of parameters like Numerical Aperture, Losses in Optical fiber link etc.													
		CO6	Analyze the behavior of various antennas													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3	2							2			2	2	2
		CO2	3	3							2			2	2	2
		CO3	3	3							2			2	3	3
		CO4	3	3							2			2	2	3
		CO5	3	3							2			2	3	3
		CO6	3	2			3				2			2	2	3

R1641048	DIGITAL SIGNAL PROCESSING LAB	CO1	Understand the architecture of DSP chips													
		CO2	Distinguish various convolution techniques													
		CO3	Design various FIR filters using different windows													
		CO4	Implement IIR filter (LP/HP) on DSP Processor													
		CO5	Generate sum of sinusoidal signals and to find frequency response of analog LP/HP filters using MATLAB													
		CO6	Implement FFT of given 1-D signal and plot using MATLAB													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3												3	1
		CO2	3												2	3
		CO3	3				3								1	3
		CO4	3				2								1	2
		CO5	3				2								2	2
		CO6	3				3								2	3

B.Tech 4th Year., II – semester

R1642041	CMC	CO1	Understand inner workings of cellular system and Describe the elements of cellular systems.													
		CO2	Categorize different interferences.													
		CO3	Distinguish the frequency management and channel assignments in cellular system and Analyse signal coverage in various environments.													
		CO4	Evaluate different antennas using at cell site and mobile units.													
		CO5	Generalize and Plan the handoffs in cellular systems.													
		CO6	Develop and Design various architectures and new technologies in cellular systems.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3		2		2							3	3	2
		CO2			3		3								2	2
		CO3		3	3		3								3	3
		CO4		3	3	3	2								2	2
		CO5			3	3	3								3	3
		CO6			3	3		3							3	3

		CO5			3		2							3	3	3
		CO6	2		3									3	3	2

R1642045	Seminar	CO1	List the promising new directions of various cutting edge technologies.													
		CO2	Understand the advanced technology and research in engineering.													
		CO3	Discuss and apply critical thinking about topics of current intellectual importance.													
		CO4	Analyze the detailed literature survey													
		CO5	Develop technical writing skills to build a document with respect to technical publications.													
		CO6	Develop effective presentation skills.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3	3		2	-	-	-	-	-	-	-	2	2	3
		CO2	3	3		2	2	-	-	-	-	-	-	2	2	3
		CO3		3	2	3	2	-	-	-	-	-	-	2	2	2
		CO4		3		3	-	-	-	-	-	-	-	2	2	3
		CO5	-	-	-	-	3	-	-	-	-	-	-	3	3	2
		CO6	-		-	-	3	-	-	-	-	-	-	3	3	2

R1642046	Project	CO1	Understand the advanced technology and research in engineering.													
		CO2	Collaborate with team members in analyzing the requirements of the project to be developed													
		CO3	Build necessary design specifications and documents for the chosen project(L5)													
		CO4	Develop apt domain and technical knowledge to implement/code the application(L3)													
		CO5	Test and deploy the project after implementation(L4)													
		CO6	Demonstrate the project comprehensively with necessary tools(L3)													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3	3					1	1	3	2	2	2	3	-
		CO2	1	3					1	-	-	3	3	3	3	2
		CO3	1	3					-	-	2	3	1	1	2	3
		CO4	-	3					1	-	1	1	2	-	2	2
		CO5	-	2					1	-	-	2	2	-	3	1