NARAYANA ENGINEERING COLLEGE:: NELLORE																		
DEPARTMENT OF ECE																		
COURSE OUTCOMES & CO - PO Mapping (-R21 -B.Tech)																		
COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
B.Tech 1-1																		
1	Algebra andCalculus	21MA1001	C111.1	Make use the concepts of Matrices to solve various Engineering problems .(BL-3)	3	3											1	
			C111.2	Solve the First order differential equations arising in various engineering fields .(BL-3)	3	3											1	
			C111.3	Identify different types of higher order differential equations and their applications in solving engineering problems . (BL-3)	3	3											1	
			C111.4	Apply Mean value theorems, Multi variable calculus to solve engineering problems.(BL-3)	3	3											1	
			C111.5	Identify solution methods for partial differential equations that model physical processes (BL-3)	3	3											1	
			C111.6	Apply multiple integrals techniques to solve engineering problems.(BL-3)	3	3											1	
				NO. OF COS MAPPED	6	6											6	
				AVERAGE CO MAPPING	3	3											1	
2	Applied Physics	21PH1001	C112.1	Explain optical phenomenon i.e. interference, diffraction using Huygen's wave theory. (BL-2)	3	2												
			C112.2	Comprehend the concepts of matter waves, wave functions and its interpretation to understand the matter at atomic scale. (BL-2)	3	2												
			C112.3	Outline Free electron theories on metals (BL-2)	3	1												
			C112.4	Demonstrate the physics of semiconductors. (BL-2)	3	1												
			C112.5	Illustrate the concepts of super conducting materials and nano-materials for scientific and engineering applications. (BL-2)	3	2				1							1	
			C112.6	Realize importance of LASERs and optical fibers in Engineering and Medical applications. (BL-2)	3	1				1							1	
				NO. OF COS MAPPED	6	6				2							2	
				AVERAGE CO MAPPING	3	1.5				1							1	
3	Basic Electrical Engineering	21ES1002	C113.1	Analyze DC and AC circuits with different sources and with different reduction techniques. (BL-4)	3	3	3										2	3
			C113.2	Analyze the AC circuits or systems. (BL-4)	2	3											3	3
			C113.3	Apply different concepts to analyze the Three Phase Circuits. (BL-3)	3	3	3	2									3	3
			C113.4	Discuss the operation and construction of DC machine. (BL-2)	3	3	3	2									3	3
			C113.5	Interpret the operation and construction of single phase and three phase transformers and machines. (BL-2)	3	3	3	2									3	3
			C113.6	Illustrate the working of single phase and three phase induction motors. (BL-2)	3	3	3	2									3	1
				NO. OF COS MAPPED	6	6	5	4									6	6
				AVERAGE CO MAPPING	2.83	3	3	2									2.8333	2.6667

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
4	ProblemSolving and Programming	21ES1001	C114.1	Understand the peripherals, ports and connecting cables and able to assemble the system. [BL - 2]	3	3	2	1										
			C114.2	Apply algorithmic approach to solve computational problems. [BL - 3]	3	3												
			C114.3	Apply modular approach for solving the problems by using the control structures. [BL -3]	3	3	3											
			C114.4	Select the individual data elements to simplify solutions and provide efficient memory utilization. [BL-3]	3	3	3											
			C114.5	Develop sorting algorithms for heterogeneous data. [BL-3]	3	3	2											
			C114.6	Explain User-Defined Data Types and Files. (BL - 2)	3	3	1											
				NO. OF COS MAPPED	6	6	5	1										
				AVERAGE CO MAPPING	3	3	2.2	1										
5	Applied Physics Lab	21PH1501	C115.1	Understand the importance of optical phenomenon like Interference, diffraction and dispersion	3													
			C115.2	Comprehend the role of lasers in diffraction and the importance of optical fiber parameters	3					1								
			C115.3	Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.	3													
			C115.4	Identify the Importance of four probe method in determination of resistivity of a given semiconductor	3													
				NO. OF COS MAPPED	4					1								
				AVERAGE CO MAPPING	3					1								
6	Basic Electrical Engineering Lab	21ES1502	C116.1	Understand the safety aspects in using the tools and equipments. (BL-2)	3	2							3	2				
			C116.2	Apply basic electrical engineering knowledge to make simple house	3	2							2	3				
			C116.3	Understand to disassemble and assemble a Personal Computer and prepare the computer ready to use (BL-2)\	3	2		1					2	2				
			C116.4	Apply knowledge to Interconnect two or more computers for information sharing (BL-3)	2	2												
				NO. OF COS MAPPED	4	4		1										
				AVERAGE CO MAPPING	2.75	2		1										
7	Engineering and IT Workshop	21ES1505	C117.1	Design and development of sheet metal objects by surface	1								2	2				
			C117.2	Build a Personal Computer and Install operating systems and prepare the computer ready to use.(BL-3)	2								2	2			2	2
			C117.3	Develop presentation and documentation of a given tasks through M	2								2	1			2	
			C117.4	NO. OF COS MAPPED	3								3	3			2	1
				AVERAGE CO MAPPING	1.67								2	1.667			2	2
8	Problem Solving and Programming Lab	21ES1501	C118.1	Translate algorithms into programs (In C language) (BL - 2)	3	3	3											
			C118.2	Solve the problems and implement algorithms in C. (BL - 3)	3	3	3											
			C118.3	Make use of different data types to handle the real time data (BL - 3)	3	2	3	3										
				NO. OF COS MAPPED	3	3	3	1										
				AVERAGE CO MAPPING	3	2.67	3	3										

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
9	Communication Skills lab	21EN1502	C119.1	To develop knowledge, skills, and judgment around human communication that facilitates their ability to work collaboratively with others.									2	3				
			C119.2	Use listening skills to create more effective, less confrontational, more productive professional & personal relationships and understand techniques required for excellent telephone etiquette.									3	2				
			C119.3	Develop their public speaking abilities to speak both formally and informally.									2	3				
			C119.4	Learn the skills necessary to deliver effective presentation with clarity and impact.									3	3				
				NO. OF COS MAPPED									4	4				
				AVERAGE CO MAPPING									2.5	2.75				
B.Tech 1-2																		
10	Chemistry	21CH1001	C121.1	Illustrate the molecular orbital energy level diagram of different molecular species. (BL-3)	3													
			C121.2	Make use the knowledge about various kinds of electro chemical cells in engineering applications. (BL-2)	3	2				2	2							
			C121.3	Interpret the various energy storage devices and emerging technologies in engineering applications. (BL-2)	3					2	2							
			C121.4	Understand the mechanism and applications of different polymers in electronic devices. (BL-2)	3					2	2							
			C121.5	Familiarize the various sources of renewable energy and their harnessing. (BL-2)	3	2					2							
				Apply the spectroscopy methods for the analysis of engineering materials. (BL-3)	3	2				2								
				NO. OF COS MAPPED	6	6				4	4							
				AVERAGE CO MAPPING	3	1				2	2							
11	Vector Calculus & Transforms	21MA1004	C122.1	Illustrate the physical interpretation of Gradient, Divergence and Curl in various engineering applications.(BL-3)	3	3											1	
			C122.2	Apply Green's, Stokes and Divergence theorem in the evaluation of double and triple integrals. (BL-3)	3	3											1	
			C122.3	Make use the concepts of Laplace transform to solve various engineering problems. (BL-3)	3	3											1	
			C122.4	Apply the Inverse Laplace transform techniques to solve differential equations arising in engineering field. (BL-3)	3	3											1	
			C122.5	Demonstrate Fourier series to study the behavior of periodic functio	3	3											1	
			C122.6	Apply the properties of Fourier transform to solve various engineering problems. (BL-3)	3	3											1	
				NO. OF COS MAPPED	6	6											6	
				AVERAGE CO MAPPING	3	3											1	

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
12	Python Programming and Data Science	21ES1005	C123.1	Summarize the fundamental concepts of python programming. (BL - 2)	3	3												
			C123.2	Apply the basic elements and constructs the python to solve logical problems. (BL - 3)	3	2	1											
			C123.3	Organize data using different data structures of python. (BL - 3)	3	2												
			C123.4	Implement the files modules and packages in programming. (BL - 3)	3	1	1											
			C123.5	Apply object oriented & exception handling concepts to build simple applications.	3	2												
			C123.6	Implement the concepts of Regular expressions and Turtle Graphics. (BL - 3)	3	1		1										
				NO. OF COS MAPPED	6	6	2	1										
				AVERAGE CO MAPPING	3	1.83	1	1										
13	English	21EN1001	C124.1	Practice the formulating appropriate sentences with Grammatical accuracy and also develop concept of word formation. .(BL3)										3				
			C124.2	Describe coherent and unified paragraphs with adequate support and detail and can write a topic sentence, support and concluding sentence. (BL2)									2	3				
			C124.3	Employ the writing and life skills in structural manner of real time scenarios. (BL-2)										3				
			C124.4	Explain the grammar rules for synthesis of sentences and use prewriting strategies to plan to write dialogues, reviews and edit the text effectively.(BL - 2)									2	3				
			C124.5	Interpret the skills and sub skills of reading and use strategies for reading effectively and provide knowledge on the structure and format of technical writing.(BL - 3)									3	3				
				Use the concepts of various real time scenarios to represent in an effective model. (BL - 3)									3	3				
				NO. OF COS MAPPED									5	5				
				AVERAGE CO MAPPING									2	3.6				
14	Chemistry Lab	21CH1501	C125.1	Demonstrate the cell constant and conductance of solutions (BL2)	3	2				2								
			C125.2	Interpret the strength of an acid present in secondary batteries (BL2)	3	2				2								
			C125.3	Demonstrate advanced polymer materials are used in engineering	3	2				2								
				NO. OF COS MAPPED	3	3				3								
				AVERAGE CO MAPPING	3	2				2								
15	Engineering Graphics	21ES1503	C126.1	Develop the orthographic projection of points and straight lines(BL 3)	2	2			1							2		
			C126.2	Construct the planes and simple solids.(BL-3).	2	2			2	1						2		
			C126.3	Understand and practice basic AUTOCAD commands (BL-2)	1	1	1		1							1		
			C126.4	Construct Isometric views using AUTOCAD (BL-3).	2	2	2		2							1		
				NO. OF COS MAPPED	4	4	2		4	1						4		

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S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
				AVERAGE CO MAPPING	1.75	1.75	1.5		1.5	1						1.5		
16	Python Programming and Data science lab	21ES1508	C127.1	Understanding and use of python- Basic Concepts (BL -2)	2	2	3											
			C127.2	Solve the concepts of python functions and data structures (BL -3)	2	2	3											
			C127.3	Understand the concepts of files, modules, multithreading and	2	2	3	3										
				NO. OF COS MAPPED	3	3	3	1										
				AVERAGE CO MAPPING	2	2	3	3										
17	English Language Lab	21EN1501	C128.1	Understand how speech sounds are used to create meaning. Apply their knowledge of English phonetics and phonology to improve their own pronunciation.									2	3				
			C128.2	Recognize and use pitch patterns to signal complete and incomplete thought groups and Speak confidently and intelligibly within groups and before an audience.									3	2				
			C128.3	Discuss and respond to content of a lecture or listening passage orally and/or in writing and make inferences and predictions about spoken discourse									3	3				
			C128.4	Produce coherent and unified paragraphs with adequate support and detail and can write a paragraph with a topic sentence, support, and concluding sentence									3	2				
				NO. OF COS MAPPED									4	4				
				AVERAGE CO MAPPING									2.75	2.5				
B.Tech 2-1																		
18	Complx Analysis and Numerical Methods	21MA1005	C211.1	Apply the techniques of special functions in various engineering problems . (BL-3)	3	3												
			C211.2	Identify the analyticity of complex functions to find the derivatives of complex functions. (BL-2)	3	3											1	
			C211.3	Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours. (BL-3)	3	3											1	
			C211.4	Solve the Algebraic ,Transcendental Equations by using numerical methods & understand the concepts of Interpolation . (BL-3)	3	3												
			C211.5	Solve the ordinary differential equations by using various numerical methods. (BL-3)	3	3											1	
				NO. OF COS MAPPED	5	5											3	
				AVERAGE CO MAPPING	3	3											1	
21	Digital Logic Design	20EC2001	C212.1	Describe the Series resonance ,parallel resonance and analyze the locus diagramsof R,L,C(BL-2)	3	2	2	1									1	1
			C212.2	Analyze the DC transients of R,L,C (BL-4)	3	2	2	2									1	1
			C212.3	Analyze the AC transients of R,L,C (BL-4)	3	2	2	2									1	1

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S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
	Design		C212.4	Derive Two port network parameters of Electrical circuits(BL-3)	3	3	2	2									1	1
			C212.5	Analyze the Filters and Network functions(BL-4)	3	3	2	2									1	1
				NO. OF COS MAPPED	5	5	4	1										5
				AVERAGE CO MAPPING	3	2.4	2.5	9										1
22	Network Analysis	21EC2002	C213.1	Describe the Series resonance ,parallel resonance and analyze the locus diagramsof R,L,C(BL-2)	3	2	2	1									1	1
			C213.2	Analyze the DC transients of R,L,C (BL-4)	3	2	2	2									1	1
			C213.3	Analyze the AC transients of R,L,C (BL-4)	3	2	2	2									1	1
			C213.4	Derive Two port network parameters of Electrical circuits(BL-3)	3	3	2	2									1	1
			C213.5	Analyze the Filters and Network functions(BL-4)	3	3	2	2									1	1
				NO. OF COS MAPPED	5	5	4	1										5
				AVERAGE CO MAPPING	3	2.4	2.5	9										1
23	Signals and Systems	21EC2003	C214.1	Interpret the concept of various signals and linear Time invariant Systems. (BL-2)	3	2	2										1	
			C214.2	Interpret the concept of Fourier series for Continuous time signals.(BL-2)	3	3	3	2									3	2
			C214.3	Apply continuous time Fourier Transform for Continuous time signals .(BL-3)	3	3	2	2									2	1
			C214.4	Apply Sampling Theorem for Continuous time signals.(BL-3)	3	2	3										2	
			C214.5	Analyze Laplace and Z-transform for continuous and discrete time systems.(BL-4)	2	3	3	1									2	2
				NO. OF COS MAPPED	5	5	5	3									5	3
				AVERAGE CO MAPPING	2.8	2.6	2.6	1.67									2	1.6667
24	Electronic Devices and Circuits Lab	21ES1514	C215.1	Demonstrate the basic characteristics and applications of basic electronic devices. (BL-02)	3	1	2						3	2		2	2	2
			C215.2	Draw the characteristics of electronic devices by plotting graphs(BL-02)	3	1	2						3	2		2	2	2
			C215.3	Analyze the Characteristics of UJT, BJT, FET, and SCR (BL-04).	3	1	1						3	2		2	2	2
			C215.4	Design FET based amplifier circuits/BJT based amplifiers for the	3	2	2						3	2		2	2	2
				NO. OF COS MAPPED	5	5											5	3
				AVERAGE CO MAPPING	2.4	1											1.6	2.6667
25	Data Structures and Algorithms	21ES1009	C216.1	Classify the Data Structures concepts in real time applications. (BL-2).	3	2	2										2	
			C216.2	Demonstrate the concepts of stacks and queues for organizing data. (BL-3).	1	3	3										2	
			C216.3	Demonstrate the concepts of Linked Lists in Linear Data Structures. (BL-3).	1	3	3	1									1	
			C216.4	Interpret different ways of handling Trees and Graphs as non-linear Data Structures (BL-3).	1	3	2	1									1	

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S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
			C216.5	Analyze different searching and sorting techniques for organizing data (BL-4).	2	3	3	1									2	
				NO. OF COS MAPPED	5	5	5	4	1								5	3
				AVERAGE CO MAPPING	1.6	2.8	2.6	0.75	0								1.6	0
26	Electronic Devices and Circuits	21ES1010	C217.1	Illustrate the V-I characteristics of P-N junction Diode and special semiconductor devices. (BL-2)	3	1											3	
			C217.2	Demonstrate the performance of rectifiers with and without filters. (BL-2)	3	2	3										3	
			C217.3	Compare the operating characteristics of BJT (BL-3)	3	2											3	
			C217.4	Analyze the BJT biasing techniques. (BL-4)	3	3	2										2	
			C217.5	Interpret the characteristics of MOSFET. (BL-2)	3	1	1										3	
				NO. OF COS MAPPED	5	5	5										5	4
				AVERAGE CO MAPPING	3	1.8	1.2										2.8	0
27	Data Structures and Algorithms lab	21ES1513	C218.1	Apply the Arrays and linked listsfor solving the problems. (BL -3)	2	2	2									1	1	1
			C218.2	Apply the stacks and queuesfor solving the given applications. (BL -3)	3	2	2									1	2	1
			C218.3	Implement operations on binary trees and binary search trees for given applications. (BL -3)	2	2	3	1								1	2	1
			C218.4	Implement searching and sorting algorithms for given applications. (BL -3)	2	2	3	1								1	2	1
				NO. OF COS MAPPED	5	5	5	4	1								5	3
				AVERAGE CO MAPPING	1.8	1.6	2	0.5	0								1.4	1.3333
28	Career competency development I	21CD6001	C219.1	Apply the Basic concepts of computing ability to solve Quantitative Problems BL[3]	2	2				2								
			C219.2	Apply Basic logical thinking to solve Reasoning Problems BL [3]	2	2				2								
			C219.3	Apply Basic analytical abilities to solve Reasoning Problems Verbal Problems BL[3]	2	2				2								
				NO. OF COS MAPPED	5	5	5	4	1								5	3
				AVERAGE CO MAPPING	1.2	1.2	0	0	0								0	0
29	Value added course/ Certificate course I	21CC6001	C2110.1	Relate the abilities with the expectations of industry. BL[2]													2	2
			C2110.2	Develop their inter-disciplinary skills. BL[2]													2	2
			C2110.3	Apply the skills for better employability. BL[3]													2	2
				NO. OF COS MAPPED	5	5	5	4	1								5	3
				AVERAGE CO MAPPING	0	0	0	0	0								1.2	2
B.Tech 2-2																		
			C221.1	Analyze the differential equations for mechanical and electrical systems and obtain the transfer function from block diagrams, servo motors and signal flow graphs (BL - 3)	2	2	3											3

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S.No.	SUBJECT NAM	UBJECT CC	O - NUM	COURSE OUTCOMES														
26	Control Systems	21EC2004	C221.2	Analyze the time domain specifications, steady state errors and to learn time response analysis of first and second order systems(BL - 3)	3	3	1											3
			C221.3	Summarize the concepts Routh's stability and Root locus to find the stability of the system (BL - 2)	1	2	2										3	
			C221.4	Summarize the frequency domain specifications from Bode, Polar, Nyquist plots and evaluate the frequency domain specifications(BL - 2)	1	1	3	1										3
			C221.5	Summarize the concept of state space analysis, controllability and Observability and to obtain the transfer function. (BL - 2)	1	3	3											3
				NO. OF COS MAPPED	5	5	5	3									5	3
				AVERAGE CO MAPPING	1.6	2.2	2.4	0.33									0.6	4
27	Electromagnetic Theory and Transmission Lines	21EC2005	C222.1	Apply the Coulomb's law and Gauss law to different charge distributions.(BL-3)	2	2	3											3
			C222.2	Make use of Biot-Savart Law, Ampere's Circuit law to static current distributions.(BL-3)	3	3	1											3
			C222.3	Analyze the electric and magnetic fields.(BL-4)	1	2	2										3	
			C222.4	Interpret the characteristics of EM Wave.(BL-2)	1	1	3	1										3
			C222.5	Illustrate the concepts of transmission lines.(BL-2)	1	3	3											3
				NO. OF COS MAPPED	5	5	5	1									1	4
				AVERAGE CO MAPPING	1.6	2.2	2.4	1									3	3
28	Electronic Circuit Analysis and design	21EC2006	C223.1	Analyze small signal amplifiers at low frequencies and high	2	2	1		1							1	2	
			C223.2	Understand the concept of different negative feedback amplifiers	2	2	1		1							1	2	
			C223.3	Understand the working principle of RC & LC oscillators	2	2	2	1	1							1	2	
			C223.4	Analyze various configurations of multistage amplifiers	2	2	2	1	1							1	2	
			C223.5	Learn operation of Power amplifiers and Tuned amplifiers	2	2	2		1							1	2	
				NO. OF COS MAPPED	5	5	5	1									1	4
				AVERAGE CO MAPPING	2	2	1.6	2									10	0
29	Probability theory and stochastic processes	21EC2007	C224.1	Interpret the concepts of sample spaces and set theory to calculate probabilities (BL-2)	3	2	2											
			C224.2	Apply the concept of random variables with probability density and distribution functions to compute probabilities for complex problems. (BL-3)	2	2	2											
			C224.3	Compute the statistical averages for multiple random variables using joint probability density and distribution functions. (BL-2)	2	3	2	3										
			C224.4	Interpret the concept of Power Spectrum Density & Cross Power Spectrum density related to temporal characteristics and spectral characteristics (BL-4)	3	3	3	3									2	
			C224.5	Apply the principles of a random process for solving system related problems. (BL-3)	3	2	2	3									2	
				NO. OF COS MAPPED	5	5	5										2	
				AVERAGE CO MAPPING	2.6	2.4	2.2										2	

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S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
30	Electronic Circuit Analysis and design lab	21EC2501	C225.1	Measure various parameters of analog circuits and compare experimental results in the laboratory with theoretical analysis				1						1				
			C225.2	Analyze negative feedback amplifier circuits, oscillators, Power amplifiers, Tuned amplifiers	2	2			2					1	1			1
			C225.3	Design analog electronic circuits using discrete components	2	2	2	1	2					1	1	1	1	1
			C225.4	Design RC and LC oscillators, Feedback amplifier for specified gain and multistage amplifiers for Low, Mid and high frequencies			2		2					1	1	1	1	1
				NO. OF COS MAPPED	5	5	5										2	
				AVERAGE CO MAPPING	0.8	0.8	0.8										1	
31	MAT LAB and Simulink Lab	21EC2502	C226.1	Demonstrate Operations on Matrices, Generation of Various signals and Sequences, Convolution and Correlation of signals and Sequences. (BL-2)	1	1							2				1	2
			C226.2	Analyze signals and sequences using MATLAB.	2	1							1				1	2
			C226.3	Apply different transforms on a given signal to draw magnitude and phase spectrum.	2	2	2	1					3				1	2
			C226.4	Identify whether the given system is linear or non-linear and time variant or invariant.	2	2	2	1					2				2	2
			C226.5	Verify sampling theorem using MATLAB.	2								1				1	2
				NO. OF COS MAPPED	5	4	2	2					5				5	5
				AVERAGE CO MAPPING	1.8	1.5	2	1					1.8				1.2	2
32	Database Management systems		C227.1	Describe database technologies and database design. (BL-2)	3	1											2	
			C227.2	Illustrate Relational data model and relational algebra for data models. (BL-2)	3	2											1	
			C227.3	Demonstrate queries, procedures for database creation in RDBMS.(BL-3)	3	2											2	
			C227.4	Apply functional dependencies and normalization for database design. (BL-3)	3	2											2	
			C227.5	Demonstrate transaction management and concurrency control techniques for database recovery. (BL-3)	3	1											1	
				NO. OF COS MAPPED	5	4	2	2					5				5	5
				AVERAGE CO MAPPING	2.4	1.75	0	0					0				1.2	0
33	Universal Human values	21EN1002	C228.1	Understand the need, basic principles, and significance of universal human values														
			C228.2	Develop the ability to distinguish between values and skills														
			C228.3	Apply the principles of trust, respect, and harmony in relationships at personal, family, and societal levels.														
			C228.4	Analyze the interconnectedness of human values with sustainable development and global well-being.														
			C228.5	Explore the importance of ethical behavior and responsibility in personal, professional, and social contexts.														
				NO. OF COS MAPPED	5	4	2	2					5				5	5
				AVERAGE CO MAPPING	0	0	0	0					0				0	0

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
33	Career competency development II		C229.1	Apply the moderate conceptual knowledge s of computing ability to solve Quantitative Problems BL[3]	2	2				2								
			C229.2	Apply Moderate logical thinking to solve Reasoning Problems BL [3]	2	2				2								
			C229.3	Apply moderate analytical abilities to solve Reasoning Problems Verbal Problems BL[3]	2	2				2								
B.Tech 3-1																		
34	Analog and Digital Communications	21EC2008	C311.1	Analyze the Analog modulation and demodulation systems BL4	3	3	2										2	
			C311.2	Verify the effect of noise on the performance of communication system BL2	3	3	3										1	
			C311.3	Analyze the various Digital modulation techniques BL4	3	3	3										2	
			C311.4	Apply the Amplitude, frequency and phase shift keying techniques BL3	3	3	2										1	
			C311.5	Make use of the different error control codes for efficient transmission BL3	3	2	2										2	
				NO. OF COS MAPPED	5	5	3										5	
				AVERAGE CO MAPPING	3	2.8	4										1.6	
35	IC Applications	21EC2009	C312.1	Analyze the various characteristics of Differential amplifier. (BL: 4).	3	3	3											
			C312.2	Interpret the characteristics and configurations of Op-amp (BL: 2).	3	3	2											
			C312.3	Analyze the linear and nonlinear applications of an Op-amp (BL:2)	3	3	3		1								1	1
			C312.4	Design the Oscillators and active filters using Op-amp (BL: 4).	3	3	2		2								2	2
			C312.5	Study the applications of the special purpose integrated circuits and Data Convertors. (BL: 2).	3	3	2		2								2	1
				NO. OF COS MAPPED	5	5	5		3								3	3
				AVERAGE CO MAPPING	3	3	2.4		1.67								1.6667	1.3333
36	Microprcessors & Microcontrollers	21EC2010	C313.1	Interpret the working principles of 8086 micro processor . (BL-2)	1		1										1	
			C313.2	Develop assembly language programs using instruction set in 8086	2	2		1	2									1
			C313.3	Compare various versions of MSP430 based on applications. (BL-2)	1	1	1										1	2
			C313.4	Summarize the interrupt types, addressing modes & memory organization of MSP430. (BL-2)	2	2	1	1	2									1
			C313.5	Implement serial communication protocols using MSp430. (BL-3)	1		1	1	1								1	
				NO. OF COS MAPPED	5	5	5		3									4
				AVERAGE CO MAPPING	1.4	1	0.8		1.67									1
37			C314.1	Demonstrate the fundamentals of MATLAB environment . (BL-2)	2				2									2

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	O - NUM	COURSE OUTCOMES														
	MATLAB Programming	21EC4003	C314.2	Develop program scripts and functions using the MATLAB development environment (BL-3)	1	2		2	2								1	2
			C314.3	Illustrate simple plot and user-interface graphics objects in MATLAB(BL-2)	1	2		2	2								1	1
			C314.4	Develop MATLAB Programming & Simulation for engineering problems. (BL-3)	1		1	2	2								1	1
			C314.5	Solve mathematical problems engineering-related problems using MATLAB.. (BL- 3)	1	1	1	1	2									2
				NO. OF COS MAPPED	5	5	5		3									4
				AVERAGE CO MAPPING	1.2	1	0.4		3.33									2
38	Java Programming	21CS2003	C315.1	Describe the basic Elements of Java for problem solving.(BL-2)	3	2											1	
			C315.2	Demonstrate the concepts of arrays and strings for organizing data. (BL-3)	1	2	2										1	
			C315.3	Describe the concepts of object oriented programming. (BL-2)	2	3	1										2	1
			C315.4	Design the web applications through java applets. .(BL-3)	1	3	3										1	2
			C315.5	Develop Multi-threaded programs to improve the system performance . (BL-6)	3	3	3										1	1
				NO. OF COS MAPPED	5	5	4										5	3
				AVERAGE CO MAPPING	2	2.6	2.25										1.2	1.3333
39	Analog and Digital Communications lab	21EC2504	C316.1	Demonstrate analog & pulse modulation and demodulation schemes. [BL:3]	3	3	2						2	2		2	3	3
			C316.2	Analyze the behaviour of digital modulation and demodulation techniques. [BL:4]	3	3							2	2		2	3	3
			C316.3	Execute programs in MATLAB to implement various digital carrier keying techniques.	3	3	2						2	2		2	3	3
			C316.4	Simulate channel coding and equalization techniques using MATLAB [BL:2]	3	3	2						2	2		2	2	2
				NO. OF COS MAPPED	4	4	3						4	4		4	4	4
				AVERAGE CO MAPPING	2.25	2.25	1.333						1.5	1.5		1.5	2.25	2.25
40	IC Applications Laboratory	21EC2505	C317.1	Illustrate the working of Op amp ICs & Application specific analog ICs.	2	2							3	3		2	3	
			C317.2	Analyze operational amplifier based circuits for linear and non-linear applications.	2	2	2						3	3		2	3	
			C317.3	Design Operational amplifiers for linear and nonlinear application, Multivibrator circuits using 555 & application specific ICs.	2	2	2						3	3		2	3	2
			C317.4	Simulate all linear and nonlinear application based Op amp Circuits and circuits based on application specific ICs.	2	2	2						3	3		2	3	2
				NO. OF COS MAPPED	4	4	3						4	4		4	4	2
				AVERAGE CO MAPPING	2	2	2						3	3		2	3	2
	Microprocessors		C318.1	Understand the installation process of CC studio & launch pad. **(BL-2)**	1	1	1		1						1	1	1	

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
41	& Microcontrollers Lab	21EC2506	C318.2	Synthesize operations on MSP430 microcontroller using Code Composer Studio. **(BL-3)**		2	2		2							2		1
			C318.3	Examine power consumption of microcontroller using low power modes. **(BL-3)**				2	2									1
				NO. OF COS MAPPED	3	3												
				AVERAGE CO MAPPING	2	2.25	3		4									2
42	Career competency development III	21CD6003	C319.1	Apply the concepts of computing ability to solve Quantitative Problems BL[3]		2	2	2		2								
			C319.2	Apply logical thinking to solve Reasoning Problems BL [3]		2	2	2		2								
			C319.3	Apply analytical abilities to solve Reasoning Problems Verbal Problems BL[3]		2	2	2		2								
				NO. OF COS MAPPED	3	3												
				AVERAGE CO MAPPING	2	2	2		2									2
43	Value added Course/Certificate Course II	21CC6002	C3110.1	Relate the abilities with the expectations of industry. BL[2]	2	1											3	3
			C3110.2	Develop their inter-disciplinary skills. BL[2]	2												3	3
			C3110.3	Apply the skills for better employability. BL[3]	1	1											3	3
				NO. OF COS MAPPED														
				AVERAGE CO MAPPING														
B.Tech 3-2																		
44	DIGITAL SIGNAL PROCESSING	21EC2011	C321.1	Illustrate the concepts of digital signal processing techniques. (BL-02)	3	3	3	3	1									2
			C321.2	Analyze time and frequency domains description of discrete time signals using FFT Algorithms(BL-03)	3	3	3	3	2									3
			C321.3	Design of IIR filters using different methods(BL-04)	3	3	3	3										
			C321.4	Design of FIR filters using different methods (BL-04)	3	3	3	3	2									3
			C321.5	Summarize the architectural features of programmable DSP Processor. (BL-02)	3	3	2	2	2								2	2
				NO. OF COS MAPPED	5	5	4	1	3									1
				AVERAGE CO MAPPING	3	3	3.5	14	2.33									10
45	VLSI DESIGN	21EC2012	C322.1	Analyze the MOS Device Equations & CMOS basic inverter characteristics. (BL-4).	3	3	3		2								2	1
			C322.2	Apply the concepts of stick diagrams and layout design rules for CMOS Circuits. (BL-3).	3	3	3										3	3
			C322.3	Design the digital complex logic gate design of various types using CMOS and other forms of logic. (BL-3).	3	3	3	3	1									3
			C322.4	Develop various Data Path subsystems, parity generators, and array of memories to compensate trade-off area, speed and power requirements. (BL-3).	3	3	3	1	1								3	1
			C322.5	Implement digital logic circuits using PLAs, FPGAs and CPLDs. (BL-4).	3	2	2	1	3								3	2
				NO. OF COS MAPPED	5	5	5	3	4								4	5
				AVERAGE CO MAPPING	3	2.8	2.8	1.67	1.75								2.75	2

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
46	Electronic Measurements & Instrumentation	21EC4012	C323.1	Illustrate the principles involved in the Electronic meters.(BL-2)	2		1										2	
			C323.2	Demonstrate the operation of CRO.(BL-2)	2	2											1	
			C323.3	Analyze the working of function generator, wave analyzers, logic analyzers and spectrum analyzers.(BL-4)	2	2											2	
			C323.4	Measure the passive parameters using ac & dc bridges.(BL-3)	2	1												2
			C323.5	Interpret the working principle of transduction for measuring non-electrical quantities.(BL-2)	2	2											1	
				NO. OF COS MAPPED	5	4	1	0	4								4	1
				AVERAGE CO MAPPING	2	1.75	1	2	0								1.5	2
47	Introduction to Internet of Things	21EC4017	C324.1	Understand the core concepts, architecture, and components of IoT systems.	3	2	1		1							1	2	1
			C324.2	Design, develop, and deploy IoT applications using various sensors, microcontrollers, and communication protocols.	3	2	1		2							2	2	2
			C324.3	Analyze IoT data using cloud computing, edge computing, and data analytics techniques.	3	2	2	1	2							2	2	2
			C324.4	Identify and address security and privacy concerns in IoT systems.	3	2	2	1	2							2	2	2
			C324.5	Gain practical experience in building and prototyping IoT systems.	3	2	3		3							2	2	3
				NO. OF COS MAPPED	5	5	5	2	4								5	5
				AVERAGE CO MAPPING	3	2	1.8	3	2.5								2	2
48	Advanced Java Programming	21CS3004	C325.1	Implement simple Web Applications and networking API.(BL 2)	3	2	2	2									2	2
			C325.2	Develop database applications using JDBC.(BL 3)	2	2	2	1	2								2	1
			C325.3	Understand the dynamic request and response model using Servlets .(BL 2)	1	2	2	2	1	1						2	2	1
			C325.4	Design enterprise application using Java Server Pages(JSP).(BL 3)	2	1	2	1								2	1	1
			C325.5	Implement Web applications using struts and Spring(BL 3)	2	2	1	2	2							2	2	2
				NO. OF COS MAPPED	5	5	5	5	4								5	5
				AVERAGE CO MAPPING	2	1.8	1.8	2	1.25								1.8	1.4
49	Digital Signal processing Lab	21EC2507	C326.1	Analyze discrete time signals & systems using MATLAB	2	3							2	2		2	2	3
			C326.2	Design & implement IIR & FIR filters for different specifications	2	2	2		2				2	2		2	2	2
			C326.3	Design DSP based real time processing systems to meet desired needs of the society	2	3							2	2		2	2	3
				NO. OF COS MAPPED	3	3	1		1				3	3		3	3	3
				AVERAGE CO MAPPING	2	2.67	2		2				2	2		2	2	2.6667
50		21EC2508	C327.1	Demonstrate the ability to design, simulate, and analyze basic electronic circuits using modern design tools and software.	2												1	

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
	Electronic Design Workshop		C327.2	Apply knowledge of electronics to build and test circuits for practical applications, such as amplifiers, filters, and power supplies.	2													1
			C327.3	Develop proficiency in the use of electronic components, instruments, and prototyping platforms for circuit implementation.	2												1	
			C327.4	Analyze and troubleshoot electronic circuits to identify and resolve performance issues.		2											1	
			C327.5	Work collaboratively in teams to design and implement innovative electronic systems for real-world problems.	2												1	
				NO. OF COS MAPPED	3	3	1		1				3	3		3	3	3
				AVERAGE CO MAPPING	1.33	0.67	0		0				0	0		0	1	0
51	VLSI Design lab	21EC2509	C328.1	Develop Verilog HDL source code for the given problem/experiment, and simulate the given circuit with suitable simulator and verify the results.	3	3	2						2	3		2	2	3
			C328.2	Analyze the obtained results of the given experiment/problem.	3	2	2						2	3		2	2	3
			C328.3	Implement the experiments using FPGA/CPLD hardware tools.	3	3	2						2	3		2	2	3
				NO. OF COS MAPPED	3	3	3						3	3		3	3	3
				AVERAGE CO MAPPING	3	0	0.333						0	0		0	0.6667	0
52	Career competency Development IV	20CD6004	C329.1	Apply the Basic concepts of computing ability to solve Quantitative Problems BL[3]		2	2	2		2								
			C329.2	Apply Basic logical thinking to solve Reasoning Problems BL [3]		2	2	2		2								
			C329.3	Apply Basic analytical abilities to solve Reasoning Problems Verbal Problems BL[3]		2	2	2		2								
				NO. OF COS MAPPED	3	3	3						3	3		3	3	3
				AVERAGE CO MAPPING	0	0	0						0	0		0	0	0
B.Tech 4-1																		
53	Management Science	21HS5002	C411.1	Apply the concepts & principles of management in real life industry.	0								2					
			C411.2	Apply the knowledge of Quality Control, Work-study principles in real life industry.					3									
			C411.3	Analyze the concepts of HRM in Recruitment, Selection and Training & Development.								2	3					
			C411.4	Evaluate PERT/CPM Techniques for projects of an enterprise		3										2		
			C411.5	Create Modern technology in management science.												3		
				NO. OF COS MAPPED	3	3	3						3	3		3	3	3
				AVERAGE CO MAPPING	0	0	0						0	0		0	0	0
54	Embedded		C412.1	Understand the basic functions,structure,concepts and applications of embeddedsystems.	2											2		
			C412.2	Understand Develop familiarity with TM4CMicrocontrollers and their applications in an embeddedEnvironment	2	1		2								1	1	

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
	Embedded Systems	21EC2013	C412.3	Analyze the concept of Communication Devices,Devicedriver programming and Interrupts.	2	2		2								2	2	
			C412.4	Analyze the concept of Multiprocessor,Multithreads,	2	2										2	2	
			C412.5	Design operating system concepts,types and choosing RTOS for projects.	1		1	1								2	2	
				NO. OF COS MAPPED		1			1			1	2			2		
				AVERAGE CO MAPPING		5			0			0	0			4.5		
	Microwave and Optical Communications	21EC2014	C413.1	Demonstrate the concepts of Microwave Transmission phenomenon. (BL-2)	3	3											1	
			C413.2	Determine the Wave parameters relevant to Microwave transmissions in Waveguides. (BL-3)	3	3											1	
			C413.3	Interpret the Principle of operation of Passive Microwave Components. (BL-2)	3	3											1	
			C413.4	Outline the Principle of operation Active Microwave Devices. (BL-2)	3	3											1	
			C413.5	Analyze the Microwave measurement techniques. (BL-4)	3	3											1	
				NO. OF COS MAPPED														
				AVERAGE CO MAPPING														
	FPGA Architecture	21EC4028	C414.1	Explain the Programmable logic devices and different types of Complex programmable logic device families architectures.(BL-2)	2		2										2	
			C414.2	Interpret the FPGA Architecture, Logic synthesis, Logic Optimization and Technology Mapping.(BL-2)	2		1										2	
			C414.3	Interpret the Logic Block Architecture, placement and routing .(BL-2)	2		1										1	
			C414.4	Outline the various Xilinx and Actel FPGAs (BL-2)	2		2		1									
			C414.5	Develop a simple Traffic Light controller, various adders and Decade Counter using FPGAs.(BL-3)	2		1										2	
				NO. OF COS MAPPED	5	5	5	4		1							5	
				AVERAGE CO MAPPING	2	0	1.4	0		0							1.4	
	Digital Image Processing	21EC4021	C415.1	Understand the fundamental concepts of a digital image processing system.(BL-02)	2	1	1		1							1	2	
			C415.2	Apply 2D filters for image enhancement in spatial and frequency domain. (BL-03)	2	3	2	1	2							1	3	
			C415.3	Understand various image compression methods.(BL-02)	2	2	2	1	2							1	3	
			C415.4	Apply segmentation methods on digital images .(BL-03)	2	2	2	1	2							1	3	
			C415.5	Select the techniques for image restoration.(BL-03)	2	2	2	1	2							1	3	
				Understand the methods to process the colour images.(BL-02)	2	1	1	1	2							1	1	
				NO. OF COS MAPPED	5	5	5	4		1							5	
				AVERAGE CO MAPPING	2	2	1.8	1.25		0							2.6	
			C416.1	Interpret the importance of waveguides	3	3	1										1	

COURSE OUTCOMES					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
S.No.	SUBJECT NAM	UBJECT CC	CO - NUM	COURSE OUTCOMES														
55	Microwave and Optical Communications Lab	21EC2014	C416.2	Illustrate the working of passive devices	3	3	1	1									1	
			C416.3	Differentiate Linear bean tubes and crossed field tubes in terms of operation and performance	3	3	1	1									3	
			C416.4	Analyze the signal propagation in optical fibers	3	3	1	1									1	
			C416.5	Select appropriate optical sources and detectors for specific applications	3	3	1	1		1							3	
				NO. OF COS MAPPED	5	5	5	4		1							5	
				AVERAGE CO MAPPING	3	3	1	1		1							1.8	
	OPEN ELECTIVE Machine learning		C417.1	Understand the concepts of computational intelligence like machine learning	3	2	1	1										
			C417.2	Understand and apply the various Machine learning strategies	1	3			1	2								
			C417.3	Familiar with basic concepts in artificial neural network and its learning methods	1	1	3	2	2									
			C417.4	Explore regression methods in Machine learning	1	3												
			C417.5	Design and analyze the instance based and reinforcement learning	1	3	2	3										
				NO. OF COS MAPPED	5	5	5	4		1							5	
				AVERAGE CO MAPPING	1.4	2.4	1.2	1.5		2							0	
56	Embedded Systems lab	21EC2510	C418.1	Understand the architecture and operation of microcontrollers and microprocessors used in embedded systems.	1		2										1	
			C418.2	Develop and test embedded systems using industry-standard development tools, simulators		2												1
			C418.3	Interface various sensors, actuators, and peripheral devices with embedded systems		2											1	
				NO. OF COS MAPPED	5	5	5	4		1							5	
				AVERAGE CO MAPPING	0.2	0.8	0.4	0		0							0.4	
57	Career competency Development V	21CD6005	C419.1	Apply the Basic concepts of computing ability to solve Quantitative Problems BL[3]		2	2	2		2								
			C419.2	Apply Basic logical thinking to solve Reasoning Problems BL [3]		2	2	2		2								
			C419.3	Apply Basic analytical abilities to solve Reasoning Problems Verbal Problems BL[3]		2	2	2		2								
				NO. OF COS MAPPED	3	3	3						3	3		3	3	3
				AVERAGE CO MAPPING	0	2	2						0	0		0	0	0
B.Tech 4-2																		
58	Project work,seminar and internship	21EC7503		Identify the problem by using the fundamental knowledge and skills.	3	3	2	2		2		2	3	3	3			
				Design a solution.to complex problems in a systematic approach.	2	3	2	3	2		2		3	3	3	2	2	2
				Demonstrate a strong working knowledge and interact with team manner in a professional manner.	2	3	2	3	3	3	2		3	3	3	2	2	2
				NO. OF COS MAPPED	3	3	3	3	2	3	2	1	3	3	3	2	2	2
				AVERAGE CO MAPPING	2.33	3	2	2.67	2.5	1.67	2	2	3	3	3	2	2	2