Department of Electronics and Communication Engineering

B. Tech. (Electronics and Communication Engineering)

MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

S. No.	Course Code	Course Name	CO No.	Course Outcomes (After completing the course students will be able to…...)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1FY2-01	Engineering Mathematics-I	CO1	Describe the concepts to use the fundamental ideas and characteristics of definite integrals, beta functions, and gamma functions to address real-world issues in the fields of science and engineering.	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Define the convergence of sequences and series and build the groundwork for future signal-processing research.	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Application of Fourier series will provide knowledge to examine the spectral properties of periodic functions.	2	3	1	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Analyse partial derivatives will allow to solve multivariable function maxima and minima.	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
			CO5	Evaluate numerous integrals for regions in the plane,to calculate the surface area, volume, area of the region surrounded by curves, mass, and centre of gravity of solid geometric figures.	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
2	1FY2-02	Engineering Physics	CO1	Describe the concepts of Wave and Quantum mechanics, Laser and Fiber optics, electromagnetic theory and material science	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain the different applications of Laser and optical fibers in communication, engineering, medicine and Science.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Using quantum mechanics, find the energy states of a 1-D or 3-D box.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Analyze the crystal structure through X-ray Diffraction & Wavelength of light through Newton's ring experiment and Michelson- interferometer	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	1FY1-05	Human Values	CO1	Relate sustained happiness through identifying the essentials of human values and skills	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO2	Describe the happiness and human values in terms of personal and social life to create harmony.	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
			CO3	Use and understand practically the importance of trust, mutually satisfaction and human relationship	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO4	Identify the orders of nature for the holistic perception of harmony for human existence	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO5	Implement professional ethics and natural acceptance of human values in his/her life	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
4	1FY3-06	Programming for Problem Solving	CO1	Describe an algorithm using flowchart/pseudo code for a given problem and fundamental of computer system	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Write a c program to compare various Conditional, Iterative statements using arrays, string, pointers, file structure and classify different Representation of numbers	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Examine the concept of Operators, Pointer, Array, String, structure, union using modularization to solve complex problems using C Programming	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Assess the User Defined functions, Memory management and File concepts to solve real time problems using C Programming	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5	1FY3-09	Basic Civil Engineering	CO1	Describe basics of surveying, types of building, mode of transportation and different causes of air and noise pollution	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
			CO2	Explain solid waste management, building by law, chemical cycle, biodiversity, causes of road accident, sanitary landfill and on-site sanitation	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Illustrate method of levelling, road safety measures, building component, hydrological cycle and environ different types of foundation, treatment and disposal of waste water, chemical cycle, traffic sign and symbol and rain water harvestingmental act	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Compute bearings and elevations of respective points on the ground, various road traffic sign, food chain and contour maps.	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
6	1FY2-20	Engineering Physics Lab	LO1	Explain the characteristics of optical fiber and laser	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO2	Determine wavelength of different spectral lines and height of an object by sextant	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO3	Analyze the band gap of semiconductor and type of semiconductor through hall effect	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO4	Learn how to communicate and work together effectively.	-	-	-	-	-	-	-	2	3	2	-	-	-	-	-
7	1FY1-23	Human Values Activities and Sports	CO1	Recall the natural and social issues and their remedies.	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
			CO2	Describe the nature of human values and the impact of external factors over it.	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
			CO3	Validate through actions the significance of trust, respect and harmony with self and surroundings.	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
			CO4	Outline the relation of human with nature and other factors in terms of human existence	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
			CO5	Associate the knowledge of self and society with clear understanding of social issues and the human beings.	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
8	1FY3-24	Computer Programming Lab	LO1	Relate the fundamental of C Programming as variable, operators and taxonomy to write a basic C Program	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO2	Write programs that perform operations using condition control statements and loop control statements, single and multi-dimensional arrays along with specific program of matrix multiplication.(Examine)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO3	Use C programs to implement operations related to Array, Macros and inline functions, Dynamic memory allocations, concept of Structure, Unions and Pointers	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO4	Learn how to communicate and work together effectively.	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-
9	1FY3-27	Basic Civil Engineering Lab	LO1	Describe various sanitary fittings and water supply fittings	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO2	Examine pH, Turbidity, Hardness and Total solids of given water sample	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO3	Use of EDM and Total Station in the field	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO4	Investigate the linear and angular measurements of the points on the ground and levelling	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-

S.No	Code	Subject	CO/LO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
			LO5	Learn how to communicate and work together effectively.	-	-	-	-	-	-	-	2	3	2	-	-	-	-
10	1FY3-28	Computer Aided Engineering Graphics	CO1	Describe engineering drawing terminology, concept of scales and conic sections.	1	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO2	Draw Projection of Points, lines, planes, solids and section of solids	-	1	-	-	-	-	-	-	-	-	-	-	2	-
			CO3	Draft 2D engineering problems on CAD software.	-	-	-	3	-	-	-	-	-	-	-	-	1	1
			CO4	Demonstrate an understanding of ethics in working as a team member.	-	-	-	-	-	-	-	2	3	-	-	-	-	-
11	2FY2-01	Engineering Mathematics-II	CO1	Use of concept of matrix to find rank by reducing into normal and echelon form, to solve linear system of equations, to determine linear dependency or independency, to find eigen values and eigen vectors for a linear transformation which is very useful in various field of technology.	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Understand ordinary differential equation and various methods of solution, to solve complex engineering problems.	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Identify a given differential equation and apply an appropriate analytical technique to find solution of first order and higher order differential equations.	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Analyze and apply appropriate mathematical technique to solve linear and non-linear partial differential equations.	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO5	Classify higher order partial differential equations and analyze a wide variety of time dependent phenomena of real world including heat conduction, wave equation particle diffusion.	-	2	-	-	-	-	-	-	-	-	-	-	-	-
12	2FY2-03	Engineering Chemistry	CO1	Describe characteristics of water, fuel and Engineering materials	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Determine of hardness of water and calorific value of fuels for Industrial as well as domestic purposes	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Compare different techniques of water treatment, fuel analysis, Manufacturing of engineering materials and corrosion protection methods	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Prepare the generic drugs or medicines by understanding the applications of organic reaction mechanism and manufacturing of engineering materials	-	2	-	-	-	-	-	-	-	-	-	-	-	-
13	2FY1-04	Communication Skills	CO1	Describe the process of communication, basics of Grammar and Writing and Literary Aspects	-	-	-	-	-	-	-	-	-	1	-	-	-	-
			CO2	Explain the types of communication, barriers and channels of communication and the concept of Literature through Short Stories and poetry	-	-	-	-	-	-	-	-	-	2	-	-	-	-
			CO3	Write and prepare professional reports, paragraph and business letters with the correct use of grammar	-	-	-	-	-	-	-	-	-	3	-	-	-	-
			CO4	Discuss and illustrate the impact of social and moral values by implying the basics of English Writing Skills through literary aspects	-	-	-	-	-	-	-	-	2	-	-	-	-	-
			CO5	Restate and outline the basic areas of English Language Skills with the applications of literature	-	-	-	-	-	-	-	-	-	-	2	-	-	-
14	1FY3-07	Basic Mechanical Engineering	CO1	Describe concepts of thermal, functional design of machine elements, materials and primary manufacturing process.	1	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO2	Classify different types of turbines and power plants, pumps and IC engines, refrigeration system, transmission of power, engineering materials and primary manufacturing processes	2	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO3	Use of fundamental knowledge of thermal engineering, in addition to understanding of materials and primary manufacturing process to solve the industrial and societal issues.	3	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO4	Examine about the turbine & pumps, IC engines, refrigeration system, modes of transmission of power, materials and primary manufacturing process	-	1	-	-	-	-	-	-	-	-	-	-	2	1
15	2FY3-08	Basic Electrical Engineering	CO1	Define various ac and dc circuit related problems	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain electromechanical energy conversion process	2	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO3	Classify characteristics of various power electronic devices.	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Identify knowledge of protective devices and energy consumption calculations.	-	2	-	-	-	-	-	-	-	-	-	-	2	-
16	2FY2-21	Engineering Chemistry Lab	LO1	Determine the strength of unknown solution by volumetric analysis.	1	-	-	-	-	-	-	1	-	-	-	-	-	-
			LO2	Examine the characteristics of lubricating oil in groups	-	-	-	-	-	-	-	2	-	-	-	-	-	-
			LO3	Analyze different characteristics of water and fuel to solve societal and enviornmental problems	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			LO4	Learn how to communicate and work together effectively.	-	-	-	-	-	-	-	2	3	-	-	-	-	-
17	2FY1-22	Language Lab	LO1	Use and pronounce the words correctly.	-	-	-	-	-	-	-	-	-	1	-	-	-	-
			LO2	Acquire knowledge of the correct expressions,vocabulary etc. in personal and professional lives.	-	-	-	-	-	-	-	-	-	2	-	-	-	-
			LO3	Plan successfully for leadership and teamwork,crack GD's, interviews and other professional activities.	-	-	-	-	-	-	-	-	-	2	-	-	-	-
			LO4	Synthesize the process of communication using LSRW.	-	-	-	-	-	-	-	-	-	-	3	-	-	-
18	2FY3-26	Basic Electrical Engineering Lab	LO1	Discuss measurement of electrical quantites	1	-	-	-	-	-	-	-	-	-	-	-	1	2
			LO2	Compare different connections of transformer	2	-	-	-	-	-	-	-	-	-	-	-	1	2
			LO3	Demonstrate constructional features of electrical machines and converters	3	-	-	-	-	-	-	-	-	-	-	-	2	2
			LO4	Learn how to communicate and work together effectively.	-	-	-	-	-	-	-	2	3	2	-	-	-	-
19	1FY3-25	Manufacturing Practices Workshop	CO1	Describe the working of Lathe machine.	1	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO2	Use the basic concepts of Foundry Shop in real life applications.	2	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO3	Develop various carpentry joints, welding joints and sheet metal objects.	-	2	-	-	-	-	-	-	-	-	-	-	1	-
			CO4	Learn how to communicate and work together effectively.	-	-	-	-	-	-	-	2	3	-	-	-	-	-
20	2FY3-29	Computer Aided Machine Drawing	CO1	Describe orthographic projections and basic Geometrical Concept	2	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO2	Analyze Sectional Views of different mechanical Components and assembly drawing	-	1	-	-	-	-	-	-	-	-	-	-	2	-
			CO3	Draft a engineering product using CAD software	-	-	-	-	2	-	-	-	-	-	-	-	2	-	1
			CO4	Learn how to communicate and work together effectively.	-	-	-	-	-	-	-	2	3	-	-	-	-	-
			CO1	Explain the Laplace transform,Fourier transform ,Z transform ,Numerical methods to find unknwon values with help of known values , Roots finding techniques,solution of differential equations like ordinary differential equation, Partial differential equation & simultaneous differential equation.	3	3	2	2	3	-	-	-	-	-	3	3	2	2

No	Code	Subject	CO/LO	Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
21	3EC2-01	Advanced Engineering Mathematics-I	CO2	Use of the appropriate technology, and Compare the viability of different approaches to the numerical solution of problems.	3	3	2	2	3	-	-	-	-	-	-	3	3	2	2
			CO3	Analyze the Fundamentals of the Fourier, Laplace, and Z-Transforms . These systems can be carried out in terms of either a time domain or a transform domain formulation.	3	3	2	2	2	-	-	-	-	-	-	3	3	2	2
			CO4	Design of electrical circuits such as filters and networks, and is ideally suited for the analysis of transient response phenomena Similarly the z-transform is an indispensable tool for the design and analysis of digital filters, especially infinite impulse response (IIR) filters, Spatial filter, Adaptive filter, Inverse and Wiener filter for specific application.	3	3	2	2	2	-	-	-	-	-	-	3	3	2	1
22	3EC1-03	Managerial Econimics and Financial Accounting	CO1	Discuss the concepts of economics like demand, supply, market structure and financial management like balance sheet	-	-	-	-	-	1	-	-	-	3	3	3	3	-	3
			CO2	Use of the appropriate technology: demand & supply functions, production & cost functions & pricing theories.	-	-	2	-	1	-	-	2	-	-	3	2	-	-	2
			CO3	Analyse the relationship between economic variables using the concept of elasticity, cash flow analysis, fund flow analysis and ratio analysis	-	3	2	3	-	-	-	-	-	-	3	2	-	-	2
			CO4	Evaluate the real life problems of business organizations using capital budgeting techniques	-	3	-	3	-	3	2	-	2	-	3	2	-	-	2
23	3EC4-04	Digital System Design	CO1	Discuss the concept of number system ,Boolean Algebra combinational , sequential circuits ,semiconductor memories and VLSI design flow.	3	2	1	2	-	1	-	-	-	-	-	-	2	3	-
			CO2	Use of the appropriate technology to optimize the performance of circuits. This means that the circuits will run more smoothly and quickly, which can save time and energy.	2	3	2	3	-	-	-	-	-	-	-	-	2	-	-
			CO3	Design and trade-offs in various digital electronic families with a view towards reduced power consumption and miniaturizations	3	2	2	1	1	-	-	-	-	-	-	-	3	-	-
			CO4	Analysis of synchronous and asynchronous sequential circuits and Develop design capability in synchronous and asynchronous sequential circuits using VHDL .	2	2	3	2	1	-	-	-	-	-	-	-	1	3	1
24	3EC4-05	Signal & System	CO1	Describe the mathematical representation and classifications of signals, LSI system , sampling theorem, MIMO System and their properties.	3	2	2	3	1	-	-	2	-	-	-	-	2	3	-
			CO2	Develop concept of convolution to figure out how the response of a linear time invariant (LTI) system changes over time when you're trying to analyze how an analog or digital communication system behaves.	3	1	-	2	3	-	-	-	-	-	-	-	3	2	3
			CO3	Analyze the signals and system using different transform domain techniques like CTFT, DTFT, Laplace and Z Transforms.	3	2	2	3	-	-	-	-	-	-	-	2	3	2	2
			CO4	Investigate whether the system is stable, Linear, causal ,Time Invariant etc	3	2	2	3	-	-	-	-	-	-	-	-	2	3	-
			CO5	Design and implement zero order hold and first order hold interpolator	3	2	3	3	1	-	-	-	-	-	2	3	1	3	2
25	3EC4-06	Network Theory	CO1	Describe and explain various concept of mesh & node analysis , network theorems, frequency domain, time domain, Electric network, Fourier series, transform, port network & filters analysis.	3	3	-	-	-	2	-	-	-	-	-	2	3	2	3
			CO2	Understanding mesh and node analysis, network theorems, frequency domain, time domain, and electric network . Port network and transient behavior analysis, helps to know how all moves around in a network.	3	3	3	-	-	-	-	-	-	-	-	2	3	3	3
			CO3	Compare operation of electric network with reference to parameters & frequency domain, time domain Analysis.	3	3	-	-	-	3	-	-	-	-	-	-	3	-	2
			CO4	Evaluate the different parameters of the A.C. & D.C. networks.	3	3	-	3	3	2	-	-	-	-	-	-	3	-	-
26	3EC4-07	Electronics Devices	CO1	Understand and explain the basic parameters of Semiconductor materials, Compound Semiconductors, Thermistors, P-N diode, Zener diode, Schottky diode, Bipolar Junction Transistor, MOSFET, LED, photodiode, solar cell and CMOS fabrication.	2	1	1	1	-	-	-	-	-	1	2	-	3	1	2
			CO2	Different methods can be used to measure different aspects of a semiconductor device, like current, voltage, and power. Scientists use these measurements to figure out how much energy is inside the device.	3	2	2	-	-	2	-	-	-	-	-	-	3	-	-
			CO3	Analyze and identify the changes in the parameters like (current, voltage, power, energy, power dissipation, time and temperature).	2	3	1	-	-	-	-	-	-	-	-	2	-	3	-
			CO4	Construct the V-I characteristic of semiconductor devices with and without variation of temperature and Design the CMOS by using different fabrication steps like (oxidation, Deposition, Etching, Diffusion and Metallization).	2	1	3	2	-	2	-	-	-	-	-	-	2	-	3
27	3EC4-21	Electronics Devices Lab	LO1	Understand the semiconductor devices and component like diode, BJT, JFET and MOSFET.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO2	Explain the working principle of the semiconductors devices.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO3	Design and analysis different-different component related to the practical on the bread board.	3	3	-	-	-	-	-	-	-	-	3	2	2	-	2
			LO4	Evaluate the result and justify it by comparison to the ideal result.	3	-	3	3	-	-	-	-	-	-	3	2	2	2	2
28	3EC4-22	Digital System Design Lab	LO1	Design, test and evaluate various combinational circuits such as adders, subtractors, comparators, multiplexers and demultiplexers.	2	-	2	-	3	-	-	-	-	-	-	-	2	2	-
			LO2	Demonstrate the truth table of various expressions using logic gates.	-	3	3	-	3	-	-	-	-	-	-	-	2	3	-
			LO3	Identify the various digital ICs and understand their operation.	-	3	-	-	-	-	-	-	-	-	-	-	-	3	-
			LO4	Analyze, design and implement Flip-Flop.	2	3	-	-	3	-	-	-	-	-	-	-	-	3	2
29	3EC4-23	Signal Processing Lab	LO1	Understand the basics features of MATLAB, fundamentals of signals and their different operations	3	-	1	-	3	-	-	-	-	-	-	-	2	2	3
			LO2	Generate random signals and different continuous and discrete time signals	2	1	1	-	2	-	-	-	-	-	-	-	2	2	-
			LO3	Develop simple algorithms for signal processing and test them using MATLAB.	2	2	3	1	3	-	-	-	-	-	-	3	-	3	2
			LO4	Verify random sequences with arbitrary distributions, mean and variance	2	1	1	-	2	-	-	-	-	-	-	-	2	3	-
			LO5	Design and conduct experiments interpret and analyse data and report results	2	1	2	2	3	-	-	-	-	-	-	2	2	3	2
			LO1	Understand the importance of structure and abstract data type, and their basic usability in different applications	2	3	2	-	-	-	-	-	-	-	-	-	-	-	-

#	Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
30	3EC4-24	Computer Programming Lab-I	LO2	Analyze and differentiate different algorithms based on their time complexity.	-	3	_	-	-	-	-	-	-	-	-	-	-	-	-
			LO3	Implement linear and non-linear data structures using linked lists.	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
			LO4	Understand and apply various data structure such as stacks, queues, trees, graphs, etc. to solve various computing problems.	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-
			LO5	Implement various kinds of searching and sorting techniques, and decide when to choose which technique.	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
31	3EC7-30	Industrial Training	LO1	Participate in the projects in industries during his or her industrial training.	3	1	1	3	-	3	2	3	3	3	3	3	2	1	2
			LO2	Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.	-	-	-	2	-	3	3	2	-	3	-	3	1	-	2
			LO3	Develop awareness about general workplace behavior and build interpersonal and team skills.	-	-	-	3	2	-	-	3	-	3	-	2	-	1	1
			LO4	Prepare professional work reports and presentations.	-	-	-	3	2	-	-	3	-	3	-	3	-	1	1
32	4EC2-01	Advanced Engineering Mathematics-II	CO-1	Define properties of complex numbers , special function and linear algebra and can apply this knowledge to the solution of complex engineering problems like in signal processing which has applications to telecommunications (cellular phone), radar(which assists the navigation of airplanes), and even biology(in the analysis of firing events from neurons in the brain).	1	-	-	-	-	-	-	-	-	-	-	1	2	-	1
			CO-2	Classify complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various forms.	2	-	-	-	-	-	-	-	-	-	-	1	2	-	1
			CO-3	Identified different techniques to solve the differential equations of higher order like Bessel's and Legendre and their application in the solution of hydrodynamics, theory of elasticity and loading of electrical transmission lines in Electronics & Communication Engineering .	3	-	-	-	-	-	-	-	-	-	-	1	2	-	1
			CO-4	Analyzed a variety of numerical Problems and solve them by using appropriate technology, and Compare the viability of different approaches to the numerical solution of problems.(Analyze)	-	3	-	-	-	-	-	-	-	-	-	1	2	-	1
33	4EC1-02	Technical Communication	CO-1	Define the process of technical communication in terms of LSRW.	-	-	-	-	-	-	-	-	-	-	3	-	3	-	-
			CO-2	Examine the concept of Technical Materials/Texts in various technical documents.	-	-	-	-	-	-	-	-	-	-	3	-	3	-	-
			CO-3	Understand and write professional documents correctly.	-	-	-	-	-	-	-	-	-	-	3	-	3	-	-
			CO-4	Analyze the basic concepts of Technical Reports, articles and their formats.	-	-	-	-	-	-	-	-	-	-	3	-	3	-	-
34	4EC4-04	Analog Circuits	CO-1	Explain the Analog Circuits related to transistor amplifiers such as BJT, FET, etc. and oscillators such as Phase Shift, Harley, etc.	2	-	-	-	-	-	-	-	-	-	-	-	3	-	2
			CO-2	Apply Uses of mathematical equations for transistor amplifiers and oscillators in various domains.	-	2	-	-	-	-	-	-	-	-	-	-	3	-	2
			CO-3	Analyse BJT, FET, OP-AMP amplifiers and oscillators such as Phase Shift, Hartley, etc their characteristics.	-	2	-	-	-	-	-	-	-	-	-	-	2	-	2
			CO-4	Design transistor amplifiers and oscillators for different applications through numerical problems.	2	2	-	-	-	-	-	-	-	-	-	-	-	-	2
35	4EC4-05	Microcontrollers	CO-1	Explain basics of Microprocessors and Microcontrollers	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO-2	Illustrate interfacing of peripheral devices with basic and advanced microprocessors and microcontrollers	2	1	-	-	-	-	-	-	-	-	-	-	3	3	-
			CO-3	Design embedded system for solving industry problems using basic and advanced microprocessors and microcontrollers	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO-4	Analysis for optimization of hardware created for industry problems	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
36	4EC3-06	Electronics Measurement & Instrumentation	CO-1	Describe and explain various concept of Errors, Electronic Instruments, Meters, Oscilloscope, Signal Generators, Analyzers & Transducers. [Understanding]	3	3	-	-	-	-	-	-	-	-	-	2	3	-	3
			CO-2	Use and apply the knowledge of Electronic meters, Oscilloscope, Q- Meters, Different types of errors, Signal generators, Wave Analyzers & Selection of transducers. [Applying ,Understanding]	3	3	-	-	-	-	-	-	-	-	-	2	3	-	3
			CO-3	Compare the operation of different instruments with usability & reference to parameters. [Analyzing]	3	-	3	-	-	-	-	-	-	-	-	-	3	-	3
			CO-4	Evaluate the different parameters of different Instruments & Transducers. Selection to the Instruments & transducers according to application. [Analyzing, Design]	3	2	3	-	-	-	-	-	-	-	-	-	3	-	3
37	4EC4-07	Analog and Digital Communication	CO-1	Demonstrate understanding of various analog and digital modulation and demodulation techniques	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO-2	Knowledge to calculate different parameters of modulation and demodulation schemes.	3	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO-3	Analyse the performance of modulation and demodulation techniques in various transmission environments.	-	3	-	2	-	-	-	-	-	-	-	-	-	2	-
			CO-4	Design the transmitter and receiver for analog and digital communication like Viterbi receiver etc.	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
38	4EC4-21	Analog and Digital Communication Lab	LO-1	Understand different analog modulation schemes for their efficiency and bandwidth.	3	2	-	-	-	-	-	-	3	-	-	-	-	-	-
			LO-2	Analyze the behavior of a communication system in presence of noise.	3	2	-	-	-	-	-	-	3	-	-	-	-	-	-
			LO-3	Investigate pulse modulation system and analyze their system performance.	3	2	-	-	-	-	-	-	3	-	-	-	-	-	-
			LO-4	Analyze different digital modulation schemes and can compute the bit error performance.	3	2	3	-	-	-	-	-	3	-	-	-	-	-	-
			LO-5	Design a communication system comprised of both analog and digital modulation techniques.	3	3	3	3	-	-	-	-	3	-	-	-	-	-	-
39	4EC4-22	Analog Circuits Lab	LO-1	Explain transistor amplifiers and oscillators for experimental evaluation of their characteristics in different dimensions	2	-	-	-	-	-	-	-	-	-	-	-	3	-	2
			LO-2	Apply circuit diagrams for experimental evaluations of these transistors and oscillators	-	2	-	-	-	-	-	-	-	-	-	-	3	-	2
			LO-3	Perform experiment in appropriate manner for experimental data generation	-	-	2	-	-	-	-	-	-	-	-	-	3	-	2
			LO-4	Analyse experimental data for the characteristic profiles of these transistors and oscillators	-	-	2	-	-	-	-	-	-	-	-	-	3	-	2

#	Course Code	Course Name	CO/LO	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
40	4EC4-23	Microcontrollers Lab	LO-1	Recall basic concept of digital fundamentals to Microprocessor and microcontroller.	3	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO-2	Develop various systems related to assembly level programming of microprocessors and microcontroller.	-	3	-	-	-	-	-	-	-	-	-	3	-	-
			LO-3	Distinguish/Analyze the properties of Microprocessors & Microcontrollers.	-	-	-	3	-	-	-	-	-	-	-	-	3	-
			LO-4	Interpret the basic knowledge of microprocessor and microcontroller interfacing, delay generation, waveform generation and Interrupts.	-	3	-	-	-	-	-	-	-	-	-	-	3	-
41	4EC4-24	Electronics Measurement & Instrumentation Lab	LO-1	Understanding of the fundamentals of Electronic Instrumentation. Explain and identify measuring instruments	3	3	-	-	-	-	-	-	-	-	-	3	-	2
			LO-2	Illustrate to measure resistance, inductance and capacitance, by using different methods.	3	3	-	-	-	-	-	-	-	-	-	3	-	2
			LO-3	Analysis the instrumentation system that meets desired specifications, requirements & results.	3	3	-	-	-	-	-	-	-	-	-	3	-	2
			LO-4	Evaluate the different parameters with different- different measuring instruments & transducers	3	3	-	-	-	-	-	-	-	-	-	3	-	2
42	5EC3-01	Computer Architecture	CO1	Understand the principles of computer organization and the basic architecture concepts of processor oragnization, memory oragnization and input-output system.	-	3	-	-	-	-	-	-	-	-	-	-	3	-
			CO2	Discuss the basic structure of a digital computer how to add and multiply integers and floating-point numbers using two's complement and IEEE floating point representation, I/O System organization	1	2	-	-	-	-	-	2	-	-	-	-	3	-
			CO3	Evaluate the computer arithmetic operations on fixed and floating point numbers using different algorithms like restoring method, microprogrammed control unit and dma controller.	2	-	-	-	2	-	-	-	-	-	-	-	3	-
			CO4	Design basic and intermediate RISC pipelines, including the instruction set , functional units and components of computers.	3	3	3	-	-	-	-	-	-	-	-	-	2	-
43	5EC4-02	Electromagnenetic Wave	CO1	Explain basic cocepts of transmission line , electromagnetic fields, waveguides and radition parameter.	3	-	-	-	-	-	-	-	-	-	-	3	2	3
			CO2	Solve specific problems related to transmission line , Maxwell's equation, uniform plane waves for different media interface	3	3	-	-	-	-	-	-	-	-	-	3	-	3
			CO3	Analyze parameter of transmission line and time varying electromagnetic wave propagation in different media	2	3	3	-	-	-	-	-	-	-	-	3	3	-
			CO4	Evaluate the nature of electromagnetic wave propagation in guided medium for specific aplications	-	-	3	2	-	-	-	-	-	-	-	-	3	-
44	5EC4-03	Control System	CO1	Describe basic concept of control system with & without feedback, time & frequency response analysis, state variable analysis, optimal control & nonlinear control systems.	3	-	-	-	-	-	-	-	-	-	-	3	2	3
			CO2	Solve problems on feedback control system, time response, frequency response & state variable analysis & stability analysis using Routh-stability criterion, root locus, polar plot, bode plot, Nyquist plots, state model, etc.	3	3	-	-	-	-	-	-	-	-	-	3	-	3
			CO3	Analyze the behavior of different types of control systems through performance in time domain, frequency domain & through state space analysis.	2	3	3	3	-	-	-	-	-	-	-	3	3	-
			CO4	Design appropriate compensator for a typical control application using time & frequency response.	-	-	3	3	3	-	-	-	-	-	-	-	3	-
45	5EC4-04	Digital Signal Processing	CO1	Define the concept of sampling and it's. Reconstruction.[Remember]	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Describe Z-Transform, DFT and FFT algorithm. [Understanding]	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Apply Z- Transform, DFT and FFT algorithm to analyze LSI system.[Apply and Analyze]	-	3	-	1	-	-	-	-	-	-	-	-	-	-
			CO4	Design IIR and FIR filter using different method for various D.S.P. applications. [Design]	-	3	2	-	-	-	-	-	-	-	-	-	-	-
46	5EC4-05	Microwave Theory & Techniques	CO1	Understanding the basic concepts and principles of microwave engineering.	3	-	-	-	-	-	-	-	-	-	-	3	-	3
			CO2	Develop understanding how EM waves work, and to create an active and passive microwave network. Also determine the specific microwave parameters used in these networks.	-	2	-	-	-	-	-	-	-	-	-	3	3	3
			CO3	Analyze an impedance tuning network for efficient transmission of satellite and RADAR communication.	-	3	2	2	-	-	-	-	-	-	-	3	3	-
			CO4	Design microwave active and passive component to create a typical communication system to evaluate the effect on human body.	-	-	3	3	2	2	2	-	-	-	-	-	3	-
47	5EC5-12	Satellite Communication	CO1	Understand the architecture of satellite systems as a means of high speed, high communication range system.	3	2	-	2	-	-	-	-	-	-	-	2	3	-
			CO2	Explain various aspects related to satellite systems such as orbital equations, sub-systems in a satellite, link budget, modulation and multiple access	2	3	2	3	-	-	-	-	-	-	-	-	2	-
			CO3	Analyse the multiple access schemes used in satellite communication.	3	2	2	-	-	-	-	-	-	-	-	-	3	-
			CO4	Calculate numerical problems related to orbital motion and design of link budget for the given parameters and conditions	2	2	3	2	-	-	-	-	-	-	-	1	3	1
48	5EC4-21	RF Simulation Lab	LO1	Describe basic microwave network theory and the use of scattering matrix.	2	-	-	-	-	-	-	-	-	-	-	-	2	2
			LO2	Use of microwave energy and its application is used to heat up a particular area or object, which in turn makes electronic devices work better.	-	3	-	-	-	3	-	-	-	-	-	-	2	3
			LO3	Demonstrate broad knowledge about RF basic concepts, RF amplifier and RF filter.	-	3	3	3	3	-	-	-	-	-	-	-	3	2
			LO4	Designing of RF amplifier using microwave BJT and microwave FET.	-	3	3	3	3	-	-	-	-	-	-	-	3	-
			LO5	Design and fabricate microwave component or device using micro strip technology.	-	3	3	3	3	-	-	-	-	-	-	-	3	-
49	5EC4-22	Digital Signal Processing Lab	LO1	Classify signals and apply different operations on signals	3	-	-	-	-	-	-	-	-	-	-	-	3	-
			LO2	Analyze various properties of digital systems	-	2	-	-	-	-	-	-	-	-	-	-	3	-
			LO3	Design simulink model and GUI for analog and digital modulation techniques	-	-	2	-	3	-	-	-	-	-	-	3	3	2
			LO4	Develop various DSP Algorithms using MATLAB Software package for different transformation	-	-	3	2	3	-	-	-	-	-	-	3	-	2

#	Code	Subject	CO/LO	Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
			LO5	Design, analyze, and implement Analog & Digital filters using MATLAB programming	-	-	3	2	3	-	-	-	-	-	-	-	3	3	2
50	5EC4-23	Microwave Lab	LO1	Describe the basic concept of microwave components mechanism used in wire line communication.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	2
			LO2	Explain the different mode of microwave transmission used in different application as mobile, satellite.	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			LO3	Analyze the behavior of different type of microwave parameter based on its fundamental characteristics.	-	3	3	2	-	-	-	-	-	-	-	-	3	2	-
			LO4	Evaluate & Design real time application based microwave waveguide for used in communication.	-	2	3	3	3	2	-	-	-	-	-	-	-	3	-
51	5EC7-30	Industrial Training	LO1	Participate in the projects in industries during his or her industrial training.	3	1	1	3	-	3	2	3	3	3	3	3	2	1	2
			LO2	Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.	-	-	-	2	-	3	3	2	-	3	-	3	1	-	2
			LO3	Develop awareness about general workplace behavior and build interpersonal and team skills.	-	-	3	2	-	-	3	-	3	-	2	-	1	1
			LO4	Prepare professional work reports and presentations.	-	-	-	3	2	-	-	3	-	3	-	3	-	1	1
52	6EC 3-01	Power Electronics	CO-1	Describe Basic operation and compare performance of various Power Semiconductor Devices, passive components and switching circuits.	3	2	-	2	-	-	-	-	-	-	-	-	3	3	3	-
			CO-2	Illustrate working of step up and step down choppers, power supplies, and Buck Boost converters can be understood by understanding the basic operational characteristics of power semiconductor devices.	2	3	-	2	-	-	-	-	-	2	-	3	3	-	2
			CO-3	Derive typical alternative solutions and select suitable power converters to control electrical motors and other industry grade apparatus.	2	3	2	-	2	-	2	-	-	-	-	3	3	2	-
			CO-4	Design and analyze single phase and three Phase Controlled Converters , Voltage and current source Inverters	-	3	2	-	-	-	-	-	-	2	-	3	2	3	-
53	6EC 4-02	Computer Network	CO-1	Able to learn and analyze the principles of layered protocol architecture; be able to identify and describe the system functions in the correct protocol layer and further describe how the layers interact.	3	3	-	-	-	-	-	-	2	3	-	3	3	-	-
			CO-2	Solve mathematical problems to understand data-link and network protocols.	3	3	-	-	-	-	-	-	2	3	-	2	3	2	-
			CO-3	Apply network layer protocols and calculate number of subnets required for a network.	3	3	2	-	2	-	-	-	2	3	-	3	3	2	-
			CO-4	Evaluate the reliability of data transfer over transport layer by lossy channel bit errors problem.	3	3	-	3	2	-	-	-	2	3	-	3	3	3	3
			CO-5	Demonstrate and describe for common services, system services, such as name and address lookups, and communications applications.	-	-	-	3	-	-	-	-	3	3	-	3	3	3	3
54	6EC 4-03	Fiber Optics Communications	CO-1	Understanding the basic concepts and principles of Fiber Optics Communication.	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO-2	Develop the understanding how fiber optic communication works, and can use that knowledge to build an optical measurement system. This system will allow us to measure a variety of important parameters, like numerical aperture, dispersion, and attenuation.	3	2	3	3									3	3	-
			CO-3	Analyze the structure of different types of optical source and receivers for implementation of optical link.	2	3	3	3	-	-	-	-	-	-	-	-	3	3	-
			CO-4	Design the WDM and DWDM systems and also characterize the performance of optical active and passive components. .	2	3	3	3	3	-	-	-	-	-	-	-	3	3	-
55	6EC 4-04	Antennas & Propagation	CO-1	Explain the fundamental concept of antenna and its applications.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO-2	Calculate the radiation pattern of an antenna, to know the antenna's shape and the wavelength of the waves it is sending out by the concept of electromagnetic waves .	-	3	-	-	-	-	-	-	-	-	-	-	3	3	-
			CO-3	Analyze the radiation pattern of various antennas.	-	-	-	3	-	-	-	-	-	-	-	-	2	3	-
			CO-4	Design Smart Antenna system for Real Time applications	-	-	3	-	-	-	-	-	-	-	-	-	3	2	-
56	6EC 4-05	Information Theory & Coding	CO-1	Explain fundamental of information theory like uncertainty, information, entropy, channel capacity and need of coding	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO-2	Apply coding tehchniques for source and channel like Huffman, Lempel-ziv, Block codes etc.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO-3	Analyze different coding & Decoding techniques for various applications like Compression, Data Transmission etc.	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO-4	Design effient codes for error detection and correction Techniques	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
57	6EC 5-11	Introduction to MEMS (Elective-1)	CO-1	Understand the fundamental principles, structure, fabrication, properties and approach of MEMS/NEMS including Micro devices, Micro systems and Micromachining techniques.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO-2	Create tiny, precise objects using MEMS technology.	3	3	2	-	-	-	-	-	-	-	-	-	3	3	-
			CO-3	Analyze the Scaling effect of Micro/Nano Sensors for specific application.	3	3	-	2	-	-	-	-	-	-	-	-	3	-	3
			CO-4	Design and Develop Micro/Nano devices, Micro/Nano systems for solving the real life problems	-	-	3	3	3	-	-	-	-	-	-	-	3	3	2
58	6EC 5-12	Nano Electronics (Elective-2)	CO-1	Explain and understand the Schrodinger equation, CMOS Scaling, the nano scale MOSFET, Finfets, Vertical MOSFETs, Resonant Tunneling Diode, Coulomb dots, Quantum blockade, Single electron transistors, Carbon nanotube electronics.	2	2	2	-	-	-	3	-	-	-	-	-	3	-	-
			CO-2	Use different methods to get energy, wave function, propagation constant, and channel length in MOSFETs and CMOS.	3	-	-	-	-	-	-	-	-	-	-	-	3	3	-
			CO-3	Analyze and identify the changes in the parameters like inter-atomic distance, 2D and 3D structure, Scaling of CMOS.	2	3	-	-	-	-	-	-	-	-	-	-	3	3	-
			CO-4	Synthesis the structure of CMOS, Finfet, Vertical MOSFET and Carbon nano tubes.	-	-	3	-	-	-	-	-	-	-	-	-	3	2	-	3
59	6EC 4-21	Computer Network Lab	LO-1	Understand the concept of TCP/IP PROTOCOLS, LAYERED STRUCTURE, LAN , MAN , WAN.	3	2	1	-	-	-	-	-	-	-	-	-	3	3	-	1
			LO-2	Use of Data Structures in Networking using the concept of Weighted and Unweighted Graph.	3	2	1	-	-	-	-	-	-	-	-	-	3	3	-	1
			LO-3	Describe the simulation of Queueing Theory.	3	2	1	-	-	-	-	-	-	-	-	-	3	3	-	1

No	Code	Course	Outcome	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
			LO-4	Design LAN Training Kit using the concept of CSMA/CD/CA.	3	2	1	-	-	-	-	-	-	-	-	3	3	-	1
60	6EC 4-22	Antenna & Wave Propagation Lab	LO-1	Understand the basic concept of antenna radiation mechanism used in wireless communication.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO-2	Apply the different mode of communication used in different application as mobile, satellite.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LO-3	Analyze and identify the problems in MOS and CMOS devices (like estimate of gate delay, transistor sizing, power dissipation, over pressure and temperature).	-	3	-	2	-	-	-	-	-	-	-	-	3	-	-
			LO-4	Analyze the behavior of different type of antenna based on its fundamental parameters.	-	-	3	3	3	-	-	-	-	-	3	-	3	2	-
61	6EC 4-23	Electronics Design Lab	LO-1	Understand the basic concepts and appliactions of Op-amp IC (741), 555 timer IC, CRO, bread board and function generator	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO-2	Apply the different designing methods on bread board using IC-741 and IC-555 for different applications.	3	-	-	-	-	-	-	-	-	-	3	-	3	2	-
			LO-3	Analyze the behavior of different type of circuits using IC-741 and IC-555 in different application for different inputs	-	3	-	2	-	-	-	-	-	-	-	-	-	-	-
			LO-4	Design the circuit diagram on bread board using IC-741 and IC-555 for different applications.	-	-	3	3	3	-	-	-	-	-	-	-	-	-	-
62	6EC 4-24	Power Electronics Lab	LO-1	Understand the characteristics of SCR and its triggering using RC and UJT triggering circuits.	3	2	-	-	3	-	-	-	-	-	-	-	3	3	-
			LO-2	Understand AC voltage regulators using TRIAC, anti parallel thyristors, TRIAC and DIAC as well as pulse generation using DSP/FPGA platform	3	3	2	2	3	-	-	-	-	-	-	3	3	-	2
			LO-3	Study single-phase bridge converter, single-phase cycloconverter and single-phase dual converter along with dc motor speed control	3	-	-	3	-	-	-	-	-	-	-	-	3	3	2
			LO-4	Perform experiment on single phase PWM inverter, buck, boost and buck-boost regulators.	2	3	-	-	3	-	-	-	-	-	-	-	3	2	3
			LO-5	Perform speed control of DC motor using a chopper and induction motors using single phase AC voltage regulator along with open loop & closed loop motor control.	3	-	3	-	3	-	-	-	-	-	-	-	3	2	3
63	7EC5-11	VLSI Design	CO1	Understand and explain different digital components like MOSFET, NMOS inverter, PMOS inverter, CMOS, CMOS inverter, logic Gates Clocked CMOS (C2MOS) logic, DOMINO logic, NORA logic, NP(ZIPPER) logic, PE(pre-charge and Evaluation) Logic. Basic Memory circuits, SRAM and DRAM	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO2	Apply different technical methods to obtain the parameters of MOSFET(like channel length modulation, higher order effects, model parameter, drain –source current relationship and body effect), CMOS(like inverter parameter, pull up and pull down ratio, and noise margin)	3	3	3	-	-	-	-	-	-	-	-	-	3	3	-
			CO3	Analyze and identify the problems in MOS and CMOS devices (like estimate of gate delay, transistor sizing, power dissipation, over pressure and temperature).	2	3	3	3	-	-	-	-	-	-	-	-	3	3	-
			CO4	Create the VHDL code for combinational and sequential components	-	3	3	-	-	-	-	-	-	-	-	-	-	3	3
			CO5	Design the layouts and stick diagram of MOSFET, CMOS inverter and any Boolean expression and different fabrication methods of NMOS and CMOS.	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-
64	7EC5-13	CMOS design	CO1	Describe the fabrication process and properties of MOS devices.	3	2	2	-	-	-	-	-	-	-	-	-	2	3	2
			CO2	Comprehend the need of hardware description language and its features.	2	3	3	2	1	-	-	-	-	-	-	-	-	2	3
			CO3	Analyze the impact of scaling on MOS circuits.	2	2	3	1	-	-	-	-	-	-	-	3	1	3	1
			CO4	Design combinational and sequential circuits using VHDL.	2	3	-	2	3	-	-	-	-	-	-	-	1	2	3
65	7EC7-21	VLSI Design Lab	LO1	Understand the physical design process of Digital Integrated Circuits.	2	3	-	-	-	-	-	-	-	-	-	-	3	2	-
			LO2	Describe procedure for designing of programmable circuits.	2	3	-	-	-	-	-	-	-	-	-	-	3	3	-
			LO3	Demonstrate the ability to use various EDA tools for digital system design	-	3	3	3	-	-	-	-	-	-	-	-	-	3	-
			LO4	Implement various combinational and sequential circuits using VHDL on FPGA.	-	3	3	-	-	3	-	-	-	-	-	-	-	3	-
			LO5	Implement schematic and layout of various digital CMOS logic circuits using EDA tools.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	7EC4-22	Advance communication lab	LO1	Design and demonstrate the digital modulation techniques	3	-	-	-	-	-	-	-	-	-	-	-	3	-	2
			LO2	Demonstrate and measure the wave propagation in microstrip antennas	-	2	2	-	-	-	-	-	-	-	-	-	3	-	-
			LO3	Characteristics of microstrip devices and measurement of its parameters.	3	-	2	2	-	-	-	-	-	-	-	-	3	2	2
			LO4	Model an optical communication system and study its characteristics.	-	-	2	2	-	-	-	-	-	-	-	-	3	-	2
			LO5	Simulate the digital communication concepts and compute and display various parameters along with plots/figures.	-	2	2	-	-	-	-	-	-	-	-	-	3	-	-
67	7EC4-23	Optical Communication Lab	LO1	Describe the principles of optical sources and power launching-coupling methods.	3	3	2	2	-	-	-	-	-	-	-	-	3	2	2
			LO2	Compare the characteristics of fiber optic receivers	3	3	3	2	3	-	-	-	-	-	-	-	3	-	-
			LO3	Design a fiber optic link based on budgets	3	-	3	3	3	-	-	-	-	-	-	-	3	-	-
			LO4	Demonstrate an understanding of optical fiber communication link, structure, propagation and transmission properties of an optical fiber.	3	-	3	3	3	-	-	-	-	-	-	-	3	3	-
68	7EC7-30	Industrial Training	LO1	Monitor and understand industry processes.	3	1	1	3	-	3	2	3	3	3	3	3	2	1	2
			LO2	Demonstrate various industrial equipment.	-	-	-	2	-	3	3	2	-	3	-	3	1	-	2
			LO3	Develop his/her report writing skill.	-	-	-	3	2	-	-	3	-	3	-	2	-	1	1
			LO4	Enhance their communication skills and confidence level through presentation.	-	-	-	3	2	-	-	3	-	3	-	3	-	1	1
69	7EC7-40	Practical Training Seminar	LO1	Identify engineering professional real time industrial or societal problem to select his/her seminar topic	3	1	2	3	-	3	3	3	3	-	3	3	2	1	2
			LO2	Investigate various reported solution of engineering problems throughout the corner of society.	3	3	2	3	3	-	-	-	3	-	3	2	2	3	2
			LO3	Argue and judge his/her findings in the selected area	-	-	-	2	3	-	-	3	3	3	3	3	-	2	2

No	Code	Subject	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
			LO4	Prepare a good professional document with his concluding remarks	-	-	-	-	3	-	-	3	-	3	3	3	-	2	2
			LO5	Enhance their communication skills and confidence level through presentation.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70	7EE6-60.1	Electrical Machines and Drives	CO1	Understand the constructional details and principle of operation of rotating electrical machines	3	-	-	3	3	-	-	-	-	-	3	-	-	-	-
			CO2	Acquire knowledge about the working principle and various aspects of electric drives.	3	-	-	2	3	-	-	-	-	-	2	-	-	-	-
			CO3	Analyze the various control techniques for speed control on various electric drives .	2	-	-	3	3	-	-	-	-	-	3	-	-	-	-
			CO4	Develop design knowledge on how to design the speed control and current control loops of an electric drive	3	-	-	3	2	-	-	-	-	-	3	-	-	-	-
71	7EE6-60.2	Power Generation Sources	CO1	Classify and describe various renewable energy sources.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Predict possible renewable energy sources.	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Illustrate the renewable energy sources.	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Re-organize energy sources	3	3	2	1	-	-	-	-	-	-	-	-	-	-	-
			CO5	Prioritize all other renewable energy sources as needed by societal application.	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-
72	7CE6-60.1	Environemental Impact Analysis (EIA)	CO1	Define terms used in Environmental impact assessment, quality standards for environmental Components	2	1	-	-	-	-	1	-	-	-	-	1	-	-	-
			CO2	Understand the concepts about EIA i.e; ecological imbalance, effects of pollution, importance of stakeholders in the EIA process	2	1	-	-	-	-	1	-	-	-	-	1	-	-	-
			CO3	Organize an environmental impact assessment for a proposed project/activity	1	2	1	-	1	1	2	-	-	-	-	2	-	1	-
			CO4	Analyze different methodologies and impacts related to EIA	1	3	1	-	1	1	2	-	-	-	-	2	-	1	-
73	7CE6-60.2	Disaster Management (DM)	CO1	Understand concept of disasters, risks, hazards, capacity building, coping with disaster and disaster management act and policy in India	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain concept of disasters, risks, hazards, capacity building, coping with disaster and disaster management act and policy in India	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Classify disasters, risks, hazards, management techniques	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Apply the concept of capacity building, coping with disaster and disaster management act and policy in India	1	2	1	-	1	1	-	-	-	-	-	-	-	1	-
			CO5	Investigate natural and manmade disasters	-	2	2	1	2	1	-	-	-	-	-	-	-	1	-
74	7CS6-60.1	Quality Management / ISO 9000 (Open Elective-1)	CO1	Understand the importance of quality management and the ways individuals can affect quality.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Analyse the components of a quality management system and the role of the quality management system.	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
			CO3	Apply quality management to improve computer based systems.	-	-	-	3	-	-	-	-	-	-	-	-	-	1	-
			CO4	Design Various components of quality system to avoid failures and rectification.	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
75	7CS6-60.2	Cyber Security (Open Elective-1)	CO1	Develop The Understanding Of Cybercrime and legal Perspectives of Security Implications for Organizations in respect to the Mobile and Wireless Devices.	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-
			CO2	Analyze different cyber offences & attacks and Determine How a Criminals plan the cyber Attacks.	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO3	Understanding the cyber security solutions and use of cyber security Tools in Cybercrime.	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
			CO4	Evaluate and communicate the Management Perspective human role in security systems with an Organizational, emphasis on ethics, social engineering vulnerabilities and training.	-	-	-	-	-	-	-	2	-	-	-	-	1	-	-
76	7ME6-60.1	Finite Element Analysis	CO1	Apply FEM mathematical models to solve complex engineering problems.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Analyze 1D and 2D problems of Mechanical and Allied engineering	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Evaluate suitable mathematical model to solve realistic problems of industry	-	-	3	-	-	-	-	-	-	-	-	-	3	-	-
			CO4	Create solutions for Higher order complex engineering problems	-	-	-	3	-	-	-	-	-	-	-	-	3	3	-
77	7ME6-60.2	Quality Management	CO1	Describe the basic concept of Quality Management	1	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO2	Explain a system, component, and process to meet desired needs within limits using modeling process quality and learn the concept of control charts	2	-	-	-	-	-	-	-	-	-	-	-	3	3	-
			CO3	Illustrate the concept of Quality Assurance, Acceptance sampling and study quality systems like ISO9000, ISO 14000 and Six Sigma	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO4	Identify engineering problems, concept of reliability and Taguchi Method of Design of experiments	-	2	-	-	-	-	-	-	-	-	-	-	3	3	-
78	8EC5-11	Artificial Intelligence And Expert Systems	CO-1	Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.	3	-	2	-	-	2	-	-	-	-	-	-	2	3	-
			CO-2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning	2	3	2	3	-	2	-	-	-	-	-	-	2	3	-
			CO-3	Demonstrate proficiency in applying scientific method to models of machine learning.	3	3	2	1	-	3	-	-	-	-	-	-	2	3	-
			CO-4	Discuss the basics of ANN and different optimizations techniques.	3	3	2	-	-	2	-	-	-	-	-	-	2	3	3
79	8EC5-12	Digital Image and Video Processing	CO-1	Understand image formation and the role of different color formats.	3	-	-	-	-	-	-	-	-	-	-	-	3	3	2
			CO-2	Compute the effect of intensity transformations on an image and apply the spatial and frequency domain filtering.	3	3	3	-	-	-	-	-	-	-	-	-	3	-	3
			CO-3	Describe the techniques for image enhancement and image restoration in a degraded environment.	3	3	2	2	-	-	-	-	-	-	-	-	3	-	3
			CO-4	Analyze the effect and requirement of morphological operations for an image and its applications.	3	3	3	3	-	-	-	-	-	-	-	-	3	2	3
			CO1	Define the simulation modeling and analyze the practical situations in organizations	3	-	-	-	-	-	-	-	-	-	-	-	2	-	1

No	Code	Name		Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
80	8ME6-60.2	Simulation Modeling and Analysis	CO2	Examine the random numbers and random variates approach in different applications	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Investigate the sensitivity of simulation solutions for realistic problems	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Interpret the model and apply the results to solve crtitical issues of a realististic problem	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
81	8ME6-60.1	Operations Research	CO1	Generate methamatical models of complex engineering problems	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO2	Analyse the various optimization techniques with the appropriate tools	3	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO3	Identify suitable optimization techniques to solve industrial and sociatal problems	-	3	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO4	Interpret the solution and apply the results to solve complex engineering problems	-	-	3	-	-	-	-	-	-	-	-	2	-	-	-
82	8EE6-60.1	Energy Audit and Demand side Management	CO 1	Understand the current Energy Scenarios in India.	3	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO 2	Understand the energy auditing of motors, lighting system and building, by appropriate analysis methods through survey instrumentations.	3	3	-	-	-	-	-	-	-	-	-	2	3	3	
			CO 3	Understand the Electrical-Load Management and Demand side Management.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
			CO 4	Apply the Energy Conservation in transport, agriculture , household and commercial sectors.	3	2	2	1	-	-	-	-	-	-	-	1	1	1	
83	8EE6-60.2	Soft Computing	LO1	Learn about soft computing techniques and their applications.	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
			LO2	Analyze various neural network architectures.	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
			LO3	Define the fuzzy systems	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
			LO4	Understand the genetic algorithm concepts and their applications	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-
			LO5	Identify and select a suitable Soft Computing technology to solve the problem.	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-
84	8CE6-60.1	Composite Materials (CM)	LO1	Explain the basics of composites, its structure and its properties	2	-	-	-	-	-	-	-	-	-	-	-	1	-	
			LO2	Compute the physio-mechanical properties of composites from tests	2	1	-	-	-	-	-	-	-	-	-	-	1	-	
			LO3	Assessment of engineering properties of composite materials	1	1	-	-	-	-	-	-	-	-	-	-	2	-	
			LO4	Analyze the failure and maintenance of composite materials	1	-	1	1	1	-	-	-	-	-	-	-	1	1	
85	8CE6-60.2	Fire and Safety Engineering (F&SE)	LO1	Explain the fundamentals of Fire Engineering	2	-	-	-	-	1	-	-	-	-	-	-	-	-	
			LO2	Apply the learned principles in planning, designing and management of fire safe buildings	2	1	1	-	1	1	-	-	-	-	1	-	1	1	
			LO3	Assess fire fighting installations, control technologies and hazardous materials	1	2	1	-	1	1	-	-	-	-	-	-	1	1	
			LO4	Design of fire safety building for fire resitant construction by following safety legislation	1	-	1	1	1	1	-	1	-	-	-	-	-	1	
86	8CS6-60.1	Big Data Analytics (Open Elective-II)	LO1	Understanding of Big Data and their needs in Industry	3	-	-	-	-	-	-	-	-	-	-	1	-	-	
			LO2	Designing of Hadoop and Google File System	-	3	-	-	-	-	-	-	-	-	-	-	-	-	
			LO3	Analysis of Map Reduce and their basic programs map reduce.	-	-	3	-	-	-	-	-	-	-	-	-	-	-	
			LO4	Design an Hive Data system.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	
87	8CS6-60.2	IPR, Copyright and Cyber Law of India (Open Elective-II)	LO1	Determine and analyse the domain name system (DNS) in internet and various cybercrime offence in cyber space.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	
			LO2	Understand the concept of Intellectual Property and Intellectual Property Rights with special reference to India and abroad.	-	-	-	-	-	-	3	-	-	-	-	-	1	-	
			LO3	Apply intellectual property law principles including the copyright law, patents law, designs and trademarks, to real problems and analyse the social impact of intellectual property law and policy.	-	-	-	-	-	3	-	-	-	-	-	-	1	-	
			LO4	Study the Jurisdiction Issues in Cyber Space and Competition Law in India	-	2	-	-	-	-	-	-	-	-	-	-	-	-	
88	8EC4-22	Skill Development Lab	LO1	Comprehend various modern engineering tools/softwares.	3	-	-	-	-	-	-	-	-	-	-	3	2	3	
			LO2	Identify current requirements of industries.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	
			LO3	Implement various tools/softwares using different design patterns.	-	3	2	-	-	-	-	-	-	-	-	3	-	3	
			LO4	Select Startup for innovation/ entrepreneurship.	-	-	3	-	-	-	-	-	-	-	-	3	3	3	
			LO5	Develop projects to provide solution for different real-life problems.	-	-	-	-	-	-	-	-	-	-	-	3	-	3	
89	8EC7-50	Project	LO1	Acquire documentation, project management and Problem solving skills.	3	-	-	-	-	-	-	-	-	-	-	3	-	2	
			LO2	Identify, analyze and solve real-life problems.	-	2	2	-	-	-	-	-	-	-	-	3	-	-	
			LO3	Develop Professionalism, team work ability.	3	-	2	2	-	-	-	-	-	-	-	3	2	2	
			LO4	Develop oral as well as written presentation skills.	-	-	2	2	-	-	-	-	-	-	-	3	-	2	
			LO5	Make comprehensive use of the technical knowledge gained from previous courses.	-	2	2	-	-	-	-	-	-	-	-	3	-	-	
90	8EC4-21	Internet of Things (IOT) Lab	LO1	Understand the concept of Internet of Things	2	-	-	-	-	-	-	-	-	-	-	-	-	-	
			LO2	Implement interfacing of various sensors with Arduino/Raspberry Pi.	2	1	-	-	-	-	-	-	-	-	-	-	-	-	
			LO3	Demonstrate the ability to transmit data wirelessly between different devices.	1	2	1	-	-	-	-	-	-	-	-	-	-	-	
			LO4	Show an ability to upload/download sensor data on cloud and server.	1	2	1	-	1	1	-	-	-	-	-	-	1	-	
			LO5	Examine various SQL queries from MySQL database.	-	2	2	1	2	1	-	-	-	-	-	-	1	-	