Department of Computer Engineering

B. Tech. (Computer 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	PO1	PO1	PO1	PSO	PSO	PSO
1	1FY2-01	Engineering Mathematics-I	CO1	Define and explain basic concepts definite integrals, sequence and series, periodic functions and multivariable functions.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Understand properties of beta and gamma function, convergence of sequence and series.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Apply properties of beta and gamma functions and definite integrals to find surface area and volumes of revolution. They will be able to apply partial derivatives and multiple integrals to solve many problems in science and engineering.	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Analyse Fourier series to make many useful deductions which lay down foundation of signal processing and image processing.	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1FY2-03	Engineering Chemistry	CO1	Describe characteristics of water, fuel and Engineering materials-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
			CO2	Determine of hardness of water and calorific value of fuels for Industrial as well as domestic purposes	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-
			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 identifying the applications of organic reaction mechanism and manufacturing of engineering materials	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	1FY1-04	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	-	-	-
4	1FY3-07	Basic Mechanical Engineering	CO1	Retrieve basic concepts of thermal and manufacturing process.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Compare different types of thermal and manufacturing processes and.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Annotating about the functioning of turbine & pumps, IC engines, refrigeration system, modes of transmission of power, materials and primary manufacturing process.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Appraise the fundamental knowledge of thermal engineering, in addition to understanding of power transmission to solve the industrial and societal issues.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
5	1FY3-08	Basic Electrical Engineering	CO1	Identify basic components of electrical engineering and connect them to form different circuits to verify basic laws.Understanding	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Analyse the output of rectifier circuit,AC and DC machines to solve problems assosciated with Basic electrical engineering.Analyse	2	3	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO3	Contribute efficiently in a team to acieve desired response of AC and DC Machines. Team Work	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
			CO4	Demonstrate the output of rectifier circuits consistiong of basic components of electrical engineering. Mechanism	-	-	-	-	-	-	-	-	-	-	3	-	2	-	-
6	1FY2-21	Engineering Chemistry Lab	CO1	Determine the strength of unknown solution by volumetric analysis.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Examine the characteristics of lubricating oil in groups	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
			CO3	Analyze different characteristics of water and fuel to solve societal and enviornmental problems	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
			CO4	Show an ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
7	1FY1-22	Language Lab	CO1	Use and pronounce the words correctly.	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
			CO2	Acquire knowledge of the correct expressions,vocabulary etc. in personal and professional lives.	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
			CO3	Plan successfully for leadership and teamwork,crack GD's, interviews and other professional activities.	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
			CO4	Synthesize the process of communication using LSRW.	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
8	1FY3-25	Manufacturing Practices Workshop	CO1	Describe the working of Lathe machine.	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO2	Apply the basic concepts of Foundry Shop	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO3	Develop various carpentry joints, welding joints and sheet metal objects.	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO4	Students will show an ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
9	1FY3-26	Basic Electrical Engineering Lab	CO1	Discuss measurement of electrical quantites	1	-	-	-	-	-	-	-	-	-	-	-	1	2	-
			CO2	Compare different connections of transformer	2	-	-	-	-	-	-	-	-	-	-	-	1	2	-
			CO3	Demonstrate constructional features of electrical machines and converters	3	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO4	show an ability to communicate effectively and work as a team member ethically	-	-	-	-	-	-	-	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	show an ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
11	2FY2-01	Engineering Mathematics-II	CO1	define basic rank of matrix to find, eigen values and eigen vectors of the matrix, degree and order of differential equations.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	explain complementary functions and particular integral of ordinary differential equation and various methods of solution of ODE to solve complex engineering problems.	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	apply an appropriate analytical technique to find solution of first order and higher order differential equations.	3	2	-	-	-	-	-	-	-	-	-				
			CO4	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	3	-	-	-	-	-	-	-	-	-	-	-	-	-
12	2FY2-02	Engineering Physics	CO1	Describe the concepts of Wave and Quantum mechanics, Laser and Fiber optics, material science and electromagnetic theory. (Recall/Remembering)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain the different applications of Laser and optical fibers in communication, engineering, medicine and Science. Application of Hall effect (Examine)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Evaluate energy states in 1-D and 3-D box with the application of quantum mechanics.(Apply)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Analyze the crystal structure through X-ray Diffraction & wavelength of light through Newton's ring experiment and Michelson- interferometer ,types of materials through Hall effect . (Analyze)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO1	Relate sustained happiness through identifying the essentials of human values and skills	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO2	Find the happiness and human values in terms of personal and social life to create harmony in them	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-

13	**2FY1-05**	**Human Values**	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	-	-	-	-	-	-	-
14	**2FY3-06**	**Programming for Problem Solving**	CO1	Understand the basic concepts of fundamental of computer system, number system and programming. (Remembering)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain various memory units, representation of number system and Conditional, Iterative statements using arrays, string, pointers, file structure. (Understanding)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Examine the concept of algorithms, flowchart, Operators, Pointer, Array, String, structure, union using modularization to solve complex problems using C Programming (Applying)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Illustrate the User Defined functions, Memory management and File concepts to solve real time problems using C Programming (Analyzing)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
15	**2FY3-09**	**Basic Civil Engineering**	CO1	Describe Scope, role and Specialization of Civil Engineering, basics of surveying, types of building, Plinth area, carpet area, floor space index, R.C.C., mode of transportation and different causes of pollution. (Remember)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain solid waste management, building by-laws, concept of sun light and ventilation, chemical and hydrological cycle, biodiversity, causes of road accident, sanitary landfill and on-site sanitation, food chain and food web, contour maps, Global warming, Climate Change, Ozone depletion, and Green House effect. (Understand)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Illustrate method of ranging and levelling, road safety measures, building component, environmental acts, different types of foundation, treatment and disposal of waste water, traffic sign and symbol and rain water harvesting. (Apply)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Compute errors in linear measurement, bearings and elevations of respective points on the ground. (Analyze)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
16	**2FY2-20**	**Engineering Physics Lab**	CO1	Operate the various devices for the multifarious use in the relative fields.	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO2	Apply knowledge of Newton's Ring,grating, spectrometer,Optical fiber ,Sextant, Hall effect , a n d L a s e r to determine wavelength of light, dispersive power,Numerical aperature Height of Object, Hall coefficient, coherence length and coherence time	2		-	-	-	-	-	-	1	-	-	-	-	-	-
			CO3	To conduct the experiments with interest and an attitude of learning.	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO4	Evaluate the Band Gap and time constants (t=RC) using basic principles of semiconductors and Capacitors by graphs.	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-
17	**2FY1-23**	**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	-	-	-	-	-	-	-	-	-
18	**2FY3-27**	**Basic Civil Engineering Lab**	CO1	Describe various sanitary fittings and water supply fittings	1	-	-	-	-	-		-	-	-	-	-	-	-	-
			CO2	Examine pH, Turbidity, Hardness and Total solids of given water sample	2	-	-	-	-	-		-	-	-	-	-	-	-	-
			CO3	Use of EDM and Total Station in the field	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Investigate the linear and angular measurements of the points on the ground and levelling	-	1	-	-	-	-	-	-		-	-	-	-	-	-
			CO5	show an ability to communicate effectively and work as a team member ethically	-	-	-	-	-	-	-	2	3	2	-	-	-	-	-
19	**2FY3-24**	**Computer Programming Lab**	CO1	Relate the fundamental of C Programming as variable, operators and taxonomy to write a basic C Program	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Use C programs to implement operations related to Array, Macros and inline functions, Dynamic memory allocations, concept of Structure, Unions and Pointers	3	-	-	-		-	-	-	-	-	-	-	-	-	-
			CO4	show an ability to communicate effectively and work ethically			-	-	-	-	-	2	-	2	-	-	-	-	-
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	show an ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
22	**3CS2-01**	**Advanced Engineering Mathematics**	CO 1	Define probability models using probability mass (density) functions, need and classification of optimization terminology.	1	-	-	-	-	-	-	-	-	-	-	2	-	-	
			CO 2	Explain the probability distributions of discrete and continuous random variables and work binomial, Poisson, uniform, exponential, normal distribution and their statistical measures.	2	-	-	-	-	-	-	-	-	-	-	2	1	-	
			CO 3	Solve mathematical models of the real world problems in optimization using Linear Programming methods such as Transportation, Traveling salesman and many more such problems.	3	-	-	-	-	-	-	-	-	-	-	2	1	-	
			CO 4	Examine the correlation between two variables and regression applications for purposes of description and prediction.	-	3	-	-	-	-	-	-	-	-	-	2	1	1	
23	**3CS1-03**	**Managerial Economics and Financial Accounting**	CO 1	Describe the fundamental concepts of Economics and Financial Management and define the meaning of national income, demand, supply, cost, market structure, and balance sheet.	-	-	-	-	-	1	-	-	-	2	3	1	-	-	-
			CO 2	Calculate the domestic product, national product and elasticity of price on demand and supply.	-	-	-	-	-	2	-	-	-	-	3	-	-	-	-
			CO 3	Draw the cost graphs, revenue graphs and forecast the impact of change in price in various perfect as well as imperfect market structures.	3	-	2	-	-	-	-	-	-	-	2	-	-	-	-
			CO 4	Compare the financial statements to interpret the financial position of the firm and evaluate the project investment decisions.	-	3	-	-	-	-	-	-	-	-	2	-	-	-	-
24	**3CS3-04**	**Digital Electronics**	CO 1	Apply the fundamentals of Number Systems and boolean Algebra for solving the numericals and logical problems.	2	-	-	-	-	-	-	-	-	-	-	2	-	-	
			CO 2	Recognize minimization techniques for reducing the size of any digital circuits.	-	2	-	-	-	-	-	-	-	-	-	2	-	-	
			CO 3	Design combinational and sequential circuits with aspects of speed, delay, energy dissipation and power.	-	-	3	-	-	-	-	-	-	-	-	2	-	-	
			CO 4	Evaluate the performance of Digital Logic Families and its realization.	-	-	-	2	-	-	-	-	-	-	-	-	-	2	-
25	**3CS4-05**	**Data Structures and Algorithms**	CO 1	explain data structures and their use in daily life .	2	-	-	-	-	-	-	-	-	-	-	-	2	-	
			CO 2	analyze the Linear and non Linear data structures like stack, Queues, link list, Graph, Trees to solve real time problems.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	
			CO 3	develop searching and sorting algorithms on predefind data	-	-	3	-	-	-	-	-	-	-	-	-	-	-	2
			CO 4	create the data structures in specific areas like DBMS ,Compiler, Operating system.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	2
26	**3CS4-06**	**Object Oriented Programming**	CO 1	Apply the various programming paradigms such as exception handling, polymorphism in software pattern	2	-	-	-	-	-	-	-	-	-	-	3	-	-	
			CO 2	Analyze the C++ programs using different programming methodologies.	-	2	-	-	-	-	-	-	-	-	-	-	2	-	
			CO 3	Design the elements of the object oriented concepts in developing structured programs.	-	-	3	-	-	-	-	-	-	-	-	-	2	-	
			CO 4	Investigate the real time applications using advance C++ concepts.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	3
			CO 1	Demostrate software life cycle models with respect to software enginneering principles.	2	-	-	-	-	-	-	-	-	-	-	3	-	2	

27	**3CS4-07**	**Software Engineering**	CO 2	analyse cost estimation techniqye and risk analysis techniques in software engineering projects.	-	2	-	-	-	-	-	-	-	-	-	-	2	3	-
			CO 3	Design Software requirement document (SRS)	-	-	3	-	-	-	-	-	-	-	-	-	2	3	-
			CO 4	synthesize UML diagrams using the concepts of object oriented analysis in software development process.	-	-	-	3	-	-	-	-	-	-	-	-	3	-	-
28	**3CS4-21**	**Data Structures and Algorithms Lab**	LO1	Utilize searching and sorting algorithms on given values.	2	-	-	-	2	-	-	-	-	2	-	-	2	-	-
			LO2	analyze the time and space efficiency of the data structure	-	-	-	-	-	2	-	-	-	-	-	-	2	-	-
			LO3	Evalute traversing, insertion and deletion operations on Linear and non linear data structures	-	-	-	-	-	-	2	-	-	-	-	2	-	2	-
			LO4	construct the solutions for real time applications	-	-	-	-	2	-	-	-	2	-	-	-	-	-	3
29	**3CS4-22**	**Object Oriented Programming Lab**	LO1	apply the programming concepts such as inheritance, polymorphism	-	-	-	-	2	-	-	-	-	-	-	2	3	-	-
			LO2	distinguish the programming methodologies to implement programs	-	-	-	-	-	2	-	-	-	-	-	2	-	2	-
			LO3	explain the concepts to develop the structured programs.	-	-	-	-	-	-	2	-	-	-	-	2	-	-	3
			LO4	construct the solutions for real time problems	-	-	-	-	-	-	-	-	2	-	3	-	-	-	3
30	**3CS4-23**	**Software Engineering Lab**	LO1	Understand and explain the basic concepts of UML, design, test case implementation, and OOP concepts using Java.	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO2	Discuss and analyze how to create software requirements specifications for a particular problem.	-	-	-	3	-	-	-	-	-	-	-	-	-	3	-
			LO3	Create Data Flow Diagrams for different systems.	-	-	3	-	-	-	-	-	-	-	-	-	-	3	2
			LO4	Understand and develop UML diagrams of various structures and behaviors.	-	-	-	-	2	-	-	-	-	-	-	-	2	3	-
31	**3CS4-24**	**Digital Electronics Lab**	LO1	Apply appropriate basic logic gates for verifying the truth tables.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			LO2	Demonstarte ability for recognizing any IC and its fuctionality.	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-
			LO3	Design any basic gates by the use of universal gates.	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
			LO4	Identify the limitation of basic logic gates while desgining any SOP and POS logics.	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-
			LO5	Design any sequential and combinational circuits using basic gates as well as by defined IC.	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-
			LO6	Demonstrate the working of Digital Trainer kits and usability of it.	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-
			LO7	Debug a circuit to find a problem and suggest suitable solution.	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2
			LO8	Able to work in a team for desgining and rectifying any errors in the digital circuit.	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2
32	**3CS7-30**	**Industrial Training**	LO1	Capability to acquire and apply fundamental principles of engineering.	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			LO2	Become master in one's specialized technology and updated with all the latest changes in technological world for desigining real time project in industry.	-	-	-	-	3	-	-	-	-	-	3	-	3	-	3
			LO3	Ability to communicate efficiently	-	-	-	-	-	-	-	-	-	3	-	-	2	-	-
			LO4	Knack to be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills.	-	-	-	-	-	-	-	3	-	-	-	2	2	3	
			LO5	Ability to identify, formulate and model problems and find engineering solution based on a systems approach.	-	-	-	3	-	3	-	-	-	-	-	-	2	2	-
			LO6	Capability and enthusiasm for self-improvement through continuous professional development and life-long learning	-	-	-	-	-	-	-	-	-	-	-	3	2	-	3
			LO7	Awareness of the social, cultural, global and environmental responsibility as an engineer.	-	-	-	-	-	-	3	2	-	-	-	-	-	2	-
33	**4CS2-01**	**Discrete Mathematics Structure**	CO 1	Define mathematically about the fundamental data types and structures used in computer algorithms and systems.	1	-	-	-	-	-	-	-	-	-	-	-	2	1	-
			CO 2	Classify algebraic techniques to basic discrete structures and algorithms.	2	-	-	-	-	-	-	-	-	-	-	-	2	1	-
			CO 3	Apply mathematical logic in making computer programs, computer circuits, concluding experiments, digital electronics, etc.	3	-	-	-	-	-	-	-	-	-	-	-	1	1	-
			CO 4	Analyze a variety of graphs and the viability of different approaches to the Model problems in Computer Science.	-	3	-	-	-	-	-	-	-	-	-	-	1	1	-
34	**4CS1-02**	**Technical Communication**	CO 1	Understanding the characteristics of technical writing and the importance of purpose, audience, and genre for written communication in technical fields.	-	-	-	-	-	3	-	-	3	3	-	3	-	-	-
			CO 2	Planning, drafting, revising, editing, and critiquing technical and professional documents through individual and collaborative writing.	-	-	-	-	-	3	-	-	2	3	-	3	-	-	-
			CO 3	Create clear, concise technical documents that effectively use grammar and information structure in ways that create meaning with the reader.	-	-	-	-	-	-	-	-	2	3	-	3	-	-	-
			CO 4	Researching, analyzing, synthesizing, and applying information to create technical reports.	-	-	-	-	-	3	-	-	3	3	-	3	-	-	-
35	**4CS3-04**	**Microprocessor & Interfaces**	CO 1	Examine the architecture of 8085 microprocessor , Memory and its type.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyze interfacing applications using microprocessor and peripherals.	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	Design Assembly Language Programs by using instructions of 8085.	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-
			CO 4	Investigate the connection of the microprocessor with the peripheral devices.	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-
36	**4CS4-05**	**Database Management System**	CO 1	apply relation algebra and SQL on Complex Problems.	3	-	-	-	-	-	-	-	-	-	-	-	2	3	-
			CO 2	analyse database management system concepts to convert raw data into relation database schema.	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	Design effective databse Scehma using refinement and Normalization technique	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
			CO 4	Judge Reason of Database filler and best recovery mechanism.	-	-	-	2	-	-	-	-	-	-	-	-	-	2	-
37	**4CS4-06**	**Theory of Computation**	CO 1	apply the theoretical knowledge of computation and basic concepts of computation like CFG, PDA etc..	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	analyze regular expressions and use Sets and Grammars in finite automata.	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	design the solutions using context free grammar, pushdown automata and turing machine problems.	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
			CO 4	investigate the concepts of Computation in Compiler Construction , Tractable & Untractable problems.	-	-	-	2	-	-	-	-	-	-	-	-	-	-	3
38	**4CS4-07**	**Data Communication and Computer Networks**	CO 1	Demostrate communication models Such as TCP/IP, OSI	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	analyse the Error control protocols such as CSMA, ALOHA.	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	Design the network Layer routing protocols such as dijkstra's, bellman ford Algorithm.	-	-	3	-	-	-	-	-	-	-	-	-	-	3	-
			CO 4	integrate the transport layer protocols in TCP/UDP .	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2
39	**4CS4-21**	**Microprocessor & Interfaces Lab**	LO1	demonstrate the basic concept of Assembly programming tools for 8085 Microprocessor	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-
			LO2	Apply the Programming concept in Assembly Language Programming to Interfacing.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			LO3	Analyzing strengths and limitations of Assembly language Programming for the real world problem.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			LO4	Able to apply different looping techniques and delay minimization in the program.	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
			LO5	Debug the program and correct it.	-	-	-	2	-	-	-	-	-	-	-	-	3	-	-
40	**4CS4-22**	**Database Management System Lab**	LO1	Select appropriate technique to design database and schemas for a given application using DDL/DML SQL commands	-	-	2	-	2	-	-	-	-	-	-	-	1	2	-
			LO2	Apply the concept of Integrity Rules and Constraints to ensure accurate and error free data	3	-	-	-	-	-	-	-	-	-	-	-	-	2	-
			LO3	Identify solutions for database update using pre store Procedures and Triggers	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-
			LO4	Compare the constraints primary key and foreign key between primary table and secondary table	-	2	-	-	-	-	-	-	-	-	-	-	-	1	-
			LO5	Construct Views to simplify and reduce complexity of database schema	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
			LO6	Decision to users with different types of privileges and check users existence in database	-	-	-	2	-	-	-	-	-	-	-	-	-	2	-
			LO7	Assemble records from multiple tables in database through Inner joins and Outer joins	-	-	3	-	-	-	-	-	-	-	-	-	1	1	-

41	**4CS4-23**	**Network Programming Lab**	LO1	Defines the basic principles of computer networks. Understand the key topologies that support the Internet.	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO2	Demonstrate the installation and configuration of network.	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
			LO3	Evaluate errors using a variety of error correction techniques.	-	-	-	3	-	-	-	-	-	-	-	-	-	2	2
			LO4	Apply a network routing algorithm, evaluate the process, and implement a simple routing network.	-	-	-	-	2	-	-	-	-	-	-	-	-	3	3
42	**4CS4-24**	**Linux Shell Programming Lab**	LO1	Apply basic commands of Linux and commands related to inode, I/O redirection and piping, process control and mails.	-	-	-	-	2	-	-	-	-	-	-	-	2	-	1
			LO2	analyze variety of problems of shell script using looping, case structures in the script programming.	-	-	-	-	-	2	-	-	-	-	-	-	2	-	1
			LO3	implement the logical problems using the shell script programming.	-	-	-	-	-	-	2	-	-	-	-	-	2	-	-
			LO4	enforce the pattens problems using shell scripts.	-	-	-	-	-	-	-	2	-	-	-	-	2	-	-
43	**4CS4-25**	**Java Lab**	LO1	apply the basic concepts of java.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO2	develop the problems of file handling, multithreading and applets.	-	-	-	-	3	-	-	-	-	-	-	-	-	-	3
			LO3	design a project in a team.	-	-	-	-	-	-	-	-	3	-	-	-	-	3	-
			LO4	analyze the various complex and real time problems.	-	-	-	-	-	-	-	-	-	-	-	3	-	-	3
44	**5CS3-01**	**Information Theory & Coding**	CO 1	Demonstrate the concept of information theory and entropy.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyze the different coding techniques for efficient communication.	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	Design the linear block code and cyclic code for error free communication.	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
			CO 4	Evaluate the shortest path by using different algorithms techniques.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	2
45	**5CS4-02**	**Compiler Design**	CO 1	illustrate the theoretical concepts of finite state machine	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 2	analyze the grammars, parsing techniques, and actual code generation methods	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	Evaluate the different types of error and convert the code in I.C.G.	-	-	3	-	-	-	-	-	-	-	-	-	-	-	2
			CO 4	Convert the optimized code into the machine code in the storage organisation and code optimization.	-	-	-	3	-	-	-	-	-	-	-	-	2	-	-
46	**5CS4-03**	**Operating System**	CO 1	demonstrate the knowledge of Operating System services including Memory, Device & File Management.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	2
			CO 2	categorize the Process management in terms of inter process communication and memory management methods for Contiguous and Noncontiguous allocation.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	Design the solution for scheduling and deadlock problems in operating system using appropriate algorithms such as round robin, FCFS, bankers algo etc.	-	-	2	-	-	-	-	-	-	-	-	-	3	-	2
			CO 4	investigate LINUX/UNIX, OS, RTOS, windows and Mobile based OS file system through case study.	-	-	-	3	-	-	-	-	-	-	-	-	2	2	-
47	**5CS4-04**	**Computer Graphics & Multimedia**	CO 1	Demonstrate the standards and Primitives of Drawing components like line, circle, ellipse, clipping, filling	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyze the graphics quality with the help 3D Graphics and Projections	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	Design the animation using transformation and clipping	-	-	3	-	-	-	-	-	-	-	-	-	-	-	2
			CO 4	Organize the primitives for Illumination, Shading and Color Models.(Evaluate)	-	-	-	2	-	-	-	-	-	-	-	-	-	-	3
48	**5CS4-05**	**Analysis of Algorithms**	CO 1	Understand complexity of an algorithm, asymptotic notation and divide and conquer method for developing an algorithm.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 2	Analyze the algorithm design using greedy algorithm and dynamic programming.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	Create search for problem solution using backtracking, branch and bound and pattern matching algorithm	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
			CO 4	synthesize the randomized algorithm, assignment problem and types of classes such as P, NP, and NP Complete.	-	-	-	2	-	-	-	-	-	-	-	-	3	-	2
49	**5CS5-11**	**Wireless Communication**	CO 1	Classify the challenges with transmission of signals in wireless communication systems and Cellular architechture with Multiplexing Techniques.	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 2	Analyze the measures to increase the capacity in GSM systems- sectorization and Spatial Filtering for Interference Reduction	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	formulate cell architecture in wirless communication sytem.	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
			CO 4	Distinguish digital signaling techniques for lossy channels.	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-
50	**5CS5-12**	**Human Computer Interaction**	CO1	apply guidelines and imperical research method in HCI to Make User Friendly Computer Interface	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	categorise Human Computer interction concept using GUI Design and Prototyping techniques	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO3	design Task models and object oriented modeling for computer interface	-	-	3	-	-	-	-	-	-	-	-	-	-	-	2
			CO4	classify types of GOMS, Family model and LAWS	-	-	-	2	-	-	-	-	-	-	-	-	1	2	-
51	**5CS4-21**	**Computer Graphics & Multimedia Lab**	LO1	apply the concepts of transformation techniques on 2D & 3D objects.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			LO2	analyze the colour modelling, shading and animation on graphic objects.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	3
			LO3	design the graphical premitives drawing algorithms such as line, circle drawing algorithms.	-	-	3	-	-	-	-	-	-	-	-	-	2	-	3
			LO4	Generate Fractal images using graphics tool like Sterling	-	-	-	2	2	-	-	-	-	-	-	-	3	-	-
			LO5	make a project to solve real life socity based problem and demonstrate following PO related capabilities: a. Improve team working skill b. Improve communication skill c. Improve ethics (i.e. plagiarism, copy others results) d. Lifelong learning attitude	-	-	-	-	-	3	3	3	3	3	3	3	3	2	3
52	**5CS4-22**	**Compiler Design Lab**	LO1	Analysis the finite state machines, lexical analyzer, parser for the grammar.	-	-	-	-	-	-	-	-	3	-	-	-	3	-	-
			LO2	Develop recognition of identifiers, constants, comments, operators, loops and keywords, and generation of parse tree and syntax tree, symbol table and non-recursive grammar based constructs.	-	-	-	-	3	-	-	-	-	-	-	-	2	-	-
			LO3	Design intermediate code genrator and converted into optimzed code	-	-	-	-	-	-	-	-	3	-	-	-	2	-	-
			LO4	demostrate hands on experience of working on system software.	-	-	-	-	-	3	-	-	-	-	-	-	-	3	-
53	**5CS4-23**	**Analysis of Algorithms Lab**	LO1	Apply sorting algorithms like quick sort for information searching.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO2	Identify problems to be broken down into simple sub problems using merge sort algorithm	-	-	-	3	-	-	-	-	-	-	-	-	-	3	-
			LO3	Device solutions using topological ordering to quickly compute shortest paths	-	-	2	-	-	-	-	-	-	-	-	-	-	3	-
			LO4	Demonstrate real world scenarios like resourse allocation using knapack algorithm	-	-	-	-	-	-	-	-	-	-	2	-	2	-	
			LO5	From a given vertex, Select Dijkstra's algorithm to find the shortest path to other vertices	-	-	-	-	2	-	-	-	-	-	-	-	-	-	3
			LO6	Demonstrate minimum cost spanning tree of a given undirected graph using kruskal's algorithm	-	3	-	-	-	-	-	-	-	-	-	-	-	-	3
54	**5CS4-24**	**Advance Java Lab**	LO1	apply event handling on AWT and Swing components.	-	-	3	-	-	-	-	-	-	-	-	-	3	-	-
			LO2	Design a page using Swing , Servlet , JSP and JDBC connectivity.	-	-	-	-	3	-	-	-	-	-	-	-	3	-	-
			LO3	create a project based on societal problem.	-	-	-	-	-	3	-	-	-	-	-	-	-	3	-
			LO4	map Java classes and object associations to relational database tables with Hibernate mapping files	-	-	-	-	-	-	3	-	-	-	-	-	-	3	3
			LO1	Capability to acquire and apply fundamental principles of engineering.	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			LO2	Become master in one's specialized technology and updated with all the latest changes in technological world for desigining real time project in industry.	-	-	-	-	3	-	-	-	-	-	3	-	3	-	3
			LO3	Ability to communicate efficiently	-	-	-	-	-	-	-	-	-	3	-	-	2	-	-

55	**5CS7-30**	**Industrial Training**	LO4	Knack to be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills.	-	-	-	-	-	-	-	-	3	-	-	-	2	2	3
			LO5	Ability to identify, formulate and model problems and find engineering solution based on a systems approach.	-	-	-	3	-	3	-	-	-	-	-	-	2	2	-
			LO6	Capability and enthusiasm for self-improvement through continuous professional development and life-long learning	-	-	-	-	-	-	-	-	-	-	-	3	2	-	3
			LO7	Awareness of the social, cultural, global and environmental responsibility as an engineer.	-	-	-	-	-	-	3	2	-	-	-	-	-	2	-
56	**6CS3-01**	**Digital Image Processing**	CO 1	Demonstrate the fundamental elements of image and basic steps of digital Image Processing.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analze the transformation function types in spatial and frequency domain for the enhancement of image.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	Design restoration and degradation models to remove noise in an image.	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-
			CO 4	Investigate compression and segmentation techniques for the images.	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-
57	**6CS4-02**	**Machine Learning**	CO 1	demonstrate the Statstical, Reinforcement, Supervised, Unsupervised and recommender Techniques.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	analyse classification and Prediction algorithms such as KNN, Naïve Bayes, SVM etc.	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	compose the solution for real world problem using Machine Learning algorithms.	-	-	3	-	-	-	-	-	-	-	-	-	-	-	2
			CO 4	Evaluate Machine Learning algorithms and Model Selection.	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2
58	**6CS4-03**	**Information Security System**	CO 1	Apply the computer security mechanism, cryptographic algorithm and network protocols to achive Integrity, Authentication, confidentiality.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyze the encryption and decryption algorithm such as RSA, DES for securing the information.	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	Design the authentication and security protocols for protecting data on network SHA-1, MD5	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
			CO 4	synthesize vulnerability assessments and digital certificates algorithms for real world problems	-	-	-	3	-	-	-	-	-	-	-	-	-	-	2
59	**6CS4-04**	**Computer Architecture and Organization**	CO 1	Apply the concept of memory hierarchy in the CPU Organisation.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyse the instruction sets of assembly language in micro-programmed control devices.	-	2	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 3	Design logical and arithmetic operation for floating and fixed point numbers.	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
			CO 4	Evaluate the architecture of basic computer system and their organization functionality.	-	-	-	3	-	-	-	-	-	-	-	-	2	-	-
60	**6CS4-05**	**Artificial Intelligence**	CO 1	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyze the issues involved in knowledge bases, reasoning systems and planning.	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	Design AI functions and components involved in intelligent systems such as computer games, expert systems, information retrieval, machine translation.	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-
			CO 4	Synthesize the AI based Solutions for real time problems.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	3
61	**6CS4-06**	**Cloud Computing**	CO 1	apply cloud fundamentals in cloud computing architecture	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	analyze various cloud service models, cloud architecture, Parallel and distributed programming paradigms.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	design the virtualization techniques regarding processor, memory, operating system, network virtualization.	-	-	2	-	-	-	-	-	-	-	-	-	2	2	-
			CO 4	specify the basic threats, security mechanism, imporatnce of SLA's in cloud and cloud services platforms for business and industry prespectives.	-	-	-	2	-	-	-	-	-	-	-	-	2	-	2
62	**6CS5-11**	**Distributed System**	CO 1	generalize the basic elements and design issues in distributed systems.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 2	analyze the concurrent processes and inter process communication in DS.	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	design the RPC and file systems in distributed systems.	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-
			CO 4	evaluate distributed process scheduling and distributed file systems and apply them through case studies.	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-
63	**6CS5-13**	**Ecommerce and ERP**	CO 1	Apply online publishing techniques in digital marketing	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 2	Compare E- Business models in web based applications for businesses.	-	2	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 3	Design an Ecommerce website and deploy it over the internet.	-	-	3	-	-	-	-	-	-	-	-	-	3	-	-
			CO 4	discriminate XML and HTML for creating interactive pages for Web, e-business, and portable applications.	-	-	-	2	-	-	-	-	-	-	-	-	3	3	-
64	**6CS4-21**	**Digital Image Processing Lab**	LO1	demostrate the basic concept of Matlab programming tools for Digital Image processing	-	-	-	-	3	-	-	-	-	-	-	3	2	-	-
			LO2	plot and compare various image enhancement operations.	-	-	3	-	-	-	-	-	-	-	-	-		2	-
			LO3	apply linear and non-linear filters on image and transform techniques on images.	-	-	-	3	-	-	-	-	-	-	-	-		2	-
			LO4	perform morphological operations on images for segmentation.	-	3	-	-	-	-	-	-	-	-	-	-		-	2
65	**6CS4-22**	**Machine Learning Lab**	LO1	choose basic python Libraries and commands used in Machine Learning	-	-	-	-	3	-	-	-	-	-	-	-	3	-	-
			LO2	apply knowledge of machine learning algorithms for problem statements provided	-	-	3	-	-	-	-	-	-	-	-	-	3	-	3
			LO3	analyze various Supervised and Unsupervised Machine Learning algorithms	-	-	-	3	-	-	-	-	-	-	-	-	3	3	-
			LO4	Evaluate Machine Learning Algorithms for real world problems	-	-	-	-	-	-	3	-	-	-	-	-	3	-	3
66	**6CS4-23**	**Python Lab**	LO1	Identify the basic datatypes and variables .	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO2	Ability to analyze the importance of conditional statement & Looping Structure.	-	3	-	-	-	-	-	-	-	-	-	-	3	3	-
			LO3	Determine the list and tuples in container data types.	-	-	3	-	-	-	-	-	-	-	-	-	-	-	2
			LO4	Able to Implement String ,Character Arrays and Fuction Programming concept in python.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	3
			LO5	Develop the ability to analyse data structure applications in Python programming.	-	-	-	-	2	-	-	-	-	-	-	-	-	3	3
67	**6CS4-24**	**Mobile Application Development Lab**	LO1	Discuss the components and different Layout for mobile application development framework for android	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO2	Apply essential Android Programming concepts.	-	2	-	-	2	-	-	-	-	-	-	-	3	-	2
			LO3	Analyze various Android applications related to layouts & rich uses interactive interfaces.	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-
			LO4	Develop Android applications related to mobile related server-less database like SQLITE.	-	-	-	2	-	-	-	-	-	-	-	-	2	2	-
68	**7CS4-01**	**Internet of Things**	CO 1	demostrate concepts IOT plateform and conectivity with devices like Ardinuo, Rasberry pi etc.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyse IOT communication models like push-pull, publish & subscribe model.	-	2	-	-	-	-	-	-	-	-	-	-	-	-	3
			CO 3	Design prototypes for Internet of Things in real time applications.	-	-	3	-	-	-	-	-	-	-	-	-	-	3	-
			CO 4	investigate solutions of complex problems using advance concepts of IOT & Big Data.	-	-	-	3	-	-	-	-	-	-	-	-	-	2	-
69	**7CS6-60.1**	**Quality Management / ISO 9000 (Open Elective-1)**	CO 1	apply Quality Tools to monitor the overall operation and continuous process improvement.	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyse systematic methods in identifying where and how it might fail and relative impacts of different failures	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	formulate effectively customer requirements and convert them into detailed engineering	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-
			CO 4	Measure themselves against internal or external standards and to improve the capability of their business processes.	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-
70	**7CS6-60.2**	**Cyber Security (Open Elective-1)**	CO 1	Apply basic concepts of Cybercrime and legal Perspectives of Security Implications for Organizations in respect to the Mobile and Wireless Devices.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyze offences, attacks and Criminals plan for the cyber space.	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO 3	Compose the cyber security solutions and cyber security Tools in Cybercrime.	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
			CO 4	Select the Management Perspective human role in security systems with an Organizational, emphasis on ethics, social engineering vulnerabilities and training.	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2
			LO1	Define the various terminal commands used in developing IOT applications.	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			LO2	develop the python scripts used in IOT applications.	-	3	-	-	-	-	-	-	-	-	-	-	-	-	3

71	7CS4-21	Internet of Things Lab	LO3	apply the logics of IOT for designing IOT applications	-	-	3	-	-	-	-	-	-	-	-	-	-	-	3	-
			LO4	make a project to solve real life socity based problem and demonstrate following PO related capabilities: a. Improve team working skill b. Improve communication skill c. Improve ethics (i.e. plagiarism, copy others results) d. Lifelong learning attitude	-	-	3	-	3	3	3	3	3	3	3	3	3	2	3
72	7CS4-22	Cyber Security Lab	LO1	analyse the data transferred and protocol using different security-based tools like Wire shark, tcpdump, rootkits, snort etc.	-	3	-	-	-	-	-	-	-	-	-	-	3	-	2
			LO2	design the substitution and transposition techniques for plain text encryption and decryption.	-	-	3	-	-	-	-	-	-	-	-	-	2	-	3
			LO3	observe ARP Poisoning, encryption and decryption techniques for secure data transmission across network using snort and digital signatures	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-
			LO4	Install appropriate tools for network protocol analyze security-based tools like Wire shark, tcpdump etc.	-	-	-	-	3	-	-	-	-	-	-	-	3	-	2
			LO5	identify and describe a variety of ethical factors that may be relevant to understanding and assessing in cyber space.	-	-	-	-	-	-	-	3	-	-	-	-	2	3	-
			LO6	Improve team working skill for desiging a solution for Key Exchange problem and general attacks on system like Diffie-Hellman Key Exchange, Brute Force Attack etc	-	-	-	-	-	-	-	-	3	-	-	-	3	2	-
			LO7	implement a small project for Server-Client technology using a File Transfer Protocol mechanism and through socket programming and make report.	-	-	-	-	-	-	2	-	-	3	3	3	-	2	3
73	7CS7-30	Industrial Training	LO1	Capability to acquire and apply fundamental principles of engineering.	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			LO2	Become master in one's specialized technology and updated with all the latest changes in technological world for desigining real time project in industry.	-	-	-	-	3	-	-	-	-	-	3	-	3	-	3
			LO3	Ability to communicate efficiently	-	-	-	-	-	-	-	-	-	3	-	-	2	-	-
			LO4	Knack to be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills.	-	-	-	-	-	-	-	-	3	-	-	-	2	2	3
			LO5	Ability to identify, formulate and model problems and find engineering solution based on a systems approach.	-	-	-	3	-	3	-	-	-	-	-	-	2	2	-
			LO6	Capability and enthusiasm for self-improvement through continuous professional development and life-long learning	-	-	-	-	-	-	-	-	-	-	-	3	2	-	3
			LO7	Awareness of the social, cultural, global and environmental responsibility as an engineer.	-	-	-	-	-	-	3	2	-	-	-	-	-	2	-
74	7CS7-40	Seminar	CO 1	Establish motivation for any topic of interest and develop a thought process for technical seminar	-	-	3	-	-	-	-	-	-	-	-	2	2	-	-
			CO 2	Organize a detailed literature survey and build a document with respect to technical publications and effective presentation	-	-	-	3	-	-	-	-	-	3	-	-	-	3	-
			CO 3	Analysis and comprehension of proof-of-concept and related data to access social, health, legal and environment issues for sustainable development.	-	3	-	-	-	3	3	-	-	-	-	-	2	-	-
			CO 4	Develop strategies for identifying and dealing with typical ethical issues, both personal and organizational	-	-	-	-	-	-	-	3	2	-	-	-	3	3	-
			LO5	Make use of new and recent technology including perdition and modeling to complex activities.	-	-	-	-	3	-	-	-	-	-	-	-	-	2	2
75	8CS4-01	Big Data Analytics	CO 1	apply the fundamentals of Big Data analytics in Hadoop	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 2	analyze the input-output methods like writeable interface and serilization in Hadoop platform.	-	2	-	-	-	-	-	-	-	-	-	-	3	-	3
			CO 3	design the Map Reduce programming models of big data analytics.	-	-	2	-	-	-	-	-	-	-	-	-	3	2	-
			CO 4	evaluate of Pig and Hive architecture and their progaramming model such as HQL, Pig script.	-	-	-	3	-	-	-	-	-	-	-	-	3	-	-
76	8CS6-60.2	IPR, Copyright and Cyber Law of India (Open Elective-II)	CO 1	**classify** the concept of cybercrime offence in cyber space and Intellectual Property Rights in terms of copyright, patent and trademark.	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	**analyse** the administrator & conventions of Intellectual Property Rights with special reference to India and abroad.	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	**generalize** intellectual property laws including the copyright law, patents law, designs and trademark law with appropriate consideration for the societal & environment.	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-
			CO 4	**conclude** the Jurisdiction Issues in Cyber Space and intellectual property for conventions in India, United Kingdom and United State of America.	-	-	-	3	-	-	-	-	-	-	-	-	2	-	-
77	8CS6-60.1	Big Data Analytics (Open Elective-II)	CO 1	apply the fundamentals of Big Data analytics in Hadoop	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 2	analyze the input-output methods like writeable interface and serilization in Hadoop platform.	-	2	-	-	-	-	-	-	-	-	-	-	3	-	3
			CO 3	design the Map Reduce programming models of big data analytics.	-	-	2	-	-	-	-	-	-	-	-	-	3	2	-
			CO 4	evaluate of Pig and Hive architecture and their progaramming model such as HQL, Pig script.	-	-	-	3	-	-	-	-	-	-	-	-	3	-	-
78	8CS4-21	Big Data Analytics Lab	LO1	analyze big data using Hadoop.	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO2	use pig and Hive scripting	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
			LO3	Apply various big data analysis techniques	-	-	3	-	-	-	-	-	-	-	-	-	3	-	-
			LO4	assess modern data analytical tools	-	-	-	-	3	-	-	-	-	-	-	-	3	-	-
79	8CS4-22	Software Testing and Validation Lab	LO1	construct the process of testing and the fundamental components of a coverage analysis and unit testing.	-	-	-	-	-	3	-	-	-	-	-	-	3	-	3
			LO2	examine mutation testing and test suits for appropriate applications.	-	-	-	-	3	-	-	-	-	-	-	-	3	-	-
			LO3	determine the website performance measurement technique using JMeter and Selenium tool to perform Test sequences and validate testing.	-	-	-	-	-	-	-	-	3	-	-	-	3	3	-
			LO4	debug the different software coding and strategies in unit testing method to the projects	-	-	-	-	-	-	-	-	-	3	-	-	3	-	-
80	8CS7-50	Project	CO 1	Apply fundamental knowledge of basic Computer Engineering courses for solving complex Engineering problem	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO 2	Analyze the literature, identify problem, its context with real world / industry issue and define problem statement	-	3	-	-	-	-	-	-	-	-	-	-	2	3	-
			CO 3	Design engineering solution to the problem using knowledge of core Computer engineering	-	-	3	-	-	-	-	-	-	-	-	-	3	3	-
			CO 4	Carryout experimentations/simulations and investigate the solution to complex Computer engineering problem	-	-	-	3	-	-	-	-	-	-	-	3	2	2	3
			CO 5	Use modern tools and techniques of Computer engineering for solving the problem	-	-	-	-	3	-	-	-	-	-	-	-	2	3	-
			CO 6	Analyse sustainability of proposed solution and its impact on environment & applicability of solution in industry and societal issues	-	-	-	-	-	3	3	-	-	-	-	-	3	-	3
			CO 7	Understand professional ethics, rules and regulations while working on interdisciplinary issues and financial management of project	-	-	-	-	-	-	-	3	-	-	3	-	2	3	3
			CO 8	demonstrate the ability to lead and productively participate in group situations and to use oral communication effectively	-	-	-	-	-	-	-	-	3	3	-	-	3	3	-
81	8CE6-60.1	Composite Materials	CO 1	Explain the basics of composites, its structure and its properties	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO 2	Compute the physio-mechanical properties of composites from tests	2	1	-	-	-	-	-	-	-	-	-	-	-	-	1
			CO 3	Assessment of engineering properties of composite materials	1	2	1	-	-	-	-	-	-	-	-	-	-	-	1
			CO 4	Analyze the failure and maintenance of composite materials	1	-	1	1	1	-	-	-	-	-	-	-	1	-	1
			CO 1	Explain the fundamentals of Fire Engineering	2	-	-	-	-	1	-	-	-	-	-	-	-	1	-

82	**8CE6-60.2**	**Fire and Safety Engineering**	CO 2	Apply the learned principles in planning, designing and management of fire safe buildings	2	1	1	-	1	1	-	-	-	-	1	-	1	1	-
			CO 3	Assess fire fighting installations, control technologies and hazardous materials	1	2	1	-	1	1	-	-	-	-	-	-	1	1	1
			CO 4	Design of fire safety building for fire resitant construction by following safety legislation	1	-	1	1	1	1	-	1	-	-	-	-	-	1	1
83	**8EC6-60.1**	**Industrial and Biomedical applications of RF Energy**	CO 1	Understanding of basic concepts and Principles of EM wave, propagation reflection and transmission. [Understanding]	3	2	-	-	-	-	-	-	3	-	-	-	-	1	-
			CO 2	Apply the knowledge for interest in complex dielectric constant, dipolar loss mechanism and design mechanism to understand the effect of rate rise of temperature.. [Applying & Understanding]	3	2	-	-	-	-	-	-	3	-	-	-	1	-	-
			CO 3	Analyze the structure of RF heating in industrial application. [Analyzing]	3	2	3	-	-	-	-	-	3	-	-	-	-	1	-
			CO 4	Design of Hazards and safety standards in various engineering problem. [Create & Design].	3	3	3	3	-	-	-	-	3	-	-	-	-	1	-
84	**8EC6-60.2**	**Robotics and control**	CO 1	Understand the fundamentals of robotics and its components, methods of linear motion into rotary motion and vice-verse. [Understanding]	3	3	2	2	2	3	3	3	2	-	3	3	2	-	-
			CO 2	Apply the appropriate techniques for movement of robotic joints with computers/microcontrollers. [Applying & Understanding]	3	2	2	2	-	3	2	-	3	2	3	3	2	-	-
			CO 3	Analyze parameters required to be controlled in a Robot for specific application. [Analyzing]	3	2	3	3	3	3	-	-	2	2	2	3	2	-	-
			CO 4	Design and Develop small automatic / autotronics applications with the help of Robotics for solving the real life problems [Create & Design].	2	2	3	2	2	2	2	3	3	2	2	3	2	-	2
85	**8EE6-60.1**	**Energy Audit and Demand side Management**	CO 1	understand the current Energy Scenarios in India.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO 2	understand the energy auditing of motors, lighting system and building, by appropriate analysis methods through survey instrumentations.	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	-	-	-	-	-	-	-	-	-	-	-
86	**8EE6-60.2**	**Soft Computing**	CO 1	Learn about soft computing techniques and their applications.	2	2	3	-	-	-	-	-	-	-	-	-	2	3	3
			CO 2	Analyze various neural network architectures.	2	2	3	-	-	-	-	-	-	-	-	-	2	2	3
			CO 3	Define the fuzzy systems	-	-	3	-	-	-	-	-	-	-	-	-	2	2	3
			CO 4	Understand the genetic algorithm concepts and their applications	3	2	3	-	-	-	-	-	-	-	-	-	2	2	3
			CO 5	Identify and select a suitable Soft Computing technology to solve the problem.	3	3	3	-	-	-	-	-	-	-	-	-	3	3	3
87	**8ME6-60.1**	**Operations Research**	CO 1	Define the simulation modeling and analyze the practical situations in organizations	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Examine the random numbers and random variates approach in different applications	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO 3	Investigate the sensitivity of simulation solutions for realistic problems	-	3	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO 4	Interpret the model and apply the results to solve crtitical issues of a realististic problem	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
88	**8ME6-60.2**	**Simulation Modeling and Analysis**	CO 1	Generate methamatical models of complex engineering problems	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Analyse the various optimization techniques with the appropriate tools	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 3	Identify suitable optimization techniques to solve industrial and sociatal problems	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 4	Interpret the solution and apply the results to solve complex engineering problems	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-