



|| Jai Sri Gurudev ||
Sri Adichunchanagiri Shikshana Trust (R)



SJB Institute of Technology

(A Constituent of BGS & SJB Group of Institutions and Hospitals)

BGS Health and Education City, Dr. Vishnuvardhana Road, Kengeri, Bengaluru-560060



Approved by AICTE, New Delhi.
Affiliated to Visvesvaraya Technological University, Belagavi.
2(f) and 12(B) recognized by UGC, New Delhi.
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Department of Electrical & Electronics Engineering

Course Outcomes and CO-PO-PSO articulation Matrix

Batch 2018-22

Semester-I/II

Subject: Basic Electrical Engineering												Subject Code: 18ELE13/23				
Course Outcomes																
CO1	To understand the basic concepts of DC, AC circuits and Electrical Machines and able to solve the problems related to DC and AC circuits.															
CO2	Analysis of Single Phase and three phase AC Circuits and the representation of alternating quantities and also determining the power and other parameters in these circuits															
CO3	Apply the basic knowledge of mathematics, science and electrical engineering to obtain the desired parameters/performance characteristics of Transformer and Electric Machines															
CO4	Conduct a study on safety aspects, wiring and consumption of electrical power in domestic installations.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	2											2			
CO2	3	2											2			
CO3	3	2											2			
CO4	2					2		2					2			
Average	2.75	2				2		2					2			

Subject: Basic Electrical Engineering Lab												Subject Code: 18ELEL17/27				
Course Outcomes																
CO1	Identify the common electrical components and measuring instruments used for conducting experiments in the electrical laboratory.															
CO2	Evaluate and Compare power factor of lamps.															
CO3	Determine impedance of an electrical circuit and power consumed in a 3-phase load.															
CO4	Determine earth resistance and understand two way and three-way control of lamps.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	2				1			1	1			2			
CO2	3	2				1			1	1			2			
CO3	3	2				1			1	1			2			
CO4	3	2				1			1	1			2			
Average	3	2				1			1	1			2			

Semester-III

Subject: Engineering Mathematics-III												Subject Code: 18MAT31			
Course Outcomes															
CO1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.														
CO2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.														
CO3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems. s														
CO4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.														
CO5	Determine the external of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2													
CO2	3	2													
CO3	3	2													
CO4	3	2													
CO5	3	2													
Average	3	2													

Subject: Electric Circuit Analysis												Subject Code: 18EE32			
Course Outcomes															
CO1	Understand the basic concepts, basic laws and methods of analysis of DC and AC networks and Solve complex electric circuits using network theorems.														
CO2	Apply mathematical and analytical techniques to analyze transient behavior of network and Discuss resonance in series and parallel circuits, Synthesize typical waveforms using Laplace transformation.														
CO3	Analyze networks based on two port networks and state variables and solve unbalanced three phase systems.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3													3
CO2	3	3													2
CO3	2	2													2
Average	2.67	2.67													2.3

Subject: Transformers and Generators												Subject Code: 18EE33			
Course Outcomes															
CO1	Understanding the construction and operation of transformers and autotransformer														
CO2	Analyze the performance of transformer by various tests, phase conversion and parallel operation														
CO3	Explanation and understanding of construction and operation of DC and AC Generators.														
CO4	Analyze the performance of Synchronous machines by various tests, parallel operation and performance of Synchronous machines on infinite bus.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2				1	1							2	

CO2	2	2				1	1							2	
CO3	3	2				1	1							2	
CO4	2	2				1	1							2	
Average	2.5	2				1	1							2	

Subject: Analog Electronic Circuits												Subject Code: 18EE34				
Course Outcomes																
CO1	Illustrate the construction and working of diodes, BJT and FET															
CO2	Design different amplifiers, oscillators and signal conditioning circuits using diodes, BJT and FET															
CO3	Analysis of transistor behaviour at different frequencies.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	2											2		1	
CO2	2	2											2		1	
CO3	2	2											2		2	
Average	2	2											2		1.33	

Subject: Digital System Design												Subject Code: 18EE35				
Course Outcomes																
CO1	Build a simplified switching equation using different reduction techniques, mealy/Moore models and state diagrams.															
CO2	Design different sequential and combinational circuits															
CO3	Explain the function of different sequential, combinational circuits and memory elements															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	3													2	
CO2	2	2													2	
CO3	2	3	2												2	
Average	2	2.67	2												2	

Subject: Electrical and Electronic Measurements												Subject Code: 18EE36				
Course Outcomes																
CO1	Explain the working of various circuits and equipments used for electrical parameters and components measurements. Also explain working of recording and display devices															
CO2	Analyze and exhibit process of adjustments and errors in electrical and electronics instruments															
CO3	Formulate the techniques to extend range of electrical and electronics instruments															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	2											1		1	
CO2	2	2											1		1	
CO3	2	1											1		1	
Average	2	1.67											1		1	

Subject: Electrical Machines Lab 1												Subject Code: 18EEL37				
Course Outcomes																
CO1	Conduct different tests on transformers to evaluate the performance characteristics of the 1-phase															

	and 3-phase transformers.														
CO2	Connect single phase transformers for three phase operation and phase conversion.														
CO3	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory and evaluate the performance of synchronous generators from the test data.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1							1	1			2	3	
CO2	3	1							1	1			2	3	
CO3	3	1							1	1			2	3	
Average	3	1							1	1			2	3	

Subject: Electronics Laboratory										Subject Code: 18EEL38					
Course Outcomes															
CO1	Design and test rectifier circuit, BJT/FET amplifier, oscillator circuit, counters and sequence generators.														
CO2	Determine h-parameter models of transistor for all models and realize the code conversion techniques.														
CO3	Demonstrate and realize boolean expression, adders and subtractors using gates.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1		2		1						1	1		2	
CO2	1		1								1	1		2	
CO3	1		1		2						1	1		2	
Average	1		1.3		1.5						1	1		2	

Semester-IV

Subject: Engineering Mathematics-IV										Subject Code: 18EE41					
Course Outcomes															
CO1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory														
CO2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing														
CO3	Apply discrete and continuous probability distributions in analysing the probability models arising in engineering field.														
CO4	Make use of correlation and regression analysis to fit a suitable mathematical model for the statistical data.														
CO5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2													
CO2	3	2													
CO3	3	2													
CO4	3	2													
CO5	3	2													
Average	3	2													

Subject: Power Generation and Economics											Subject Code: 18EE42				
Course Outcomes															
CO1	Interpret the working of hydroelectric, steam, nuclear power plants and state functions of major equipment of the power plants.														
CO2	Understand and classify various substations and explain the importance of grounding.														
CO3	Analyze the economic aspects of power system operation and its effects.														
CO4	Explain the importance of power factor improvement methods.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2					2	2						3	2	
CO2	2					2	2						3	2	
CO3	2	2				2	2						2	2	
CO4	2	2				2	2						2	2	
Average	2	2				2	2						2.5	2	

Subject: Transmission and Distribution											Subject Code: 18EE43				
Course Outcomes															
CO1	Explain transmission and distribution scheme, Identify the importance of different transmission systems and Types and study of Insulators														
CO2	Analyze and compute the parameters of the transmission line for different configurations and Assess the performance of overhead lines.														
CO3	Interpret corona, explain the use of underground cables														
CO4	Classify different types of distribution systems; examine its quality & reliability.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2											3		
CO2	3	2											3		
CO3	3	3	3			2		2					3		
CO4	3	3	2			2		1					3		
Average	2.75	2.5	2.5			2		1.5					3		

Subject: Electric Motors											Subject Code: 18EE44				
Course Outcomes															
CO1	Explain the constructional features of DC Motors and selection of a suitable drive for specific Application.														
CO2	Analyze and assess the performance characteristics of DC motors by conducting suitable tests and control of DC Motors														
CO3	Understand and analyse the constructional features of three phase and single phase Induction Motors and assess their performance.														
CO4	Analyse Starters and Speed control of Induction Motor														
CO5	Explanation of operation of Synchronous motor and special motors.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1				1	1							3	
CO2	3	1				1	1							2	
CO3	3	1				1	1							2	
CO4	3	1				1	1							2	

CO5	3	1				1	1							2	
Average	3	1				1	1							2.2	

Subject: Electromagnetic Field Theory												Subject Code: 18EE45			
Course Outcomes															
CO1	Knowledge about the vector calculus and fundamental laws of physics to understand the electric and magnetic field														
CO2	Problem formulation and analysis of electromagnetic fields in the region surrounded by static and moving charge configuration.														
CO3	illustrate the behaviour of electric and magnetic field across the boundary.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2													1
CO2	2	2													1
CO3	2	2													2
Average	2	2													1.33

Subject: Operational Amplifiers and LIC												Subject Code: 18EE46			
Course Outcomes															
CO1	Describe ideal and practical opamps and design amplifier circuits using opamps														
CO2	Design and analyze Opamp Filters, oscillators, Signal processing and nonlinear circuits like Schmitt triggers, comparators and converters														
CO3	Analyse and employ voltage regulator circuits and ICs														
CO4	Understand and explain PLL, VCO and timer circuits														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2													2
CO2	3	3	2												2
CO3	2	2													2
CO4	2	1													2
Average	2.25	2	2												2

Subject: Electrical Machines Lab 2												Subject Code: 18EEL47			
Course Outcomes															
CO1	Demonstrate and understanding the performance of DC motors by conducting suitable experiments.														
CO2	Evaluate the performance of induction and synchronous motor by conducting suitable experiments														
CO3	Compare and analyze the speed control techniques for single phase and three-phase induction motors.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2				1			1	1			2	3	
CO2	3	2				1			1	1			2	3	
CO3	3	2				1			1	1			2	3	
Average	3	2				1			1	1			2	3	

Subject: Op-amps and Linear ICs Lab												Subject Code: 18EEL48			
Course Outcomes															
CO1	Determine the characteristic parameters of OP-Amp and utilize op-amp as linear circuit like amplifier, rectifier, signal processing circuit														
CO2	To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator, Schmitt trigger, comparators														
CO3	To design test the OP-Amp as oscillators and filters														
CO4	Design and study of Linear IC's as multivibrator power supplies, voltage regulator														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2							1	1					2
CO2	3	2			1				1	1					2
CO3	3	2			1				1	1					2
CO4	3	2			1				1	1					2
Average	3	2			1				1	1					2

Semester-V

Subject: Management & Entrepreneurship												Subject Code: 18EE51			
Course Outcomes															
CO1	Explain the nature, characteristic, needs and process of management, entrepreneurship and intrapreneurship														
CO2	Apply the knowledge of project proposal for getting the funding from different private and government agencies and also apply knowledge of cpm/ pert algorithm for enterprise														
CO3	Utilize the schemes and facilities provided by government, social responsibility														
CO4	Manage the human, material resources and capitol in enterprise, ssi.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1								2	3	2			1		
CO2								3	2	2	2		1		
CO3								3	2	2			1		
CO4								2	2	2	2		1		
Average								2.5	2.25	2	2		1		

Subject: Microcontrollers												Subject Code: 18EE52			
Course Outcomes															
CO1	Discuss the architectural details of microcontrollers and instruction set.														
CO2	Develop and analyse the assembly and C language programs to facilitate the data movement, arithmetic, logical, branching operation and other operations														
CO3	Design and apply the knowledge of on-chip peripherals and also to interface external hardware to microcontroller.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3														2
CO2	2	2			2										2
CO3	2	2			2										3
Average	2.3	2			2										2.3

Subject: Power Electronics												Subject Code: 18EE53				
Course Outcomes																
CO1	An overview of applications and types power electronics and power diode characteristics, techniques for design and analysis of diode rectifier circuits using DC and AC supply															
CO2	To explain different power transistors, their steady state and switching characteristics and limitations															
CO3	To explain different types of Thyristors, their gate characteristics and gate control requirements															
CO4	To design, analysis techniques, performance parameters and characteristics of Controlled rectifiers, Choppers, Inverters and Voltage controllers															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	1	1									1		3		
CO2	3	2	1									1		3		
CO3	3	2	1									1		3		
CO4	3	2	1			1	1					1		2		
Average	3	1.75	1			1	1					1		2.75		

Subject: Signals and Systems												Subject Code: 18EE54				
Course Outcomes																
CO1	Explain basic signals, it's classification and properties of various systems															
CO2	Analysis of the given continuous and discrete LTI system using frequency response, different transforms, & convolution methods.															
CO3	Solve difference and differential equation and block diagram representation of the LTI system.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	2	2		1							1			3	
CO2	2	2	2		1							1			3	
CO3	2	2	2		1							1			3	
Average	2	2	2		1							1			3	

Subject: Electrical Machines Design												Subject Code: 18EE55				
Course Outcomes																
CO1	Discuss different design trends, factors, properties of materials, manufacturing process, limitations of electrical machines, short circuit ratio and its effects on performance of synchronous machines.															
CO2	Formulate, Design and solve the output equations, stator and rotor circuits of DC machines and AC machines.															
CO3	Design windings, core of transformer and Estimate the number of cooling tubes, no load current and leakage reactance of core type transformer.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2													2		
CO2	2	3	3											2		
CO3	2	3	3											2		
Average	2	3	3											2		

Subject: High Voltage Engineering												Subject Code: 18EE56			
Course Outcomes															
CO1	Apply their knowledge to distinguish breakdown phenomenon in dielectrics and specifications of Equipment conforming to standards.														
CO2	Summarize generation of high voltages and currents														
CO3	Outline measurement techniques for high voltages and currents														
CO4	Summarize overvoltage phenomenon and insulation coordination in electric power systems														
CO5	Acquire the knowledge of testing various materials and electric apparatus in power systems.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2				2	2						3	2	
CO2	3	2				2	2						2	2	
CO3	3	2				2	2						2	2	
CO4	2	1				1	1						3	2	
CO5	3	2				2	2						3	2	
Average	2.6	1.8				1.8	1.8						2.6	2	

Subject: Microcontroller Laboratory												Subject Code: 18EEL57			
Course Outcomes															
CO1	Formulate programs to handle data movement, arithmetic and logical instructions														
CO2	Develop codes to handle different data types.														
CO3	Create codes in order to control the external devices using microcontroller														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	3	2		3				2	2					3
CO2	2	3	2		3				2	2					3
CO3	2	3	3		3				2	2					3
Average	2	3	2.33		3				2	2					3

Subject: Power Electronics Lab												Subject Code: 18EEL58			
Course Outcomes															
CO1	To Study the static characteristics and performance of semiconductor devices														
CO2	To Learn the different methods of triggering SCR														
CO3	To Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RLE loads.														
CO4	To Analyze the Speed control of different motors and to Discuss the performance of a single-phase full bridge inverter connected to resistive load.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	2						1	1		1		3	
CO2	3	2	2						1	1		1		3	
CO3	3	2	2						1	1		1		2	
CO4	3	2	2						1	1		1		2	
Average	3	2	2						1	1		1		2.5	

Semester-VI

Subject: Control Systems												Subject Code: 18EE61			
Course Outcomes															
CO1	Analyze and model electrical and mechanical system using analogous.														
CO2	Apply block diagram reduction techniques and signal flow graph methods to obtain transfer function of systems														
CO3	Design and Analyze the stability of control system, ability to determine transient and steady state time response.														
CO4	Examine the performance of system stability using Root locus , Bode plots ad Nyquist plots.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2												2	
CO2	2	1												2	
CO3	3	3	2											2	
CO4	3	3	2											2	
Average	2.5	2.25	2											2	

Subject: Power System Analysis-1												Subject Code: 18EE62			
Course Outcomes															
CO1	Understand one-line diagram, per unit system & construct per unit impedance diagram of power system.														
CO2	Analyze three phase symmetrical faults on power system and understand selection of circuit breaker rating														
CO3	Assess unbalanced phasors in terms of sequence components and develop sequence networks.														
CO4	Analyze various unsymmetrical faults on power system.														
CO5	Inspect dynamics of synchronous machine and determine the power system stability.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3											3	3	
CO2	3	3				2	2						3	2	
CO3	3	3				2	2						3	2	
CO4	3	3				2	2						3	2	
CO5	3	2											3	2	
Average	3	2.8				2	2						3	2.2	

Subject: Digital Signal Processing												Subject Code: 18EE63			
Course Outcomes															
CO1	Apply the knowledge of Fourier Transform and Z-Transform to understand the frequency domain processing of discrete time signals and able to solve related problems.														
CO2	Apply FFT algorithms for efficient computation of DFT and IDFT of a given sequence.														
CO3	Analyze the mathematical model of digital filters using different realization structures.														
CO4	Apply the relevant theoretical knowledge to design and analyse IIR and FIR Filters.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2													3
CO2	3	2													3

CO3	2	1													3
CO4	3	3	2												2
Average	2.75	2	2												2.75

Subject: Embedded systems											Subject Code: 18EE644				
Course Outcomes															
CO1	Understand about the components and interfaces of embedded systems														
CO2	Enumerate about trade offs and challenges of embedded systems														
CO3	Apply software aspects and programming to design embedded systems														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	1													1
CO2	2	1	1									1			1
CO3	2	1	1		1										1
Average	2	1	1		1							1			1

Subject: Object Oriented Programming											Subject Code: 18EE645				
Course Outcomes															
CO1	Describe the basics of Object-Oriented Programming concepts.														
CO2	Apply the object initialization and destroy concept using constructors and destructors also concept of polymorphism by using overloading methods and operators.														
CO3	Utilize I/O operations and file streams in programs and the concept of inheritance to reduce the length of code to evaluate the usefulness.														
CO4	Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2				2										2
CO2	2				2										2
CO3	2				2			1							2
CO4	2				2			1							2
Average	2				2			1							2

Subject: Renewable Energy Resources											Subject Code: 18EE653				
Course Outcomes															
CO1	Discuss causes of energy scarcity and its solution, energy resources and availability of renewable energy.														
CO2	Outline energy from sun, energy reaching the Earth's surface and solar thermal energy applications.														
CO3	Discuss types of solar collectors, their configurations, solar cell system, its characteristics and their applications.														
CO4	Explain generation of energy from hydrogen, wind, geothermal system, solid waste and agriculture refuse a serialization														
CO5	Discuss and summarize production of energy from biomass, biogas, tidal energy resources, sea wave energy and ocean thermal energy.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2														2

CO2	3	1			2										2
CO3	2	2			2										3
CO4	2	2	2		2										3
CO5	2	3	2		2										3
Average	2.2	2	2		2										2.6

Subject: Control system lab										Subject Code: 18EEL67					
Course Outcomes															
CO1	Assessing the time and frequency domain responses of a given second order system by using software package and discrete components														
CO2	Design, analyze and simulate Lead, Lag and Lag – Lead compensators for given specifications														
CO3	Determine the performance characteristics of AC and DC servomotors and synchro-transmitter receiver pair used in control systems														
CO4	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system														
CO5	Write a script file to plot root locus, bode plot, Nyquist plots to study and compare the stability aspects of the system using a software package														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1			2				2	2				2	2
CO2	3	1			2				2	2				2	2
CO3	3								2	2				2	1
CO4	2	2			2				2	2				1	2
CO5	2	2			2				2	2					3
Average	2.6	1.5			2				2	2				1.75	2

Subject: Digital Signal Processing Lab										Subject Code: 18EEL68					
Course Outcomes															
CO1	Compute the frequency Response and time Response of the given system using sampling theorem.														
CO2	Solve impulse response and step response of a given difference equation theoretically & by using a suitable software and compare the results.														
CO3	Compute N-point DFT as well N-point FFT (Both DIT and DIF) of a given sequence and also plot magnitude and phase response														
CO4	Perform Convolution of (Linear and circular) two sequences using DFT and IDFT.														
CO5	Design and implement IIR and FIR digital filter to meet the given specification using suitable software														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2		2	3				2	2					3
CO2	3	2		2	3				2	2					3
CO3	3	2		2	3				2	2					3
CO4	3	2		2	3				2	2					3
CO5	3	2		2	3				2	2					3
Average	3	2		2	3				2	2					3

Semester-VII

Subject: Power System Analysis-2												Subject Code:18EE71				
Course Outcomes																
CO1	Formulate network matrices and models for solving load flow problems															
CO2	Perform power flow analysis of power systems using numerical iterative techniques															
CO3	Solve issues of economic load dispatch and unit commitment problems															
CO4	Analyze short circuit faults in power system networks using bus impedance matrix															
CO5	Apply numerical techniques to solve swing equation for stability analysis															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	3											3	3		
CO2	3	3				2	2						3	2		
CO3	3	3				2	2						3	2		
CO4	3	3				2	2						3	2		
CO5	3	2											3	2		
Average	3	2.8				2	2						3	2.2		

Subject: Power System Protection												Subject Code:18EE72				
Course Outcomes																
CO1	Classify & compare various relays & its protective schemes.															
CO2	Analyse schemes of Overcurrent protection & distance protection															
CO3	Analyse schemes such as carrier current protection& differential protection.															
CO4	Understand various circuit breakers, fuse used in power system.															
CO5	Discuss the protection against Over voltages and modern trends in power system protection.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	1	1										2	2		
CO2	1	2	1				1						1	2		
CO3	1	2	1				1						1	2		
CO4	1	2	1				1						2	2		
CO5	1	2	1				1						2	2		
Average	1.2	1.8	1				1						1.6	2		

Subject: Integration of Distributed Generation.												Subject Code:18EE733				
Course Outcomes																
CO1	Understand and Explain the concepts of Distributed Generation by various Sources of Energy.															
CO2	Analyse the Power System Performance, Overloading and Losses impacts on Distributed Generation															
CO3	Interpret Voltage Magnitude Variations impacts on Distributed Generation															
CO4	Study and Solve Power Quality Disturbances impacts on Distributed Generation															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	2				1	1						1	1		

CO2	3	2				1	1						1	1	
CO3	3	2				1	1						1	1	
CO4	3	2				1	1						1	1	
Average	3	2				1	1						1	1	

Subject: Utilization of Electrical Power												Subject Code: 18EE742			
Course Outcomes															
CO1	Understand and discuss the different types of electrical heating, welding and electrolytic process employed in domestic and industrial applications														
CO2	Apply the knowledge of fundamental engineering principles to design various lighting systems for different applications.														
CO3	Analyze the behavior of electrical traction systems under various conditions of operation.														
CO4	Discuss the importance of electric vehicles, hybrid electric vehicles and its architectures.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2				1	2					1	3		
CO2	3	2				1	2					1	3		
CO3	3	2				1	3					1	3		
CO4	2					1	3					1	2		
Average	2.75	2				1	2.5					1	2.75		

Subject: Electric Vehicles												Subject Code: 18EE752			
Course Outcomes															
CO1	Understand types of EV and utilize the concepts of kinetics, dynamics, performance parameters and characteristics of Vehicles														
CO2	Explain and adopt different drive trains and propulsion systems for EV and HEV														
CO3	Design and analyze electric and hybrid electric vehicles														
CO4	Model energy storage systems for EV and HEV.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	1	2			1	1							1	
CO2	2	2	2	1		2	2						1	3	
CO3	2	2	3	1		2	2						1	3	
CO4	2	2				2	2						1	3	
Average	2	1.75	2.33	1		1.75	1.75						1	2.5	

Subject: Electrical Energy Conservation and Auditing												Subject Code: 18EE754			
Course Outcomes															
CO1	Understand & Explain: energy scenario & importance of Energy Conservation														
CO2	Discuss load management techniques and energy efficiency.														
CO3	Demonstrate the need of energy audit, energy audit methodologies & DSM.														
CO-PO-PSO Mapping															
COs	POs												PSOs		

	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2					2	2						2		
CO2	2	1				2	2						2	2	
CO3	2	1			2	2	2						2	2	
Average	2	1			2	2	2						2	2	

Subject: Power System Simulation Lab												Subject Code:18EEL76			
Course Outcomes															
CO1	Develop a program in MATLAB package to assess the performance of medium and long transmission lines.														
CO2	Develop a program in MATLAB package to obtain load flow analysis and power angle characteristics of Synchronous machine														
CO3	Develop a program in MATLAB package to assess the transient stability under three phase fault.														
CO4	Develop programs in MATLAB package to formulate bus admittance, bus impedance and Jacobian matrices of interconnected power systems														
CO5	Solve Power flow, economic load dispatch and short circuit problems on power system using MIPOWER package.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2			3				3	3			3		3
CO2	3	3			3				3	3			3	2	3
CO3	3	3			3				3	3			3		2
CO4	3	3			3				3	3			3		3
CO5	3	3			3				3	3			3		3
Average	3	2.8			3				3	3			3	2	2.8

Subject: Relay and High Voltage Lab												Subject Code:18EEL77			
Course Outcomes															
CO1	Apply knowledge on conduct experiment for obtaining breakdown characteristic of air insulation subjected for HVAC, HVDC applications to distinguish between Uniform/Non-uniform field conditions..														
CO2	Apply knowledge to assess quality of transformer oil sample by conducting experiment as per standards and assessing dielectric strength of it.														
CO3	Analyse the Electromechanical & Microprocessor based type of over current, overvoltage & under voltage relays.														
CO4	Acquire the knowledge experimentally by map field lines for co-axial cable model using electrolytic tank and protection of Motor & Generator.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2				2	2		2	2			3	3	
CO2	3	2				2	2		2	2			3	3	
CO3	3	2				2	2		2	2			3	2	
CO4	3	2				2	2		2	2			3	2	
Average	3	2				2	2		2	2			3	2.5	

Subject: Project Phase I											Subject Code: 18EEP78				
Course Outcomes															
CO1	Ability to identify gap from literature survey, demonstrate technical knowledge on complex engineering problem of selected project topic.														
CO2	Identify, Select, Apply a suitable engineering/IT tool in modelling/data interpretation/analytical Studies, conduct projects leading to a logical solution														
CO3	Design multi-disciplinary engineering solutions to complex problems addressing societal and environmental concerns														
CO4	Communicate effectively to a diverse audience and develop technical reports and publications														
CO5	Work as a team member/leader to manage projects and costs in a diversified environment														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3		3				1				3	3	3	3
CO2	3	3	3		3			1					3	3	3
CO3	3	3	2			3	3	1					3	3	3
CO4	3							2	2	3			3	3	3
CO5	3							2	3	3	3	3	3	3	3
Average	3	3	2.5	3	3	3	3	1.4	2.5	3	3	3	3	3	3

Semester-VIII

Subject: Power System Operation and Control											Subject Code: 18EE81				
Course Outcomes															
CO1	Understand and Explain the Concepts Explain Distributed Generation by various Sources of Energy.														
CO2	To study the Power System Performance, Overloading and Losses impacts on Distributed Generation														
CO3	To study the Voltage Magnitude Variations impacts on Distributed Generation														
CO4	To study the Power Quality Disturbances impacts on Distributed Generation														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2								1			3		2
CO2	3	2											2		1
CO3	3	2											2		
CO4	3	2	1										3		1
Average	3	2	1							1			2.67		1.3


Subject: Electrical Estimation and Costing											Subject Code: 18EE822				
Course Outcomes															
CO1	Acquire knowledge on general principles of estimation & costing, IE rules.														
CO2	Identify considerations & types of Residential wiring, Applying Safety rules														
CO3	Analyse design aspects for service connections, Power circuits & their Earthing														
CO4	Estimate the cost of Overhead Transmission & Distribution Lines, Sub-station.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3

CO1	3	2	2			1							1	1	
CO2	3	1	1			1							1	1	
CO3	3	1	1			1							1		
CO4	3	1	1			1							1	1	
Average	3	1.25	1.25			1							1	1	

Subject: Project Phase II											Subject Code:18EEP83				
Course Outcomes															
CO1	Apply the fundamental knowledge of mathematics, science and engineering principles in design of solutions or system components.														
CO2	Identify, Select, Apply a suitable engineering/IT tool in modelling/data interpretation/analytical studies, conduct experiments leading to a logical solution														
CO3	Design multidisciplinary engineering solutions to complex problems addressing societal and environmental concerns.														
CO4	Communicate effectively to a diverse audience and develop technical reports and publications.														
CO5	Work as a team member/leader to manage projects and costs in a diversified environment.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3									3	2	2	2
CO2	3	3			3								3	3	3
CO3	3	3	3	3		3	3						3	3	3
CO4										3		3	3	3	3
CO5						3			3	3	3		2	2	2
Average	3	3	3	3	3	3	3		3	3	3	3	2.6	2.6	2.6

Subject: Technical Seminar											Subject Code:18EES84				
Course Outcomes															
CO1	Identify, understand and discuss current, real-time issues														
CO2	Improve oral and written communication skills														
CO3	Attain, use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study														
CO4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.														
CO5	Demonstrate the ability to asses and report														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3		3							3		3	3	3
CO2										3			3	3	3
CO3				3								3	3	3	3
CO4	3	3									3		3	3	3
CO5		3								3		3	3	3	3
Average	3	3		3						3	3	3	3	3	3

Subject: Internship												Subject Code: 18EEI85			
Course Outcomes															
CO1	Gain practical experience and knowledge of the industry and professionals														
CO2	Develop and experience communication, interpersonal and other critical skills in technical fields														
CO3	Demonstrate the ability to assess and report the technical documents														
CO4	Develop a greater understanding about career options to achieve career goals in the interested technical fields														
CO5	Apply knowledge and skills learned to classroom work														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3									3	2	2	2
CO2	3	3			3								3	3	3
CO3	3	3	3	3		3	3						3	3	3
CO4										3		3	3	3	3
CO5						3			3	3	3		2	2	2
Average	3	3	3	3	3	3	3		3	3	3	3	2.6	2.6	2.6


Co-ordinator
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HOD
 Dr. Babu N V