



|| 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: 2019-23

Semester-I/II

Subject: Basic Electrical Engineering											Subject Code: 18ELE13/23					
Course Outcomes																
CO1	Understand the basic concepts of DC and AC circuits and Solve the problems on circuits															
CO2	Analysis of Single Phase and three phase AC Circuits															
CO3	Apply the basic knowledge to obtain the desired parameters/performance characteristics of Transformer and Electric Machines															
CO4	Discuss types of domestic wiring with electrical safety Rules & standards															
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		2								
Average	3	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	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						
CO2	3	2				1			1	1						
CO3	3	2				1			1	1						
CO4	3	2				1			1	1						
Average	3	2				1			1	1						

Semester-III

Subject: Electric Circuit Analysis												Subject Code: 18EE32				
Course Outcomes																
CO1	Understand and apply the basic concepts and laws to analyze DC and AC networks															
CO2	Apply network theorems to solve complex electric circuits															
CO3	Analyze the resonant circuits and discuss transient analysis with Initial conditions															
CO4	Synthesize waveforms using Laplace transformation															
CO5	Analyze unbalanced three phase systems and also evaluate the performance of two port networks															
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														3
CO3	3	3														3
CO4	3	1														2
CO5	3	2														2
Average	3	2.4														2.6

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	Analyze and explain the operation of the synchronous machine connected to infinite machine.															
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						3	2		
CO2	2	2				1	1						3	2		
CO3	3	2				1	1						3	2		
CO4	2	2				1	1						3	2		
Average	2.2	2				1	1						3	2		

Subject: Analog Electronic Circuits												Subject Code: 18EE34				
Course Outcomes																
CO1	Illustrate the construction and working of diodes, BJT and FET															
CO2	Design and Analyse the different amplifiers, oscillators and signal conditioning circuits using diodes, BJT and FET															
CO3	Analysis of Transistor behavior 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	1	1									1				3
CO2	2	2	2			1						1				3
CO3	2	2	2									1				3
Average	2	1.66	1.66			1						1				3

Subject: Digital System Design												Subject Code: 18EE35				
Course Outcomes																
CO1	Build a simplified 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	2													2	
CO2	2	3													2	
CO3	2	2	2												2	
Average	2	2.7	2												2	

Subject: Electrical and Electronic Measurements												Subject Code: 18EE36				
Course Outcomes																
CO1	Explain the working of various circuits and equipment's 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	3	2										3		1	
CO2	2	3	3										3		1	
CO3	2	1	1										2		1	
Average	2	2.33	2										2.66		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 also 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	2	2			2				1	1		1			2
CO2	2	2			2				1	1		1			2
CO3	2	2			2				1	1		1			2
Average	2	2			2				1	1		1			2

Semester-IV

Subject: Power Generation and Economics											Subject Code: 18EE42				
Course Outcomes															
CO1	Interpret the working of hydroelectric power plant and analyse the different turbine uses and economic aspects of hydro generation.														
CO2	Understand and explain the operation of different thermal plants and compare them w.r.t to economic aspects.														
CO3	Illustrate and infer the operation and importance of nuclear power plants and its benefits to economy.														
CO4	Understand and classify various substations, explaining the importance of grounding and power factor improvement.														
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 type of insulators														
CO2	Analyse and compute the parameters of the transmission line for different configurations.														
CO3	Assess the performance of overhead lines														
CO4	Interpret corona, explain the use of underground cables														
CO5	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				2							3		
CO2	3	3	2	1		2							3		
CO3	3	3	2	1		2							3		
CO4	3	3				2							3		
CO5	3	3	2	1		2							3		
Average	2.8	2.8	2	1		2							3		

Subject: Electric Motors												Subject Code: 18EE44			
Course Outcomes															
CO1	Explain the constructional features, classifications and operation of DC, AC & special Motors.														
CO2	Analyze and assess the performance characteristics and speed control of DC motors by conducting suitable tests.														
CO3	Explain the constructional features of Three Phase and Single phase induction Motors and assess their performance.														
CO4	Explain the operation, speed control & starting methods of Synchronous motor and 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	2	2				2							2	2	
CO2	3	2				2							2	3	
CO3	3	2				2							2	3	
CO4	3	2				2							2	3	
Average	2.75	2				2							2	2.75	

Subject: Electromagnetic Field Theory												Subject Code: 18EE45			
Course Outcomes															
CO1	Demonstrate 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 different static and moving charge configuration.														
CO3	Asses time varying fields and propagation of waves in different media also behaviour of electric and magnetic field across a 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											2		1
CO2	2	2			2								2		1
CO3	2	2			2								2		2
Average	2	2			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 non linear 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	1	1									1	1		2
CO2	3	3	3	1								1			2
CO3	3	3	3	1								1			2
CO4	2	1	1									1			2
Average	2.5	2	2	1								1	1		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			3	3	

Subject: Op-amps and Linear ICs Lab										Subject Code:18EEL48					
Course Outcomes															
CO1	Determine the characteristics of opamp and utilize it as linear circuit like amplifier, rectifier, signal processing, oscillator and filters														
CO2	To design and test opamp as non linear circuit like differentiator & integrator, ZCD, Schmitt trigger and comparator														
CO3	Design and study of linera Ics as multivibrator, power supplies, voltage regulator														
CO4															
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			2
CO2	3	2			1				1	1		1			2
CO3	3	2			1				1	1		1			2
CO4															
Average	3	2			1				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 capital 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						
CO2								3	2	2	2					
CO3						1		3	2	2						
CO4						1		2	2	2	2	1				
Average						1		2.5	2.25	2	2	1				

Subject: Microcontrollers												Subject Code: 18EE52				
Course Outcomes																
CO1	Understand and discuss the architectural details of Microcontroller and Instruction set															
CO2	Develop and analyze the assembly and C language programs to facilitate the data movement, arithmetic, logical, branching 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	2														1	
CO2	3	2													3	
CO3	2	2	2	1	2							1			3	
Average	2.33	2	2	1	2							1			2.33	

Subject: Power Electronics												Subject Code: 18EE53				
Course Outcomes																
CO1	Illustrate types of power electronics circuits with applications, design and analyze power diode circuits															
CO2	To explain steady state, switching and gate characteristics of power transistors and Thyristors															
CO3	To design and analyze the performance parameters of various Converters															
CO4																
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	1									1		2		

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

Subject: Signals and Systems												Subject Code: 18EE54			
Course Outcomes															
CO1	Explain basic signals, its classification and properties of various system.														
CO2	Analysis of the given continuous and discrete LTI system using frequency response, different transform and convolution method.														
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			3
CO2	2	2	2									1			3
CO3	2	2	2									1			3
Average	2	2	2									1			3

Subject: Electrical Machines Design												Subject Code: 18EE55			
Course Outcomes															
CO1	Compare electrical engineering materials and its properties, fundamental aspects of electrical machine design														
CO2	Design the main dimension, shunt and series field windings of DC machine														
CO3	Design output equations, main dimension, estimate the number of cooling tubes and leakage reactance of transformer														
CO4	Design output equation, stator and rotor circuits of induction machine and synchronous machine														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2														
CO2	3	3	2	2		2	2							3	
CO3	3	3	2	2		2	2							3	
CO4	3	3	2	2		2	2						3	3	
Average	2.75	3	2	2		2	2						3	3	

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	Explain different types of generation of high AC & DC voltages and currents.														
CO3	Understand the practical 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	Interface and control the external peripherals 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	2	2	3				2	2		2			3
Average	2	3	2	2	3				2	2		2			3

Subject: Power Electronics Lab										Subject Code: 18EEL58					
Course Outcomes															
CO1	To Study the Static characteristics and performance of semiconductor devices.														
CO2	Compare different methods of triggering SCR														
CO3	To Verify the performance of single phase controlled Full wave rectifier and AC voltage controller With R and RL Loads.														
CO4	To analyze the speed Control of different motors and to discuss the performance of 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	1						2	2		1		3	
CO2	3	2	1						2	2		1		3	
CO3	3	2	1						2	2		1		2	
CO4	3	2	1						2	2		1		2	
Average	3	2	1						2	2		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	1	1											1	2	
CO3	2	2											2	2	
CO4	2	2											1	2	
Average	1.75	1.75											1.5	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 to 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	
Average	3	2.8				2	2						3	2.2	

Subject: Digital Signal Processing												Subject Code:18EE63				
Course Outcomes																
CO1	Analyze signals using the discrete Fourier transform (DFT). And solve problems on circular convolution using periodic, matrix and tabular methods.															
CO2	Solve problems on efficient computation of DFT using DIT and DIF- FFT and composite DFT algorithms.															
CO3	Implement digital systems (FIR and IIR systems) in a variety of forms (direct form I and II, parallel, cascade, ladder structure and linear phase realization).															
CO4	Apply design (IIT and BLT) techniques for IIR type (Butterworth and Chebyshev) digital filters.															
CO5	Design FIR type digital filters using "windowing method" and "frequency sampling method."															
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	2	2													3	
CO4	3	3	2												3	
CO5	3	3	2												3	
Average	2.6	2.4	2												3	

Subject: Electric vehicle technologies												Subject Code:18EE646				
Course Outcomes																
CO1	Understand types of EV and utilize the concepts of kinetics, dynamics, performance parameters and characteristics of vehicles.															
CO2	Model energy storage systems for EV and HEV, charging methods and power electronic converter for batteries															
CO3	Explain and adopt different drive trains and propulsion systems for EV and HEV															
CO4	Design and analyse electric and hybrid electric vehicles.															
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			1	1							1		
CO2	2	2	2	2		2	2						1	3		
CO3	2	2	2	1		2	2						1	3		
CO4	2	2				2	2						1	3		
Average	2	1.75	1.67	1.5		1.75	1.75						1	2.5		

Subject: Embedded Systems												Subject Code:18E644				
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: 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 Lead – Lag 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	3	2			2				2	2				1	2
CO5	3	2			2				2	2					3
Average	3	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	Discuss components of protection scheme, performance of protective relays and overcurrent protection.														
CO2	Discuss protection of Generators, Motors, Transformer, Bus Zone Protection, pilot protection and distance protection.														
CO3	Understand the construction and operation of different types of circuit breakers.														
CO4	Explain the features of fuse, causes of over voltages and its protection, also 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	3	2				2	2						3	1	
CO2	3	2				2	2						3	2	
CO3	3	2				2	2						3	2	
CO4	3	2				2	2						3	2	
Average	3	2				2	2						3	1.75	

Subject: IDG												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	Understand and apply the knowledge of fundamental engineering principles to design various lighting systems for different applications.														
CO3	Apply the basic knowledge of engineering to analyze the behavior of electrical traction systems under various conditions of operation.														
CO4	Understand and discuss the importance of electric vehicles and 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	2	2				2	2						3	2	
CO2	2	2				2	2						3	2	
CO3	3	2				2	2						3	2	
CO4	2					2	2						3	2	
Average	2.25	2				2	2						3	2	

Subject: Smart Grid												Subject Code: 18EE744			
Course Outcomes															
CO1	Explain the concept of Smart grid enables the Electric Net and need of smart grid.														
CO2	Outline the benefits and drivers of DC Power delivery system														
CO3	Summarize the Intelligrid Architecture for the smart grid.														
CO4	Explain the Efficient Electric End-use Technology Alternatives.														
CO5	Discuss Demand side planning and Evaluation														
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	3	2	2										3		
CO4	3	2											3		
CO5	3	2											3		
Average	3	2	2										3		

Subject: Power System Simulation Lab												Subject Code: 18EEL76			
Course Outcomes															
CO1	Construct a program in MATLAB package to assess the performance of medium and long transmission lines.														
CO2	To obtain the power angle characteristics of Synchronous machine and calculation of bus current, bus power & line flows by developing a program in MATLAB package.														

CO3	Develop a program in MATLAB package to assess the transient stability under three phase faults														
CO4	To formulate bus admittance, bus impedance and Jacobian matrices of interconnected power systems by developing a program in MATLAB package														
CO5	Solve Power flow problem, 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	Analyze 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

	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	Describe various levels of controls in power systems, components, architecture and configuration of SCADA														
CO2	Develop and analyze the mathematical model of automatic generation and control in Power System														
CO3	Analysis of controlling voltage and reactive power in Power System														
CO4	Explain security and State estimation of power System														
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						3	2	
CO2	3	2	1	1		1	1		1	1		1	3	2	
CO3	3	2	1	1		1	1		1	1		1	3	2	
CO4	3	2	1	1		1	1					1	3	2	
Average	3	2	1	1		1	1		1	1		1	3	2	


Subject: Electrical Estimation and Costing												Subject Code: 18EE822			
Course Outcomes															
CO1	Acquire knowledge on general principles of estimation & costing, IE rules, IE-Act														
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			2		2					2	2	
CO2	3	2	2			2		2					2	2	
CO3	3	2	2			2		2					2		
CO4	3	2	2			2		2					2	2	
Average	3	2	2			2		2					2	2	

Subject: Project Work Phase - 2											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 assess 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	3
CO4	3	3							3		3		3	3	3
CO5	3	3								3		3	3	3	3
Average	3	3		3					3	3	3	3	3	3	3

Subject: Internship											Subject Code: 18EEI85				
Course Outcomes															
CO1	Demonstrate the ability to assess and report														
CO2	Assess interests and abilities in their field of study														
CO3	Demonstrate the ability to plan, implement, professional, ethical practice and evaluate engineering studies														
CO4	Develop communication, interpersonal and other critical skills in the job interview process														
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		
CO2	2											3	3	2	
CO3								2				2	3	2	
CO4									2	3			3	2	
Average	2.5							2	2	3	2	3	3	2	


Co-ordinator
 Mr. Kubera U


 28/3/23
HOD
 Dr. Babu N V