DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

2022 SCHEME

Course Name	Course Code	CO. No.	Course Outcomes
TRANSFORM CALCULUS, FOURIER SERIES & NUMERICAL TECHNIQUES (COMMON TO ALL)	21MAT31	CO1	Understand The Concepts Of Laplace Transforms, Fourier Series, Fourier Transforms, Z-Transforms, Numerical Techniques And Calculus Of Variations
		CO2	Demonstrate Various Physical Phenomena Using The Concepts Of Laplace Transforms,Fourier Series, Fourier Transforms, Z-Transforms, Numerical Techniques And Calculus Of Variations
		CO3	Apply The Knowledge Of Laplace Transforms, Fourier Series, Fourier Transforms, Z-Transforms, Numerical Techniques And Calculus Of Variations In Modeling Various Physical And Engineering Phenomena.
		CO4	Relate The Concepts Of Laplace Transforms, Fourier Series, Fourier Transforms, Z-Transforms, Numerical Techniques And Calculus Of Variations To Their Respective Branches.
ELECTRIC CIRCUIT ANALYSIS	BEE302	CO1	Apply the concepts of network reduction techniques to solve the complex electrical circuits.
		CO2	Apply the concepts of network theorems to study the behaviour of electric circuits.
		CO3	Apply the concept of resonance and transient behaviour in electrical circuits.
		CO4	Apply Laplace transformation concepts to solve electrical circuits
		CO5	Compute the electrical parameters of unbalanced 3-phase systems and two port networks.
		CO6	Build the electrical networks and verify the different network theorems.
		CO7	Obtain the electrical parameters (time constant, power and power factor) in 3-phase ac circuit
ANALOG ELECTRONIC CIRCUITS	BEE303	CO1	Apply the concepts of diode clipping & clamping circuits and transistor biasing characteristics to obtain performance parameter of DC circuits.
		CO2	Analyze the different transistor based amplifier circuits using hybrid and pi model to obtain the frequency response characteristics.
		CO3	Describe the multistage and feedback amplifiers to study their characteristics

		CO4	Apply the concepts of different power amplifiers and oscillator circuits to obtain the performance parameters.
		CO5	Apply the Biasing concepts of JFET and MOSFET in amplifiers
		CO6	Build different electronic circuits (diode circuits, amplifiers and oscillators) and validate their performance
		CO7	Simulate rectifier and oscillator circuits and validate the design values
TRANSFORMERS AND GENERATORS	BEE304	CO1	Describe the working principle, construction and different tests on single phase transformer to find performance parameters.
		CO2	Explain the concepts of different transformer connections, parallel operation of three phase transformers and auto transformer operation in power system.
		CO3	Explain the construction, working principle, equivalent circuit and different tests to find the efficiency, voltage regulation and other performance parameters of synchronous generators.
		CO4	Discuss the parallel operation, methods of synchronization and performance characteristics of synchronous generators.
		CO5	Discuss the construction, working principle, merits & demerits of solar and wind power generation.
TRANSFORMERS AND GENERATORS LAB	BEEL305	CO1	Determine the various parameters and plot the performance characteristics of electrical machines
DIGITAL LOGIC CIRCUITS	BEE306A	CO1	Apply the different techniques to minimize the combination circuits
		CO2	Build the combinational logic circuits using basic gates, multiplexer and decoders.
		CO3	Describe the operations of various Flip-flop Circuits
		CO4	Develop sequential circuits like registers, counters using Flip flops and verify its sequence.
		CO5	Apply the Melay, Moore Models to develop the state diagrams, counter and study its applications
ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	BEE306B	CO1	Explain the concepts of electrical and electronic measuring system and instruments.
		CO2	Describe the various ac and dc bridges for the measurement of resistance, inductance and capacitance.
		CO3	Explain the use of instrument transformers to measure high level voltages and currents.
		CO4	Explain the construction and working principles of

			Electronic and Digital Instruments.
		CO5	Discuss the working principle of various display and Recording devices in electrical and electronic systems.
ELECTROMAGNETIC FIELD THEORY	BEE 306C	CO1	Apply the concepts of vector analysis in different coordinate systems for the computation of Electric field intensity and flux density for different charge configuration.
		CO2	Apply the concepts of Energy, Potential and boundary conditions for static charge distribution to determine Electric field intensity and flux density
		CO3	Apply Poisson's , Laplace Equations and laws of steady magnetic field to determine electric and magnetic field parameters (Field intensity and Flux density)
		CO4	Apply the concepts of magnetic forces, properties of magnetic material and boundary conditions to compute Inductance and energy stored in steady magnetic fields.
		CO5	Modify Maxwell equations for Time varying fields and apply their implication to study Electromagnetic wave propagation in different media
555 IC LABORATORY	BEEL358B	CO1	Apply the concepts of 555 IC timer to build the simple applications
ELECTRIC MOTORS	BEE401	CO1	Understand the construction and operation, characteristics, Testing of DC Motors and determine losses and efficiency.
		CO2	Understand the construction and operation, classification and types of Three phase Induction motors.
		CO3	Describe the performance characteristics and applications of three phase Induction motors.
		CO4	Demonstrate and explain Speed Control methods of three phase induction motor and types of single phase induction motors
		CO5	Understand the construction and operation, V and inverted V curves of synchronous motors and Construction and operation of Universal motor, AC servomotor, Linear induction motor, PMSM, SRM and BLDC motors.
TRANSMISSION & DISTRIBUTION	BEE402	CO1	Apply the concepts of power system on overhead transmission line, insulators to determine the effect of different parameters on transmission line.
		CO2	Compute the various transmission line parameters and their effects on power system.
		CO3	Model different types of transmission lines and assess their performance.
		CO4	Illustrate the Concepts of UG cables and effects of

			corona on Transmission line
		CO5	Apply the concepts of distribution to determine reliability & quality
MICROCONTROLLERS	BEE403	CO1	Describe the architecture, registers, internal memory organization and addressing modes of 8051.
		CO2	Illustrate different types of assembly programming instructions, Assembler directives to operate internal modules of 8051.
		CO3	Develop 8051C and assembly programs for time delay, I/O operations, logic and arithmetic operations, data conversion and timer/counter
		CO4	Explain the basics of serial communication and interrupts, also develop 8051 programs for serial data communication and interrupt handling.
		CO5	Write application specific programs to interface and control of external devices like stepper motor , DC motor , LCD, DAC and keyboard etc. with 8051 Microcontroller and using assembly or C – languages
		CO6	Write, simulate and debug 8051 programs using assembly and Embedded C languages.
		CO7	Demonstrate the control of ancillary devices using 8051 Microcontroller
ELECTRIC MOTORS LABORATORY –	BEEL404	CO1	Pre-determine the performance characteristics of DC and AC machines by conducting suitable tests.
		CO2	Perform load test on ac and dc machines and assess their performance.
		CO3	Conduct speed control of ac and dc machine by various methods.
POWER GENERATION AND ECONOMICS	BEE405A	CO1	Compute Hydrograph, load curve, load duration curve, flow duration curve, mass curve for Hydro power.
		CO2	Describe the general layout/arrangement, advantages/disadvantages, working of major equipment and auxiliaries used in conventional power plants.
		CO3	Describe the operation, maintenance and working of nuclear power plant.
		CO4	Classify substations and explain the importance of grounding.
		CO5	Analyse the economic features of Conventional power plants.

ARDUINO AND RASPBERRY PI BASED PROJECT	BEEL456D	CO1	Understand internet of things (IOT) and its hardware and software components
BIOLOGY FOR ENGINEERS	BBOK407	CO1	Interdisciplinary applications of biomolecules by exploiting its molecular properties
		CO2	Compare the working human organs to known equipments/machineries
		CO3	Relate various technologies on the principles of biomechanics
		CO4	Evaluate the design of bioengineering used in the solution of contemporary problems.

2021 SCHEME

Course Name	Course Code	CO. No.	Course Outcomes
BASIC ELECTRICAL ENGINEERING	21ELE13	CO1	Apply the basic laws in Electrical engineering to DC and AC electric circuits
		CO2	Explain the working principles of transformers and electrical machines
		CO3	Explain the concepts of electric power transmission and distribution of power.
		CO4	Understand the electricity billing, and working principles of circuit protective devices and personal safety measures.
		CO5	Exhibit and debug a small projects.
BASICELECTRICALENGINEERINGLABORATORY	21ELE17	CO1	Design / Write the procedure with given specification.
		CO2	Conduct / Simulate the experiments with given specification.
		CO3	Tabulate and validate the readings and infer the results graphically.
		CO4	Interpret the concepts and results both orally and written.
BASIC ELECTRICAL ENGINEERING	21ELE23	CO1	Apply the basic laws in Electrical engineering to DC and AC electric circuits
		CO2	Explain the working principles of transformers and electrical machines
		CO3	Explain the concepts of electric power transmission and distribution of power.

		CO4	Understand the electricity billing, and working principles of circuit protective devices and personal safety measures.
		CO5	Exhibit and debug a small projects.
BASICELECTRICALENGINEERINGLABORATORY	21ELE27	CO1	Design / Write the procedure with given specification.
		CO2	Conduct / Simulate the experiments with given specification.
		CO3	Tabulate and validate the readings and infer the results graphically.
		CO4	Interpret the concepts and results both orally and written.
TRANSMISSION & DISTRIBUTION	21EE51	CO1	Apply the concepts of power system on overhead transmission line, insulators to determine the effect of different parameters on transmission line.
		CO2	Compute the various transmission line parameters and their effects on power system.
		CO3	Model different types of transmission lines and assess their performance.
		CO4	Illustrate the Concepts of UG cables and effects of corona on Transmission line
		CO5	Apply the concepts of distribution to determine reliability & quality
CONTROL SYSTEMS	21EE52	CO1	Model electrical and mechanical system using analogous and determine the performance characteristics of AC and DC servomotors
		CO2	Develop transfer functions using block diagram and signal flow graphs.
		CO3	Illustrate the performance of a given system, stability analysis using Routh-stability criteria
		CO4	Illustrate the performance of a given system, stability analysis using root locus, bode plots
		CO5	Analyse Lead, Lag and Lag Lead compensators for given specifications.
		CO6	Experiment the control systems with servomotors, time-domain analysis, bode and nyquist plots and analyse lead, lag and lag lead compensators.
POWER SYSTEM ANALYSIS-1	21EE53	CO1	Describe representation of power system in its equivalent circuit and in one line diagram, Define symmetrical and Unsymmetrical faults and system stability
		CO2	Understand per unit system, symmetrical components and classify the faults and its severity. Explain about power system stability and the dynamics of synchronous machine
		CO3	Use the tool of symmetrical components and per unit system for fault calculations and equal area criterion for

			stability calculation
		CO4	Analyze different faults in the power system and examine the stability conditions of the system
POWER ELECTRONICS LAB	21EEL55	CO1	List and describe various power semiconductor devices, power converters and its applications.
		CO2	Explain the characteristics of power semiconductor devices and operation of various power converters for different loads.
		CO3	Apply the concept of power electronic converters to control different loads and compute their performance parameters

2018 SCHEME COURSE OUTCOMES

Course Name	Course Code	CO. No.	Course Outcomes
ENGINEERING MATHEMATICS-III	18MAT31	CO1	Have the knowledge of Fourier series, Fourier transforms, Z-transforms, Calculus of variations, Numerical and statistical methods
		CO2	Solve Engineering problems using Fourier series and Fourier transforms Numerical and statistical methods and Calculus of Variation.
		CO3	Communicate and reflect on applications of Mathematics as tool.
ELECTRIC CIRCUIT ANALYSIS	18EE32	CO1	Apply the various circuit reduction techniques, network theorems, Laplace transform, transient behavior of circuit elements under switching conditions, and concept of series and parallel resonance ,3 phase unbalanced system, two port network to a given electrical network.
		CO2	Interpret the behavior of series and parallel resonant circuits, circuit elements under switching conditions, different network theorems and two port networks, Laplace transform for various time functions
		CO3	Identify the sources and networks, State different network theorems, Define Laplace transform for standard test inputs, active and reactive power and two port network parameters.
TRANSFORMERS AND GENERATORS	18EE33	CO1	Explain the construction, operation of single phase, three phase transformers and synchronous Generators.
		CO2	Describe and select various transformer connections
		CO3	Compute the circuit parameters of transformer, synchronous machine
		CO4	Analyse the performance of the transformers, DC

			generators and Syn. Generators
ANALOG ELECTRONIC CIRCUITS	18EE34	CO1	Design electronic circuits.
		CO2	Analyze electronic circuits based on diodes and transistors with special focus on amplifiers and oscillators.
		CO3	Solve problems on various applications of diodes and transistors.
		CO4	Understand construction, working and characteristics of diodes and different types of transistors.
DIGITAL SYSTEM DESIGN	18EE35	CO1	Understand the basic principles of Boolean algebra, Combinational, Sequential circuits and Hardware Description Language (HDL) Module.
		CO2	Apply the different techniques (Boolean algebra, K-Maps and Quine –Mc Clusky Methods and MEV/VEM) to minimize the Combinational and Sequential circuits.
		CO3	Analyze and evaluate different techniques to realize various Combinational and Sequential circuits.
		CO4	Design and develop Combinational and Sequential circuits by use of conventional methods and Hardware Description Language (HDL) module.
ELECTRICAL AND ELECTRONIC MEASUREMENTS	18EE36	CO1	Illustrate various electrical and electronic instruments used to measure, display and record the different electrical and magnetic parameters.
		CO2	Compare the different electrical and electronic measuring, display and recording instruments used in electrical and electronics.
		CO3	Solve numerical involved in measurement of respective electrical parameters.
		CO4	Analyze the errors in electrical instruments and specify respective minimization techniques.
ELECTRICAL MACHINES LABORATORY -1	18EEL37	CO1	Evaluate the performance of transformers from the test data obtained.
		CO2	Connect and operate two single phase transformers of different KVA rating in parallel.
		CO3	Connect single phase transformers for three phase operation and phase conversion.
		CO4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
ELECTRONICS LABORATORY	18EEL38	CO1	Design and test different diode circuits.
		CO2	Design and test amplifier and oscillator circuits and analyze their performance.
		CO3	Use universal gates and ICs for code conversion and arithmetic operations.
		CO4	Apply the knowledge of counters and sequence generators

ENGINEERING MATHEMATICS-IV	18MAT41	CO1	Identify the numerical techniques to solve the problems, special functions, complex variables, probability, sampling theory and stochastic process.
		CO2	Compute the solutions using numerical techniques, special functions, complex variables, probability, sampling theory and stochastic process.
		CO3	Interpret the solutions using numerical techniques, special functions, complex variables, probability, sampling theory and stochastic process.
POWER GENERATION AND ECONOMICS	18EE42	CO1	Describe the general layout/arrangement, advantages/Disadvantages, working of major equipment and auxiliaries used in conventional power plants and substations.
		CO2	Classify substations and explain the importance of grounding.
		CO3	Sketch Hydrograph, load curve, load duration curve, flow duration curve, mass curve for hydro power plant and Bus bar arrangement schemes in Substations.
		CO4	Analyze the economic features of Conventional power plants.
TRANSMISSION AND DISTRIBUTION	18EE43	CO1	Analyze the performance of transmission line with the effect of sag, wind, ice & different parameters.
		CO2	Develop the mathematical models of different types of transmission lines and assess their performance.
		CO3	Discuss/Describe reliability & quality of distribution systems, advantages of different transmission & distribution system & types of conductors & supporting structures.
		CO4	Describe the various parameters of transmission system, selection of insulators, importance of sag corona & lightening, types of distribution systems & grading.
ELECTRIC MOTORS	18EE44	CO1	Analyze the performance of AC and DC motors
		CO2	Employ the most suitable method of starting and speed control for AC and DC motors and to solve problems on AC and DC motors.
		CO3	Explain the performance characteristics of AC and DC motors for different modes of operation.
		CO4	
ELECTROMAGNETIC FIELD THEORY	18EE45	CO1	Apply the concepts of vectors and its operation in solving problems associated with static, steady and time varying fields.
		CO2	Apply the laws of Electrostatics, Magnetostatics and Electromagnetics in developing Maxwell's equations for static and time varying fields.
		CO3	Analyze the performance of electromagnetic fields and waves using Maxwell's equation in different media and

			also at the boundaries.
		CO4	Develop the relationship between electric and magnetic fields under steady conditions
LINEAR ICS AND APPLICATIONS	18EE46	CO1	Design and develop models using linear integrated circuits for a given specification.
		CO2	Analyze the working of different applications of op-amps.
		CO3	Solve problems related to op-amps, timers, voltage regulators and PLL.
		CO4	Understand the basics of linear integrated circuits (op-amps, timers, voltage regulators and PLL)
ELECTRICAL MACHINES LABORATORY	18EEL47	CO1	Test DC machines to determine their characteristics and also to control the speed of DC motor
		CO2	Pre-determine the performance characteristics of DC machines by conducting suitable tests.
		CO3	Perform load test on single phase and three phase induction motor to assess its performance.
		CO4	Conduct test on induction motor and on a synchronous motor to pre-determine the performance characteristics.
LINEAR ICS AND APPLICATIONS LABORATORY	18EEL48	CO1	Design and build various linear integrated circuits.
		CO2	Troubleshoot and test various linear integrated circuits.
		CO3	Apply the concepts of electronics of electronic components in designing and building various linear integrated circuits.
MANAGEMENT AND ENTREPRENEURSHIP	18EE51	CO1	Understand the fundamental concepts of Management and Entrepreneurship .Describe the functions of Managers,Entrepreneurs and their social responsibilites.
		CO2	Select a best Entrepreneurship model for the required domain of establishment.
		CO3	Describe the functions of Managers,Entrepreneurs and their social responsibilites.
		CO4	Compare various types of Entrepreneurs and analyse the instituitional support by various state and central government agencies.
MICROCONTROLLER	18EE52	CO1	Describe the internal organization, instruction set, data types and addressing modes of 8051.
		CO2	Develop assembly and embedded C programs for applications of 8051 Microcontrollers.
		CO3	Analyze and design circuitry to interface peripherals devices with 8051.
		CO4	Work as an individual or as a team –member to design and implement projects on real time embedded system applications using microcontroller
POWER ELECTRONIC	18EE53	CO1	Describe the Power devices, Power electronics circuits with their characteristics and effects.

S		CO2	Compute the performance parameters of different power converters and power devices for given data.
		CO3	Analyze the behavior of power devices and power converters for different load condition.
		CO4	Design the triggering and protection circuits for power Converters and devices.
SIGNALS AND SYSTEMS	18EE54	CO1	Apply the knowledge of mathematics and engineering to analyze and obtain the response of continuous and discrete system.
		CO2	Analyze LTI system and their properties using impulse response.
		CO3	Apply various transformation techniques to solve difference and differential equations and sketch the block diagram..
		CO4	Analyze continuous time and discrete signals and systems in frequency domain using Fourier analysis tools like CTFS, CTFT, DTFS and DTFT.
ELECTRICAL MACHINE DESIGN	18EE55	CO1	Explain the factors to be considered in selecting the materials for design of various parts of electrical machines
		CO2	Examine various performance indices of the AC and DC machines as per standards.
		CO3	Design of AC and DC machines for given specification
		CO4	Desin overall dimensions of AC and DC machines based on specific loadings
HIGH VOLTAGE ENGINEERING	18EE56	CO1	Evaluation of dielectric performance of high voltage equipment's, PD, RI and corona as per Standards.
		CO2	Analyze the circuits of AC, DC and transient voltage and currents, Generation and Measurements.
		CO3	Applying knowledge of dielectric property for insulation coordination of lines and power Equipment's.
		CO4	Describe the dielectric properties of solid, liquid and gaseous insulating material, causes of overvoltages, corona and their remedial measures.
MICROCONTROLLER LABORATORY	18EEL57	CO1	Write the assembly language programs for data transfer, arithmetic, Boolean and logical instructions, code conversions. generation of delays, counters, configuration of SFRs for serial communication timers and interfacing.
		CO2	Conduct the experiments for data transfer, arithmetic, Boolean and logical instructions, code conversions. generation of delays, counters, configuration of SFRs for serial communication timers and interfacing.
		CO3	Tabulate and validate the readings and infer the results.
		CO4	Interpret the concepts and results both orally and written.

POWER ELECTRONICS LABORATORY	18EEL58	CO1	List and describe various power semiconductor devices, power converters and its applications.
		CO2	Explain the characteristics of power semiconductor devices and operation of various power converters for different loads.
		CO3	Apply the concept of power electronic converters to control different loads and compute their performance parameters
		CO4	
CONTROL SYSTEMS	18EE61	CO1	Develop mathematical models , transfer functions of open loop and closed loop systems.
		CO2	Analyze time response and frequency response of a control system.
		CO3	Determine the stability of a system in the time and frequency domain using different techniques.
		CO4	Design Controller for a given specification.
POWER SYSTEM ANALYSIS – 1	18EE62	CO1	Describe representation of power system in its equivalent circuit and in one line diagram, Define symmetrical and Unsymmetrical faults and system stability
		CO2	Understand per unit system, symmetrical components and classify the faults and its severity. Explain about power system stability and the dynamics of synchronous machine
		CO3	Use the tool of symmetrical components and per unit system for fault calculations and equal area criterion for stability calculation
		CO4	Analyze different faults in the power system and examine the stability conditions of the system
DIGITAL SIGNAL PROCESSING	18EE63	CO1	Evaluate the DFT of various signals using its properties and linear filtering of two sequences.
		CO2	Apply fast and efficient algorithms for computing DFT and inverse DFT of a given sequence.
		CO3	Design digital IIR filters by using different transformation techniques.
		CO4	Design digital FIR filters using different sampling techniques.
		CO5	Model digital filters using different realization methods
EMBEDDED SYSTEM	18EE644	CO1	Describe different types of Embedded Systems, components and skills required for embedded systems design.
		CO2	Explain the Interfacing of analog, digital converters, Serial, Parallel port I/O devices and Memory devices to Microcontroller and System on Chip (SOC).
		CO3	Apply software aspects and programming concepts to

			the design of Embedded System.
		CO4	Illustrate different issues, tradeoffs, technologies and challenges in embedded system design.
		CO5	Explain the Signal conditioning and data acquisition system in embedded System design.
CONTROL SYSTEM LABORATORY	18EEL66	CO1	Rig up/Design/simulate the circuit diagram based on the specifications given for different types controllers , compensators , ac and dc servomotors and synchro-transmitter receiver pair
		CO2	Conduct the experiments for different types controllers, compensators, ac and dc servomotors and synchro-transmitter receiver pair
		CO3	Tabulate and Infer the results graphically/Mathematically
		CO4	Interpret the concepts and results.
POWER SYSTEM ANALYSIS – 2	18EE71	CO1	Implement network matrices and model for solving load flow problems[Application]
		CO2	Analyze steady state power flow analysis of power system using numerical techniques [Analysis]
		CO3	Examine optimal scheduling, unit commitment and stability in power system [Analysis]
		CO4	Apply algorithms and numerical solutions for symmetrical fault and stability studies respectively [Application]
POWER SYSTEM PROTECTION	18EE72	CO1	Identify the need for protection in power system; list the types of faults, protective relays, circuit breakers and fuses.
		CO2	Explain different types of relays, circuit breakers and protection schemes for transmission lines and electrical machines.
		CO3	Apply the characteristics of different protective schemes to solve problems
		CO4	Compare and distinguish between various types of relay of relays, circuit breakers and fuses
MICRO AND NANO SCALE SENSORS AND TRANSDUCERS	18EE732	CO1	Understand the operating principle and structure of different micro and nano sensors and transducers
		CO2	Apply the knowledge of micro and nano sensors and transducers to measure different parameters
		CO3	Analyze the experimental results of different micro and nano sensors and transducers.
INTEGRATED OF DISTRIBUTION	18EE733	CO1	Identify the suitable distributed generation for integration in distribution system
		CO2	Analyze the effects of integration of distributed generation on the performance the power system.

GENERATION .		CO3	Examine the effect of overloading, losses and voltage magnitude variations on power system
		CO4	Analyze the power quality disturbances introduced as a result of distributed generation integration
REACTIVE POWER CONTROL IN ELECTRIC POWER SYSTEMS	18EE735	CO1	Analyse load compensation and steady state reactive power in compensated and uncompensated power system network[Analysis]
		CO2	Implement various compensation schemes in transmission lines[Application]
		CO3	Application of Capacitors for reactive power compensation[Application]
		CO4	Construct model for reactive power coordination and effects of harmonics on electrical equipment[Application]
UTILIZATION OF ELECTRICAL POWER	18EE742	CO1	Describe the various processes involved in electric heating, welding, electrolysis, air-conditioning, illumination, traction and electric vehicles.
		CO2	Distinguish the different techniques in heating, welding, electrolysis, illumination, traction and interpret the advantages of electric vehicles
		CO3	Solve various numerical problems related to heating, welding, electrolysis, illumination and electric traction.
SMART GRID	18EE744	CO1	Explain the concept of smart enables the Electric Net, Efficient Electric end Use technology Alternatives and need of Smart Grid.
		CO2	Outline the benefit and drivers of DC Power delivery system.
		CO3	Summarize the Intelligrid Architecture for the smart grid.
		CO4	Discuss Demand side planning and Evaluation.
PSS LABORATORY	18EEL76	CO1	Write a program to Calculate different parameters of transmission lines, synchronous Machines, power system network using MatLAB/SciLAb/Octave/MiPower.
		CO2	Simulate load flow, short circuit and load dispatch studies using MiPower.
		CO3	Tabulate and validate theoretical and practical values under different consequences /scenarios
		CO4	Interpret the results obtained in performance of transmission lines, synchronous machines, load flow, short circuit and economic dispatch studies
RELAY & HV LAB	18EEL77	CO1	Write the circuit diagram based on the specifications given for different types of relays ,spark over characteristics of air and liquid dielectric medium, capacitance of parallel plate capacitor and co-axial cable
		CO2	Conduct the experiments for different types of relays,

			spark over characteristics of different dielectric medium and capacitance of parallel plate capacitor and co-axial cable
		CO3	Tabulate and validate the readings and infer the results graphically.
		CO4	Interpret the concepts and results both orally and written.
POWER SYSTEM OPERATION AND CONTROL	18EE81	CO1	Illustrate the concepts of AGC, LFC, stability and SCADA system for power system operation and control.
		CO2	Analyze optimal solutions for AGC, LFC, voltage and reactive power control in different power system problems.
		CO3	Apply the concepts of monitoring, operation, control, contingency, state estimation and security of power system.
		CO4	Model LFC, AGC and AVR for single and two area power systems.
FACTS AND HVDC TRANSMISSION	18EE821	CO1	To apply various types of FACTs controllers to control power flow and stability in transmission systems
		CO2	To analyze different series and shunt FACTs controllers in providing compensation for power system network.
		CO3	To examine the converter control and technology for Benefit of HVDC systems
ELECTRICAL ESTIMATION AND COSTING	18EE822	CO1	Explain estimating, costing and tender process.
		CO2	Apply the technical knowledge in estimating the quantity of materials required for domestic and industrial electrification process
		CO3	Design the circuits and sub circuits required for electrifying the commercial and power installation.
		CO4	Design and estimate the transmission lines and substation.
POWER SYSTEM PLANNING	18EE824	CO1	Illustrate the need for power generation, transmission and distribution planning.
		CO2	Interpret the principles and practices involved in generation expansion, transmission and distribution planning.
		CO3	Analyse the planning tools, techniques and technologies involved in power system planning.
		CO4	Assess the economic and reliability implications in power system planning.