**SRI SAIRAM**
**COLLEGE OF ENGINEERING**
Anekal, Bengaluru

Accredited by NAAC
ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi
Affiliated to Visvesvaraya Technological University
www.sairamce.edu.in

## DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

## 2017 SCHEME COURSE OUTCOME

| COURSE CODE | COURSE NAME | CO NUMBER | CO's |
|---|---|---|---|
| 17MAT31 | Engineering Mathematics III | C231.1 | Know the use of periodic signals and Fourier series to analyze circuits and system communication. |
| | | C231.2 | Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier transforms and Z-transform. |
| | | C231.3 | Employ appropriate Numerical methods to solve algebraic and transcendental equations. |
| | | C231.4 | Apply Greens theorem, Divergence theorem and Stokes theorem in various applications in the field of elector-magnetic and gravitational fields and fluid flow problems. |
| | | C231.5 | Determine the externals of functionals and solve the simple problems of the calculus of variations. |
| 17EE32 | ELECTRIC CIRCUIT ANALYSIS | C232.1 | Understand the basic concepts, basic laws and methods of analysis of DC and AC networks and reduce the complexity of network using source shifting, source transformation and network reduction using transformations. |
| | | C232.2 | Solve complex electric circuits using network theorems. |
| | | C232.3 | Discuss resonance in series and parallel circuits and also the importance of initial conditions and their evaluation. |
| | | C232.4 | Synthesize typical waveforms using Laplace transformation. |
| | | C232.5 | Solve unbalanced three phase systems and also evaluate the performance of two port networks. |
| 17EE33 | TRANSFORMERS AND GENERATORS | C233.1 | Understand the construction and operation of 1-phase, 3-Phase transformers and Autotransformer. |
| | | C233.2 | Analyze the performance of transformers by polarity test, Sumpner's Test, phase conversion, |

| | | | |
|---|---|---|---|
| | | | 3- phase connection, and parallel operation. |
| | | C233.3 | Understand the construction and working of AC and DC Generators. |
| | | C233.4 | Analyze the performance of the AC Generators on infinite bus and parallel operation. |
| | | C233.5 | Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPF Methods |
| 17EE34 | ANALOG ELECTRONIC CIRCUITS | C234.1 | Obtain the output characteristics of clipper and clamper circuits. |
| | | C234.2 | Design and compare biasing circuits for transistor amplifiers & explain the transistor switching. |
| | | C234.3 | Explain the concept of feedback, its types and design of feedback circuits |
| | | C234.4 | Design and analyze the power amplifier circuits and oscillators for different frequencies. |
| | | C234.5 | Design and analysis of FET and MOSFET amplifiers. |
| 17EE35 | DIGITAL SYSTEM DESIGN | C235.1 | Develop simplified switching equation using Karnaugh Maps and Quine McClusky techniques. |
| | | C235.2 | Design Multiplexer, Encoder, Decoder, Adder, Subtractors and Comparator as digital combinational control circuits. |
| | | C235.3 | Design flip flops, counters, shift registers as sequential control circuits. |
| | | C235.4 | Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits. |
| | | C235.5 | Explain the functioning of Read only and Read/Write Memories, Programmable ROM, EPROM and Flash memory. |
| 17EE36 | ELECTRICAL AND ELECTRONICMEASUREMENTS | C236.1 | Measure resistance, inductance and capacitance using bridges and determine earth resistance. |
| | | C236.2 | Explain the working of various meters used for measurement of Power, Energy & understand the adjustments, calibration & errors in energy meters. |
| | | C236.3 | Understand methods of extending the range of instruments & instrument transformers. |
| | | C236.4 | Explain the working of different electronic instruments. |
| | | C236.5 | Explain the working of different display and recording devices. |
| 17EEL37 | ELECTRICALMACHINES LABORATORY - 1 | C237.1 | Evaluate the performance of transformers from the test data obtained. |
| | | C237.2 | Connect and operate two single phase transformers of different KVA rating in parallel. |
| | | C237.3 | Connect single phase transformers for three phase operation and phase conversion. |
| | | C237.4 | Compute the voltage regulation of synchronous |

| | | | |
|---|---|---|---|
| | | | generator using the test data obtained in the laboratory. |
| | | C237.5 | Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus. |
| 17EEL38 | ELECTRONICS LABORATORY | C238.1 | Design and test rectifier circuits with and without capacitor filters. |
| | | C238.2 | Determine h-parameter models of transistor for all modes. |
| | | C238.3 | Design and test BJT and FET amplifier and oscillator circuits. |
| | | C238.4 | Realize Boolean expressions, adders and subtractors using gates. |
| | | C238.5 | Design and test Ring counter/Johnson counter, Sequence generator and 3 bit counters. |
| 17MAT41 | Engineering Mathematics IV | C241.1 | Solve first order ordinary differential equation arising in flow problems using single step and multi step numerical methods. |
| | | C241.2 | Solve second order ordinary differential equation arising in flow problems using single step numerical methods and Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials |
| | | C241.3 | Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing |
| | | C241.4 | Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering |
| | | C241.5 | Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process. |
| 17EE42 | POWER GENERATION AND ECONOMICS | C242.1 | Describe the working of hydroelectric, steam, nuclear power plants and state functions of major equipment of the power plants. |
| | | C242.2 | Classify various substations and explain₃ the functions of major equipments in substations. |
| | | C242.3 | Explain the types of grounding and its importance. |

| | | | |
|---|---|---|---|
| | | C242.4 | Infer the economic aspects of power system operation and its effects. |
| | | C242.5 | Explain the importance of power factor improvement. |
| 17EE43 | TRANSMISSION AND DISTRIBUTION | C243.1 | Explain transmission and distribution scheme, identify the importance of different transmission systems and types of insulators. |
| | | C243.2 | Analyze and compute the parameters of the transmission line for different configurations. |
| | | C243.3 | Assess the performance of overhead lines. |
| | | C243.4 | Interpret corona, explain the use of underground cables. |
| | | C243.5 | Classify different types of distribution systems; examine its quality & reliability. |
| 17EE44 | ELECTRIC MOTORS | C244.1 | Explain the construction, operation and classification of DC Motor, AC motor and Special purpose motors. |
| | | C244.2 | Describe the performance characteristics & applications of Electric motors. |
| | | C244.3 | Demonstrate and explain the methods of testing of DC machines and determine losses and efficiency. |
| | | C244.4 | Control the speed of DC motor and induction motor. |
| | | C244.5 | Explain the starting methods, equivalent circuit and phasor diagrams, torque angle, effect of change in excitation and change in load, hunting and damping of synchronous motors. |
| 17EE45 | ELECTROMAGNETIC FIELD THEORY | C245.1 | Use different coordinate systems , Coulomb's Law and Gauss Law for the evaluation of electric fields produced by different charge configurations. |
| | | C245.2 | Calculate the energy and potential due to a system of charges & Explain the behavior of electric field across a boundary conditions. |
| | | C245.3 | Explain the Poisson's, Laplace equations and behavior of steady magnetic fields. |
| | | C245.4 | Explain the behavior of magnetic fields and magnetic materials. |
| | | C245.5 | Asses time varying fields and propagation of waves in different media. |
| 17EE46 | OPERATIONAL AMPLIFIERS AND LINEAR Ics | C246.1 | Describe the characteristics of ideal and practical operational amplifier. |
| | | C246.2 | Design filters and signal generators using linear ICs. |
| | | C246.3 | Demonstrate the application of Linear ICs as comparators and rectifiers. |
| | | C246.4 | Analyze voltage regulators for given specification using op-amp and IC voltage regulators. |
| | | C246.5 | Summarize the basics of PLL and Timer. |
| 17EEL47 | ELECTRICAL MACHINES LABORATORY - 2 | C247.1 | Test DC machines to determine their characteristics and also to control the speed of DC motor. |
| | | C247.2 | Pre-determine the performance characteristics of |

| | | | |
|---|---|---|---|
| | | | DC machines by conducting suitable tests. |
| | | C247.3 | Perform load test on single phase and three phase induction motor to assess its performance. |
| | | C247.4 | Conduct test on induction motor to pre-determine the performance characteristics. |
| | | C247.5 | Conduct test on synchronous motor to draw the performance curves. |
| 17EEL48 | OP- AMP AND LINEAR ICS LABORATORY | C248.1 | To conduct experiment to determine the characteristic parameters of OP-Amp |
| | | C248.2 | To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator. |
| | | C248.3 | To design test the OP-Amp as oscillators and filters. |
| | | C248.4 | Design and study of Linear IC's as multivibrator power supplies. |
| | | C248.5 | To design test the OP-Amp as ADC, DAC and Voltage Regulators |
| 17EE51 | MANAGEMENT AND ENTREPRENEURSHIP | C351.1 | Explain the field of management, task of the manager, planning and steps in decision making. |
| | | C351.2 | Discuss the structure of organization, importance of staffing, leadership styles, modes of communication, techniques of coordination and importance of managerial control in business. |
| | | C351.3 | Explain the concepts of entrepreneurship and a businessman's social responsibilities towards different groups. |
| | | C351.4 | Show an understanding of role of SSI's in the development of country and state/central level institutions/agencies supporting business enterprises. |
| | | C351.5 | Discuss the concepts of project management, capital budgeting, project feasibility studies, need for project report and new control techniques. |
| 17EE52 | MICROCONTROLLER | C352.1 | Outline the 8051 architecture, registers, internal memory organization, addressing modes. |
| | | C352.2 | Discuss 8051 addressing modes, instruction set of 8051, accessing data and I/O port programming. |
| | | C352.3 | Develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic and arithmetic operations, data conversion and timer/counter programming. |
| | | C352.4 | Summarize the basics of serial communication and interrupts, also develop 8051 programs for serial data communication and interrupt programming. |
| | | C352.5 | Program 8051 to work with external devices for ADC, DAC, Stepper motor control, DC motor control, Elevator control |
| 17EE53 | POWER ELECTRONICS | C353.1 | To give an overview of applications power electronics, different types of power semiconductor devices, their switching characteristics, power diode characteristics, types, their operation and the effects of power diodes on RL circuits. |
| | | C353.2 | To explain the techniques for design and analysis of |

![Sri Sairam College of Engineering logo]

**Sri SAIRAM**
**COLLEGE OF ENGINEERING**
Anekal, Bengaluru

Accredited by NAAC
ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi
Affiliated to Visvesvaraya Technological University
www.sairamce.edu.in

## DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

| | | | |
|---|---|---|---|
| | | | single phase diode rectifier circuits. |
| | | C353.3 | To explain different power transistors, their steady state and switching characteristics and limitations. |
| | | C353.4 | To explain different types of Thyristors, their gate characteristics and gate control requirements. |
| | | C353.5 | To explain the design, analysis techniques, performance parameters and characteristics of controlled rectifiers, DC- DC, DC -AC converters and Voltage controllers. |
| 17EE54 | SIGNALS AND SYSTEMS | C354.1 | Explain the generation of signals, behavior of system and the basic operations that can be performed on signals and properties of systems. |
| | | C354.2 | Apply convolution in both continuous and discrete domain for the analysis of systems given impulse response of a system. |
| | | C354.3 | Solve the continuous time and discrete time systems by various methods and their representation by block diagram. |
| | | C354.4 | Perform Fourier analysis for continuous and discrete time, linear time invariant systems. |
| | | C354.5 | Apply Z-transform and properties of Z transform for the analysis of discrete time systems. |
| 17EE553 | ESTIMATING & COSTING | C3553.1 | Explain the purpose of estimation and costing and Discuss market survey, estimates, purchase enquiries, preparation of tenders, comparative statements and payment of bills. |
| | | C3553.2 | Discuss Indian Electricity act and Indian Electricity rules and Discuss the distribution of energy in a building, wiring and methods of wiring, cables used in internal wiring, wiring accessories and fittings, fuses and types of fuses. |
| | | C3553.3 | Discuss design of lighting points and its number, total load, sub-circuits, size of conductor. |
| | | C3553.4 | Discuss types of service mainsand estimation of service mains and power circuits. Discuss estimation of overhead transmission and distribution system and its components. |
| | | C3553.5 | Discuss main components of a substation, preparation of single line diagram of a substation and earthing of a substation. |
| 17EE562 | PROGRAMMABLE LOGIC CONTROLLERS | C3562.1 | Discuss history of PLC, its sequence of operation, advantages and disadvantages, main parts and their functions. Describe the hardware components of PLC: I/O modules, |

6

| | | | |
|---|---|---|---|
| | | | CPU, memory devices, other support devices, operating modes and PLC programming. |
| | | C3562.2 | Describe field devices Relays, Contactors, Motor Starters, Switches, Sensors, Output Control Devices, Seal-In Circuits, and Latching Relays commonly used with I/O module. |
| | | C3562.3 | Convert relay schematics and narrative descriptions into PLC ladder logic programs and Analyze PLC timer and counter ladder logic programs. |
| | | C3562.4 | Describe the operation of different program control instructions and Discuss the execution of data transfer instructions, data compare instructions and the basic operation of PLC closed-loop control system. |
| | | C3562.5 | Describe the operation of mechanical sequencers, bit and word shift registers, processes and structure of control systems and communication between the processes. |
| 17EEL57 | MICROCONTROLLER LABORATORY | C357.1 | Write assembly language programs for data transfer, arithmetic, Boolean and logical instructions and code conversions. |
| | | C357.2 | Write ALP using subroutines for generation of delays, counters, configuration of SFRs for serial communication and timers. |
| | | C357.3 | Perform interfacing of stepper motor and dc motor for controlling the speed, elevator, LCD, external ADC and temperature control. |
| | | C357.4 | Generate different waveforms using DAC interface. |
| | | C357.5 | Work with a small team to carryout experiments using microcontroller concepts and prepare reports that present lab work. |
| 17EEL58 | POWER ELECTRONICS LABORATORY | C358.1 | Obtain static characteristics of semiconductor devices to discuss their performance. |
| | | C358.2 | Trigger the SCR by different methods |
| | | C358.3 | Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads. |
| | | C358.4 | Control the speed of a DC motor, universal motor and stepper motors. |
| | | C358.5 | Verify the performance of single phase full bridge inverter connected to resistive load. |
| 17EE61 | CONTROL SYSTEMS | C361.1 | Analyze and model electrical and mechanical system using analogous. |
| | | C361.2 | Formulate transfer functions using block diagram and signal flow graphs. |
| | | C361.3 | Analyze the stability of control system, ability to |

| | | | |
|---|---|---|---|
| | | | determine transient and steady state time response. |
| | | C361.4 | Illustrate the performance of a given system in time and frequency domains, stability analysis using Root locus and Bode plots. |
| | | C361.5 | Discuss stability analysis using Nyquist plots, Design controller and compensator for a given specification. |
| 17EE62 | POWER SYSTEM ANALYSIS – 1 | C362.1 | Model the power system components & construct per unit impedance diagram of power system. |
| | | C362.2 | Analyze three phase symmetrical faults on power system. |
| | | C362.3 | Compute unbalanced phasors in terms of sequence components and vice versa, also develop sequence networks. |
| | | C362.4 | Analyze various unsymmetrical faults on power system. |
| | | C362.5 | Examine dynamics of synchronous machine and determine the power system stability. |
| 17EE63 | DIGITAL SIGNAL PROCESSING | C363.1 | Apply DFT and IDFT to perform linear filtering techniques on given sequences to determine the output. |
| | | C363.2 | Apply fast and efficient algorithms for computing DFT and inverse DFT of a given sequence |
| | | C363.3 | Design and realize infinite impulse response Butterworth and Chebyshev digital filters using impulse invariant and bilinear transformation techniques. |
| | | C363.4 | Develop a digital IIR filter by direct, cascade, parallel, ladder and FIR filter by direct, cascade and linear phase methods of realization. |
| | | C363.5 | Design and realize FIR filters by use of window function and frequency sampling method. |
| 17EE64 | ELECTRICAL MACHINE DESIGN | C364.1 | Identify and list, limitations, modern trends in design, manufacturing of electrical machines and properties of materials used in the electrical machines. |
| | | C364.2 | Derive the output equation of DC machine, discuss selection of specific loadings and magnetic circuits of DC machines, design the field windings of DC machine, and design stator and rotor circuits of a DC machine. |
| | | C364.3 | Derive the output equations of transformer, discuss selection of specific loadings, estimate the number of cooling tubes, no load current and leakage reactance of core type transformer. |
| | | C364.4 | Develop the output equation of induction motor, discuss selection of specific loadings and magnetic circuits of induction motor, |

8

![Sri Sairam College of Engineering logo]

**Sri**
**SAIRAM**
**COLLEGE OF ENGINEERING**
Anekal, Bengaluru

Accredited by NAAC
ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi
Affiliated to Visvesvaraya Technological University
www.sairamce.edu.in

## DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

| | | | |
|---|---|---|---|
| | | | design stator and rotor circuits of a induction motor. |
| | | C364.5 | Formulate the output equation of alternator, design the field windings of Synchronous machine, discuss short circuit ratio and its effects on performance of synchronous machines, design salient pole and non-salient pole alternators for given specifications. |
| 17EE651 | COMPUTER AIDED ELECTRICAL DRAWING | C3651.1 | Develop armature winding diagram for DC and AC machines |
| | | C3651.2 | Develop a Single Line Diagram of Generating Stations and substation using the standard symbols. |
| | | C3651.3 | Construct sectional views of core and shell types transformers using the design data |
| | | C3651.4 | Construct sectional views of assembled DC and AC machine and their parts using the design data or the sketches |
| | | C3651.5 | Construct sectional views of assembled AC machine and their parts using the design data or the sketches |
| 17EE662 | SENSORS AND TRANSDUCERS | C3662.1 | Discuss need of transducers, their classification, advantages and disadvantages. Show an understanding of working of various transducers and sensors. |
| | | C3662.2 | Discuss recent trends in sensor technology and their selection. |
| | | C3662.3 | Discuss basics of signal conditioning and signal conditioning equipment and discuss configuration of Data Acquisition System and data conversion. |
| | | C3662.4 | Show knowledge of data transmission and telemetry. |
| | | C3662.5 | Explain measurement of non-electrical quantities -temperature, flow, speed, force, torque, power and viscosity. |
| 17EEL67 | CONTROL SYSTEM LABORATORY | C367.1 | Utilize software package and discrete components in assessing the time and frequency domain response of a given second order system. |
| | | C367.2 | Design, analyze and simulate Lead, Lag and Lag – Lead compensators for given specifications. |

9

| | | | |
|---|---|---|---|
| | | C367.3 | Determine the performance characteristics of ac and DC servomotors and synchro-transmitter receiver pair used in control systems. |
| | | C367.4 | 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. |
| | | C367.5 | Develop a script files to plot Root locus, Bode plot and Nyquist plot to study the stability of Control system |
| 17EEL68 | DIGITAL SIGNAL PROCESSING LABORATORY | C368.1 | Explain physical interpretation of sampling theorem in time and frequency domains. |
| | | C368.2 | Evaluate the impulse response of a system. |
| | | C368.3 | Perform convolution of given sequences to evaluate the response of a system. |
| | | C368.4 | Compute DFT and IDFT of a given sequence using the basic definition and/or fast methods. Provide a solution for a given difference equation. |
| | | C368.5 | Design and implement IIR and FIR filters. |
| 17EE71 | POWER SYSTEM ANALYSIS – 2 | C471.1 | Formulate network matrices and models for solving load flow problems. |
| | | C471.2 | Perform steady state power flow analysis of power systems using numerical iterative techniques. |
| | | C471.3 | Solve issues of economic load dispatch and unit commitment problems. |
| | | C471.4 | Analyze short circuit faults in power system networks using bus impedance matrix. |
| | | C471.5 | Apply Point by Point method and Runge Kutta Method to solve Swing Equation. |
| 17EE72 | POWER SYSTEM PROTECTION | C472.1 | Discuss performance of protective relays, components of protection scheme and relay terminology over current protection. |
| | | C472.2 | Explain the working of distance relays and the effects of arc resistance, power swings, line length and source impedance on performance of distance relays. |
| | | C472.3 | Discuss pilot protection, construction, operating principles and performance of differential relays and discuss protection of generators, motors, transformer and Bus Zone Protection. |
| | | C472.4 | Explain the construction and operation of different types of circuit breakers. |
| | | C472.5 | Outline features of fuse, causes of overvoltages and its protection, also modern trends in Power System Protection. |

**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

| | | | |
|---|---|---|---|
| 17EE73 | HIGH VOLTAGE ENGINEERING | C473.1 | Explain conduction and breakdown phenomenon in gases, liquid dielectrics and Explain breakdown phenomenon in solid dielectrics |
| | | C473.2 | Explain generation of high voltages and currents |
| | | C473.3 | Discuss measurement techniques for high voltages and currents |
| | | C473.4 | Discuss overvoltage phenomenon and insulation coordination in electric power systems |
| | | C473.5 | Discuss non-destructive testing of materials and electric apparatus andhigh-voltage testing of electric apparatus |
| 17EE741 | ADVANCED CONTROL SYSTEMS | C4741.1 | Discuss state variable approach for linear time invariant systems in both the continuous and discrete time systems. Develop of state models for linear continuous – time and discrete – time systems. |
| | | C4741.2 | Apply vector and matrix algebra to find the solution of state equations for linear continuous – time and discrete – time systems. Define controllability and observability of a system and test for controllability and observability of a given system. |
| | | C4741.3 | Design pole assignment and state observer using state feedback. |
| | | C4741.4 | Develop the describing function for the nonlinearity present to assess the stability of the system. |
| | | C4741.5 | Develop Lyapunov function for the stability analysis of nonlinear systems. |
| 17EE751 | FACTS & HVDC Transmission | C4751.1 | Discuss transmission interconnections, flow of Power in an AC System, limits of the loading capability, dynamic stability considerations of a transmission interconnection and controllable parameters. |
| | | C4751.2 | Explain the basic concepts, definitions of flexible ac transmission systems and benefits from FACTS technology. Describe shunt controllers, Static Var Compensator and Static Compensator for injecting reactive power in the transmission system in enhancing the controllability and power transfer capability. |
| | | C4751.3 | Describe series Controllers Thyristor-Controlled Series Capacitor (TCSC) and the |

11

| | | | |
|---|---|---|---|
| | | | Static Synchronous Series Compensator (SSSC) for control of the transmission line current. |
| | | C4751.4 | Explain advantages of HVDC power transmission, overview and organization of HVDC system. |
| | | C4751.5 | Describe the basic components of a converter, the methods for compensating the reactive power demanded by the converter. Explain converter control for HVDC systems, commutation failure, control |
| 17EEL76 | POWER SYSTEM SIMULATION LABORATORY | C476.1 | Develop a program in suitable package to assess the performance of medium and long transmission lines. |
| | | C476.2 | Develop a program in suitable package to obtain the power angle characteristics of salient and non-salient pole alternator. |
| | | C476.3 | Develop a program in suitable package to assess the transient stability under three phase fault at different locations in a of radial power systems. |
| | | C476.4 | Develop programs in suitable package to formulate bus admittance and bus impedance matrices of interconnected power systems. |
| | | C476.5 | Use suitable package to solve power flow problem for simple power systems, to study unsymmetrical faults at different locations in radial power systems and to study optimal generation scheduling problems for thermal power plants. |
| 17EEL77 | RELAY AND HIGH VOLTAGE LABORATORY | C477.1 | Verify the characteristics of over current, over voltage, under voltage and negative sequence relay both electromagnetic and static type. |
| | | C477.2 | Verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay. |
| | | C477.3 | Show knowledge of protecting generator, motor and feeders. Analyze the spark over characteristics for both uniform and non-uniform configurations using High AC and DC voltages |
| | | C477.4 | Measure high AC and DC voltages and breakdown strength of transformer oil. |
| | | C477.5 | Draw electric field and measure the capacitance of different electrode configuration models. Show knowledge of generating standard lightning impulse voltage to determine efficiency, energy of impulse generator and 50% probability flashover voltage for air insulation. |
| 17EE78 | PROJECT PHASE – I | C478.1 | Demonstrate a sound technical knowledge of their selected project topic. |
| | | C478.2 | Undertake problem identification, formulation and solution. |
| | | C478.3 | Design engineering solutions to complex problems |

![Sri Sairam College of Engineering logo]

**Sri SAIRAM**
**COLLEGE OF ENGINEERING**
Anekal, Bengaluru

Accredited by NAAC
ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi
Affiliated to Visvesvaraya Technological University
www.sairamce.edu.in

**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

| | | | |
|---|---|---|---|
| | | | utilizing a systems approach. |
| | | C478.4 | Communicate with engineers and the community at large in written an oral forms. |
| | | C478.5 | Develop interactive, communication, organization, time management, and presentation skills. |
| 17EE81 | POWER SYSTEM OPERATION AND CONTROL | C481.1 | Describe various levels of controls in power systems, architecture and configuration of SCADA. |
| | | C481.2 | Develop and analyze mathematical models of Automatic Load Frequency Control. |
| | | C481.3 | Develop mathematical model of Automatic Generation Control in Interconnected Power system |
| | | C481.4 | Discuss the Control of Voltage , Reactive Power and Voltage collapse. |
| | | C481.5 | Explain security, contingency analysis, state estimation of power systems |
| 17EE82 | FACTS AND HVDC TRANSMISSION | C482.1 | Explain the advantages, choice and control of electric drive |
| | | C482.2 | Explain the dynamics, generating and motoring modes of operation of electric drives |
| | | C482.3 | Explain the selection of motor power rating to suit industry requirements |
| | | C482.4 | Analyze the performance & control of DC motor drives using controlled rectifiers |
| | | C482.5 | Analyze the performance & control of converter fed Induction motor, synchronous motor & stepper motor drives. |
| 17EE831 | SMART GRID | C4831.1 | Discuss the progress made by different stakeholders in the design and development of smart grid. Explain measurement techniques using Phasor Measurement Units and smart meters. |
| | | C4831.2 | Discuss tools for the analysis of smart grid and design, operation and performance. |
| | | C4831.3 | Discuss classical optimization techniques and computational methods for smart grid design, planning and operation. Explain predictive grid management and control technology for enhancing the smart grid performance Develop cleaner, more environmentally responsible technologies for the electric system. |
| | | C4831.4 | Discuss the computational techniques, communication, measurement, and monitoring technology tools essential to the design of the smart grid. |

| | | | |
|---|---|---|---|
| | | **C4831.5** | Explain methods to promote smart grid awareness and making the existing transmission system smarter by investing in new technology. |
| 17EE84 | INTERNSHIP | **C484.1** | Gain practical experience within industry in which the internship is done. Acquire knowledge of the industry in which the internship is done. |
| | | **C484.2** | Apply knowledge and skills learned to classroom work. |
| | | **C484.3** | Develop a greater understanding about career options while more clearly defining personal career goals. |
| | | **C484.4** | Experience the activities and functions of professionals. |
| | | **C484.5** | Develop and refine oral and written communication skills. |
| 17EEP85 | PROJECT WORK | **C485.1** | Present the project and be able to defend it. |
| | | **C485.2** | Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task |
| | | **C485.3** | Habituated to critical thinking and use problem solving skills |
| | | **C485.4** | Communicate effectively and to present ideas clearly and coherently in both the written and oral forms. |
| | | **C485.5** | Work in a team to achieve common goal. Learn on their own, reflect on their learning and take appropriate actions to improve it. |