Department of Electrical and Electronics Engineering

All Subjects Course Outcomes (COs)

R21 Regulation

ALGEBRA AND CALCULUS (21MA1001)

CO 1: Make use the concepts of Matrices to solve various Engineering problems.

CO 2: Identify different types of higher order differential equations and their applications in solving engineering problems.

CO 3: Apply Mean value theorems, Multi variable calculus to solve engineering problems

CO 4: Apply a range of techniques for solutions of first order Linear and non-Linear Partial Differential Equations (PDE)

CO 5: Apply the techniques of multiple integrals for the area and volume of the region bounded by curves

APPLIED PHYSICS (21PH1001)

CO 1: Explain the conecpts of interference, diffraction using Huygen's wave theory

CO 2: Comprehend the conecpts of matter waves, wave functions and their interpretation for understanding the matter at atomic scale

CO 3: Summarize the importance of free electron theories in determining the properties of metals and semiconductors

CO 4: Realize the importance of the lasers and optical fibres in engineering and medical applications

CO 5: Realize the importance of the lasers and optical fibres in engineering and medical applications Realize the importance of the lasers and optical fibres in engineering and medical applications

BASIC ELECTRICAL CIRCUITS (21ES1003)

CO 1: Solve various electrical networks in presence of active and passive elements

CO 2: Understand the fundamental behaviour of AC circuits and solve AC circuit Problems

CO 3: Explain the behaviour of the circuit at series & parallel resonance of circuit & theeffect of resonance

CO 4: Apply graph theory to formulate network equations

CO 5: Solve electrical networks by using principles of network theorem

PROBLEM SOLVING AND PROGRAMMING

CO 1: Identify methods to solve a problem through computer programming

CO 2: Understand the use of basic elements of C language

CO 3: Understand the usage of various control statements and the modular approach for solving the problems

CO 4: Apply the Arrays and Pointers for solving problems

CO 5: Explain User-Defined Data Types and Files

Applied Physics lab (21PH1501)

CO 1: learn important concepts of physics through involvement in the experiments by applying theoretical knowledge

CO 2: understand the concepts of interference and diffraction and their applications

CO 3: recognize the applications of laser in finding the wavelength, slit width and its role in diffraction studies

CO 4: understand the important parameters of optical fibres and metals

BASIC ELECTRICAL CIRCUIT LAB (21ES1506)

CO 1: Apply the KCL and KVL for circuit analysis and verify the results theoretically

CO 2: Experimentally determine self inductance, mutual inductance and coefficient of coupling

CO 3: Practically determine band width, Q-factor and verify with theoretical values

CO 4: Able to draw locus diagrams, waveforms and phasor diagrams for lagging and leading networks

CO 5: Apply suitable theorems for the given Electrical circuit and verify with theoretical values

ENGINEERING & IT WORK SHOP (21ES1505)

CO1: Understand the safety aspects in using the tools and equipments

CO2: Apply tools for making models in respective trades of engineering workshop

CO3: Apply basic electrical engineering knowledge to makes imple housewiring circuits

And check their functionality

CO4: Understand to disassemble and assemble a Personal Computer and prepare the Computer ready to use

CO5: Apply knowledge to Interconnect two or more computers for information sharing

PART-B   IT WORKSHOP LAB

CO 1: Understand functionalities of a computer and operating system

CO 2: Practice Word processors, Presentation and Spreadsheet tool

CO 3: Connect computer using wired and wireless connections.

Problem Solving and Programming Lab (21ES1501)

CO 1: Translate algorithms into programs (In C language)

CO 2: Code and debug programs in C program language using various constructs

CO 3: Solve the problems and implement algorithms in C

CO 4: Make use of different data types to handle the real time data

Communication skills Lab (21EN1502)

CO 1: To develop knowledge, skills, and judgment around human communication that facilitates their ability to work collaboratively with others

CO 2: Develop their public speaking abilities to speak both formally and informally

CO 3: Understand the nuances of English language and skills required for effective Participation in group activities

CHEMISTRY (21CH1001)

CO 1: Understand the fundamental concepts of chemistry to predict the structure and bonding of materials

CO 2: Discuss various kinds of electro chemical cells.

CO 3: Compare the materials of various energy storage devices and emerging technologies.

CO 4: Demonstrate the mechanism and applications of different polymers in electronic devices

CO 5: Explain calorific values, refining of petroleum and cracking of oils

VECTOR CALCULUS COMPLEX VARIABLES & TRANSFORMS (21MA1003)

CO 1: Interpret the different operators such as gradient, curl and divergence to find out point function

CO 2: Understand the concept the limit, continuity & differentiation of complex variable

CO 3: Evaluate the integral by using contour integration

CO 4: Apply the Laplace transform to convert time domain into frequency domain & Inverse Laplace transforms techniques to solve the differential equations

CO 5: Develop the Fourier Series to the given periodic functions

PYTHON PROGRAMMING AND DATA SCIENCE (21ES1005)

CO 1: Demonstrate various operators, data types and decision structures in python

CO 2: Solve problems using Functions and data structures in Python

CO 3: Implement the concept of Files and Modules

CO 4: Implement Data Science queries using NUMPY module

CO 5: Solve data manipulation task using PANDAS module

ENGLISH (21EN1001)

CO 1: Acquire in-depth knowledge on formulating appropriate sentences with grammatical accuracy and also develop concept of word formation.

CO 2: Use coherent and unified paragraphs with adequate support and detail and can write a topic sentence, support and concluding sentence.

CO 3: Analyze the concepts of various real time scenarios to represent in an effective model.

CO 4: Understand the grammar rules for synthesis of sentences and use pre writing strategies to plan to write dialogues, reviews and edit the text effectively.

CO 5: Relate the skills and sub skills of reading effectively and provide knowledge on the structure and format of technical writing.

CHEMISTRY LAB (COMMON TO CSE,ECE & EEE) (21CH1501)

CO 1: Determine the cell constant and conductance of solutions

CO 2: Perform quantitative analysis using instrumental methods

CO 3: Utilize the fundamental laboratory techniques for analyses such as titrations, separation purification and Spectroscopy

CO 4: Analyze and gain experimental skill

ENGINEERING GRAPHICS (21ES1503)

CO 1: Define the qualities of precision and accuracy in engineering drawing

CO 2: Draw engineering curves with different methods

CO 3: Develop the orthographic projection of points and straight lines

CO 4: Construct the planes and simple solids

CO 5: Understand and practice basic AUTOCAD commands

Python Programming and Data Science Lab (21ES1508)

CO1: Understanding and use of python- Basic Concepts

CO2 : Solve the problems using python Iterative Statements

CO3: Understand the concepts of files, modules Understand the concepts of files, modules

CO4: Solve the Numerical problems that involve Matrices

CO5: Provide solutions for data cleaning tasks

English Language Lab (21EN1501)

CO1: Understand how speech sounds are used to create meaning. Apply their knowledge of English phonetics and phonology to improve their own pronunciation

CO2: Recognize and use pitch patterns to signal complete and incomplete thought groups and Speak confidently and intelligibly within groups and before anaudience

CO3: Learn, practice and acquire the skills necessary to deliver effective, presentation with clarity and enable them to prepare resume with cover letter

PROBABILITY STATISTICS AND NUMERICAL METHODS

CO 1: Apply the probability distributions in life testing, expected failures for various engineering applications

CO 2: Test the data by applying large samples inferential techniques

CO 3: Test the data by applying small samples inferential techniques.

CO 4: solve algebraic and transcendental equations and interpolate the trend value

CO 5: To Solve ordinary differential equations by using numerical methods

DC MACHINES AND TRANSFORMERS (21EE2001)

CO 1: Study construction, different phenomena like: armature reaction, commutation in DC machines

CO 2: Understand about different types of dc generators and significance of OCC.

CO 3: Develop mathematical relations for torque developed by dc motor and learn about speed – torque characteristics of different types of DC motor. Gain knowledge of about different testing methods of dc machines

CO 4: Identification of physical components of single phase transformer

CO 5: Learn difference between two windings and auto transformers.
Identification of three phase transformers circuits

Electrical Circuit Analysis (21EE2002)

CO 1: Understand the analysis of three phase balanced and unbalanced circuits.

CO 2: Solve the problems in DC transient response for the given circuit.

CO 3: Solve the problems in AC transient response for the given circuit.

CO 4: Analyze the given network using different two port network parameters

CO 5: Explain about the fundamental and types of filters

POWER SYSTEM ARCHITECTURE (21EE2003)

CO 1: Describe the working principle and operation of Nonrenewable generating stations

CO 2: Discuss the working principle and operation of various Renewable energy sources

CO 3: Analyze and compute the transmission line parameters.
CO 4: Estimate the performance of a given transmission line
CO 5: Analyze the performance of transmission lines

Universal Human Values (21EN1002)

CO 1: Students are expected to become more aware of themselves, and their surroundings (family, society, nature)

CO 2: They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

CO 3: They would have better critical ability

CO 4: They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).

CO 5: It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction

AC MACHINES (21EE2004)

CO 1: To acquire the basic knowledge of construction, working and operation of induction motor

CO 2: Identify different speed controlling techniques of Induction motor for the given application.

CO 3: To impart knowledge on Construction and performance of salient and non – salient type synchronous generators and determine how several alternators running in parallel share the load on the system

CO 4: Analyze the performance characteristics of synchronous motors

CO 5: To impart knowledge on Construction, principle of operation and performance of single phase induction motors and special machines

ENGINEERING ELECTROMAGNETICS (21EE2006)

CO 1: Ability to identify appropriate coordinate systems and visualize and understand the practical significance of vector calculus

CO 2: Understanding of the basic laws of electrostatics, Ability to compute, visualize electrostatic fields along with practical applications

CO 3: Understanding of the basic laws of magnetostatics

CO 4: Ability to compute, visualize magneto static fields along with practical applications

CO 5: Understanding of Maxwell's equations in different forms and medium

LINEAR CONTROL SYSTEMS (21EE2007)

CO 1: Determine the transfer function for the given electrical or mechanical systems and also determine the transfer function of a system using block diagram reduction techniques and Mason's gain formula

CO 2: Analyze the system behaviour in time domain and step response to various dampings

CO 3: Determine the stability of given system by applying Routh's stability criteria.

CO 4: Analyze the stability of given system by means of Bode plot and polar plot

CO 5: Determine the state model and assessment of controllability & observability from the given transfer function.

DC MACHINES AND TRANSFORMERS LAB (21EE2501)

CO 1: Determine the magnetization and load characteristics of a DC shunt generator

CO 2: Describe the efficiency and performance characteristics of DC motors

CO 3: Predetermination of transformer with different loads

ELECTRICAL CIRCUIT ANALYSIS AND SIMULATION LAB (21EE2502)

CO 1: Analyze the three phase circuits for identification of utilization in Power system.

CO 2: Examine the transient response of series and parallel circuits with different combinations of R, L and C by using AC / DC supply.

CO 3: Identify the various parameters to analyze the transmission and distribution system in electrical engineering.

CO 4: Model the different types of filters for understand the pass band and attenuation of the various signals

LINEAR CONTROL SYSTEMS & SIMULATION LAB (21EE2503)

CO 1: Get the knowledge of feedback control and transfer function of DC servo motor

CO 2: Model the system and able to design the controllers and compensators

CO 3: Get the knowledge about the effect of poles and zeros location for second order systems

Digital Electronics & Logic Design

CO 1: Use number systems, binary codes and Boolean algebra to implement digital circuits

CO 2: Apply minimization techniques on Boolean expressions.

CO 3: Design combinational circuits using logic gates.

CO 4: Analyze synchronous sequential circuits.

CO 5: Classify the memories & programmable logic devices

POWER DISTRIBUTION & DISTRIBUTED GENERATION

CO 1: Compare the advantages & disadvantages of various distributed generation

CO 2: Describe various Distributed Generation systems, Micro-grid and storage devices

CO 3: Illustrate the Economic and control aspects of DGs

CO 4: Analyze the different load characteristics, distribution factors & Modelling of
distribution system.

CO 5: Design of Distribution Feeders, Voltage Drop and power loss in D.C Distributors

POWER ELECTRONICS

CO 1: Describe the operation of power semiconductor devices

CO 2: Illustrate the construction and operation of silicon controlled rectifier

CO 3: Analyze the various uncontrolled rectifiers and design suitable filter circuits

CO 4: Demonstrate the operation of the DC-DC converters and inverters

CO 5: Summarise the operation of AC controllers

AC MACHINES Lab

CO 1: Find the performance characteristics of the 3-phase induction motor

CO 2: Draw the direct and quadrature axis reactance and regulation of synchronous machine

CO 3: To Know the Equivalent Circuit Parameters of a Single Phase Induction Motor

CO 4: To know how to draw circle diagram and determine the electrical parameters byusing 3-phase squirrel cage induction motor

CO 5: Know the voltage regulation of synchronous machine by using Synchronous Impedance Method.

CO 6: Know the voltage regulation of synchronous machine by using M.M.F.Method

CO 7: Know the voltage regulation of synchronous machine by using ZPF.Method.

CO 8: Know the voltage regulation of synchronous machine by using ASA.Method.

CO 9: To know how to draw the V and Λ curves of synchronous motor

CO 10: Know the separation of losses of the 1-phase transformer.

ADVANCED POWER SYSTEM ANALYSIS

CO 1: Discuss the Representation of power system matrices with formation of Y_{BUS}

CO 2: Describe the Representation of power system matrices with formation of Z_{BUS}

CO 3: Apply the concepts of algorithm for the given power system network

CO 4: Analyse the symmetrical faults and unsymmetrical faults of a power system network.

CO 5: Develop the steady State, Dynamic and Transient Stabilities for a power system

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

CO 1: Describe the concepts and principles of Measuring Instruments to measure voltage and current.

CO 2: Analyze the working principles of single and three phase wattmeters & energy meter to measure power and energy in circuits.

CO 3: Demonstrate the concepts and principles of AC and DC bridges to evaluate resistance,
inductance and Capacitance for AC and DC Circuits.

CO 4: Demonstrate the operating principles of instrument transformers and potentiometer to measure unknown voltage, Current & Resistance in circuits.

CO 5: Identify the physical variables to describe operating principle of the transducers

SWITCH GEAR & PROTECTION

CO 1: Demonstrate the operation of different types of Circuit Breakers

CO 2: Describe the operation & application of various types of protective relays.

CO 3: Compare the different types of comparators

CO 4: Analyze the various protection schemes of various power system components like alternators, transformers and bus-bars.

CO 5: Illustrate the various methods of over voltage protection in power systems

ELECTRICAL MEASUREMENT & INSTRUMENTATION LAB

CO 1: Accurately determine the values of inductance and capacitance using a a.c bridges

CO 2: Compute the coefficient of coupling between two coupled coils

CO 3: Calibrate various electrical measuring instruments

CO 4: Accurately determine the values of very low resistances

POWER SYSTEM LAB

CO 1: Examine the power system analysis

CO 2: Identify characteristics of various Relays

CO 3: Understand various tests on Motors and Transformers

SOLID STATE ELECTRICAL DRIVES

CO 1: Describe the basic requirements of motor selection for different load profiles.

CO 2: Analyze the operation of the converter fed dc drive

CO 3: Demonstrate the operation of the chopper fed dc drive

CO 4: Illustrate the operation and performance of AC Induction motor drives

CO 5: Analyze the induction motor drive using inverter

POWER SYSTEM OPERATION & CONTROL

CO 1: Enumerate the Heat rate curves, Economic operations of power systems

CO 2: Describe the Hydrothermal power stations Scheduling

CO 3: Discuss the single area load frequency control, modelling of turbines , speed governing systems.

CO 4: Illustrate two area load frequency control , tie line and economic dispatch control for load frequency control

CO 5: Discuss the deregulation and conditions of deregulation in a power systems.

POWER SYSTEM SIMULATION LAB

CO 1: Examine the power system analysis

CO 2: Construct the controllers of a power system

CO 3: Analyze the various power system stabilities

INDUSTRIAL ELECTRICAL SYSTEMS

CO 1: Understand the electrical wiring systems for residential, commercial and industrial consumers through symbols, drawings and SLD

CO 2: Justify the need of industrial electrical system components and industrial automation

CO 3: Analyze the size, rating and cost of electrical installations for residential and commercialapplications

CO 4: Analyze the appropriate electrical system with protective equipments for industrial Applications

CO 5: Understand the role of industrial automation

POWER SYSTEM PLANNING

CO 1: Discuss primary components of power system planning, planning methodology for optimum power system expansion and show knowledge of forecasting of future load requirements of both demand and energy by deterministic and statistical techniques using forecasting tools

CO 2: Discuss methods to mobilize resources to meet the investment requirement for thepower sector and understand economic appraisal to allocate the resources efficiently and appreciate the investment decisions to power generation and planning for system energy in the country

 CO 3: Analyze the operating states of transmission system, their associated contingencies and the stability of the system and discuss principles of distribution planning,supply rules, network development and the system studies

CO 4: Discuss reliability criteria for generation, transmission, distribution and reliability evaluation and analysis, grid reliability, voltage disturbances and their remedies

CO 5: Discuss planning and implementation of electric –utility activities, market principles and the norms framed by CERC for online trading and exchange in the interstate power market

Reactive Power Compensation and Management

CO 1: Distinguish the importance of load compensation in symmetrical as well as un symmetrical loads

CO 2: Observe various compensation methods in transmission lines

CO 3: Construct model for reactive power coordination

CO 4: Understand the demand side reactive power management

CO 5: Understand the user side reactive power management

POWER QUALITY

CO 1: Address power quality issues to ensure meeting of standards

CO 2: Apply the concepts of compensation for sags and swells using voltage regulating Devices

CO 3: Assess harmonic distortion and its mitigation

CO 4: Understand the power measurement data according to standards

CO 5: Analyze the power quality improvement with custom power devices

SMART GRID TECHNOLOGIES

CO 1: Understand technologies for smart grid

CO 2: Understand the smart transmission system and its technologies

CO 3: Understand the smart distribution system and its technologies

CO 4: Realize the distribution generation and smart consumption

CO 5: Know the regulations and market models for smart grid

System Modelling and Identification(21EE4002)

CO 1: Learn the design of Modelling of Dynamic Systems

CO 2: Analyze the Stability margins, correlation of frequency domain and time domain

CO 3: Analyse linear sampled data systems

CO 4l: Learn the computation Z-transform

CO 5: Understand the compensation in Z domain and W plane

ADVANCED CONTROL SYSTEMS(21EE4007)

CO 1: Learn the design of state feedback controller and state observer

CO 2: Analyze the linear and nonlinear systems using phase plane method.

CO 3: Analyse nonlinear systems using describing function method..

CO 4: Learn the optimal control problem

CO 5: Understand the Solution of Kalman Filter by duality principle, Direct method of Lypanov forLinear and Nonlinear continuous time autonomous systems.

Digital Signal Processing(21EE4012)

CO 1: Understand Discrete-time signals and systems & properties

CO 2: Analyze the z- Transform, inverse z- Transform & properties

CO 3: Understand the design of low pass, high pass, band pass & stop band IIR digital filters

CO 4: Learn Computer aided design of Equiripple Linear phase FIR filters

CO 5: Understand arithmetic round off errors, Low sensitivity digital filters.

MULTIVARIABLE CONTROL SYSTEMS(21EE4017)

CO 1: Learn the Multivariable Connections, Multivariable Representation

CO 2: Analyze the Performance Specification in Multivariable Systems

CO 3: Analyse Stability of Multivariable Feedback

CO 4: Learn the Controllability and Observability and Realization in Multivariable Systems

CO 5: Understand the Multivariable Control System Design

REAL TIME CONTROL SYSTEMS(21EE4022)

 CO 1: Analyze the Characteristic features of RT applications and develop features from Non - RT and Off- line system

CO 2: Understand the Hierarchical representation and analyzing Logical properties

CO 3: Derive the Example of checking safety and timing properties and also understand the Requirements and features of real - time Computing Environments

CO 4: Understand and analyze the Real – time Programming for real-time systems.

CO 5: Analyze the Real - time process, Applications and understand the Distributed Real - time systems

MACHINE MODELING AND ANALYSIS(21EE4003)

CO 1: Understand the basic concepts of AC/ DC machine modeling

CO 2: Understand the Mathematical model of the DC Machine

CO 3: Analyze the Reference frame theory model of Electrical machine

CO 4: Analyze the steady state and dynamic state operation of three-phase induction machine.

CO 5: Analyze the modeling and simulation of three phase synchronous machine

Electrical Machine Design(21EE4008)

CO 1: Understand the basic principles of machine design

CO 2: Analyze the performance design DC motor

CO 3: Analyze the performance design winding and core of transformer.

CO 4: Analyze the performance design winding and core of rotating electrical machine

CO 5: Analyze the short circuit ratio and its effects on performance of synchronous machines.

Programmable Control Devices and Applications(21EE4013)

CO 1: Understand different types of PLCs

CO 2: Understand the usage of Easy Veep software

CO 3: Understand the hardware details of Allen Bradley PLC

CO 4: Programming of PLCs

CO 5: Know about few applications of PLCs in different fields of Science and Technology

HYBRID ELECTRICAL VEHICLES(21EE4018)

CO 1: Understand the models to describe hybrid vehicles and their performance

CO 2: Classify various hybrid drive-train topologies

CO 3: Understand the various configurations of DC & AC Motor drives.

CO 4: Understand the different possible ways of energy storage and different strategies related to Energy management strategies

CO 5: Understand the mode of operation and control Architecture.

AUTOMOTIVE ELECTRICAL ENGINEERING(21EE4023)

CO 1: Compute the efficiency of Batteries through various test's

CO 2: Understand the working of different starter drive units and their maintenance and the concept of vehicle charging system with its auxiliaries

CO 3: Understand the dazzling of head light and its preventive methods

CO 4: Understand the electronic dashboard instruments & onboard diagnostic system

CO 5: Understand the various sensors used in Automobiles

RENEWABLE ENERGY CONVERSION SYSTEMS(21EE4004)

CO 1: Understand various Electric Energy Conversion Systems

CO 2: Analyze the solar thermal conversion system (Also for high temperature applications)

CO 3: Analyze the Photovoltaic & Bio-Energy Conversion Systems

CO 4: Illustrate the existing Wind Energy Conversion System

CO 5: Extend the knowledge about working principle of various Fuel cell technology

SOLAR AND FUEL CELL ENERGY SYSTEMS(21EE4009)

CO 1: Understand the need of radiation of sun and discuss the various performance characteristics of solar radiation

CO 2: Discuss the photovoltaic effect, PV Cell efficiency and its limits along with the concepts of fabrication technology for solar cell

CO 3: Predict the performance of solar photovoltaic device and analyze its performance

CO 4: Carry out the application of photovoltaic system as power system.

CO 5: Analyze the performance of fuel cells under different operating conditions and also defend appropriate fuel cell technology for a given application

WIND & BIOMASS ENERGY SYSTEM(21EE4014)

CO 1: Understand the present wind energy scenario

CO 2: Explain the various wind energy technologies

CO 3: Identify various applications of wind energy

CO 4: Explain the various biomass conversion technologies and testing of performance of biogas.

CO 5: Understand the Bio-Energy Systems with Efficient Applications

UTILIZATION OF ELECTRICAL ENERGY(21EE4019)

CO 1: Utilize the suitable electric drives for different applications

CO 2: Analyze the Speed-Time Curves of Different Services

CO 3: Identify the energy saving based on Illumination system

CO 4: Understand the utilization of electrical energy for heating and welding Purposes

CO 5: Illustrate the effective usage of solar and windenergy for electrical Applications

ENERGY AUDIT & DEMAND SIDE MANAGEMENT(21EE4024)

CO 1: Understand the importance of energy audit and the basic ideas of conduction an energy audit

CO 2: Analyze various techniques of energy management and conservation

CO 3: Understand energy efficient methods and power factor improvement techniques

CO 4: Analyze demand side management concepts through case study

CO 5: Understand various Cost effectiveness test for demand side management programs

ADVANCED POWER ELECTRONICS(21EE4005)

CO 1: Explain basic Concept of Switches and their controlling process

CO 2: Demonstrate the device physics, Application and Analysis of Switches in DC-DC converters and Single Phase Converter

CO 3: Analyze the operation Single Phase Converter, Three Phase Converter, Multipulse Converter and Effect of Source Inductance and PWM Rectifiers

CO 4: Analyze the Power Quality Improvement Techniques in electrical systems

CO 5: Analyze the applications of FACTS Devices in electrical system

ADVANCED ELECTRICAL DRIVES(21EE4010)

CO 1: Analyze the Power electronic converters for electrical drives

CO 2: Analyze the field oriented control of machines

CO 3: Understand the vector control of electrical drives

CO 4: Understand the sensor less control of AC drives

CO 5: Analyze the direct torque control of Induction Machines

HVDC and FACTS

CO 1: Find the applications of different types of HVDC links

CO 2: Apply converters for HVDC transmission for control of converters

CO 3: Understand the concept of filters to mitigate harmonics, concept of reactive power requirements

CO 4: Understand the working principles of FACTS devices

CO 5: Analyze the performance of Series, Shunt and combined FACTS controllers

ADVANCED POWER CONVERTERS

CO 1: Evaluate different dc-dc voltage regulators

CO 2: Analyze resonant converters

CO 3: Evaluate various multi-level inverter configurations

CO 4: Select appropriate phase shifting converter for a multi-pulse converter

CO 5: Analyze the various DC power supplies

ADVANCED POWER SEMICONDUCTOR DEVICES AND PROTECTION

CO 1: Analyze power switching devices

CO 2: Design of current controlled devices and their parameters

CO 3: Analyze the voltage controlled devices and their parameters

CO 4: Understand new power semiconductor devices

CO 5: Design of protecting circuit