



**SIR C R REDDY COLLEGE OF ENGINEERING**  
**ELURU-534007, WEST GODAVARI DIST, ANDHRA PRADESH, INDIA**  
 (Approved by AICTE, New Delhi & Affiliated to JNTUK, Kakinada)  
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**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

### R16 Course Outcomes

I Year Semester – I:

Subject Code	Subject Title	CO No	Course Outcomes
1101	English-I	1	Maximize the practice of four language learning skills-listening, speaking, reading, writing (LSRW)
		2	Analyse the basic concepts of grammar and usage
		3	Build vocabulary to facilitate good communication
		4	Develop acceptable personality traits to become leaders
1102	Mathematics-I	1	Apply the ordinary differential equation of first order, higher order differential equations and concerned applications
		2	Solve Laplace Transforms and apply to linear differential equations
		3	Understand Apply the partial differentiation in physical problem
		4	Solve linear PDE with constant coefficients and classifying second order PDE.
1106	Applied Chemistry	1	"Understand the advantages and limitations of plastic materials and their use in day to day life. "
		2	Identify the fuels which are commonly used and their economics, advantages and limitations.
		3	Select the suitable methods of corrosion control.
		4	Recognize the need of awareness of materials like nano materials, liquid crystals and their uses.
		5	Apply the knowledge of various conducting materials used in electronic devices.
		6	Apply the knowledge for utilization of non-conventional energy sources
1111	Engineering Mechanics	1	Calculate frictional force by resolving the forces into components, moment of force
		2	Draw complete and correctly labelled Free Body Diagrams of rigid bodies or systems of rigid bodies in static equilibrium
		3	Compute the Centroid and the Centre of gravity of 2-D bodies using the method of composite area
		4	Analyse the properties of surfaces & solids in relation to moment of inertia.
		5	Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems
		6	Determine the complete motion of a rigid body resulting from an application of a system of forces, using work energy and impulse momentum principles
1107	Computer Programming	1	Gains the knowledge on Computer Hardware, Software concepts, Writing Algorithms, Drawing Flowcharts, Writing, Compiling and



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Subject Code	Subject Title	CO No	Course Outcomes
			Executing simple C programs in Linux environment.
		2	Distinguishes branching, iteration and data representation using Arrays and Strings.
		3	Constructs programs using Modular programming and Recursive solution formulation.
		4	Explains working with pointers and how they are used to allocate memory dynamically and Uses miscellaneous aspects like enum, typedef, structure and union types in applications.
		5	Explains operations on files and working with different types of files.
1108	Environmental Studies	1	Ability to acquire knowledge about the importance of environment & availability of resources.
		2	Understand different environmental challenges induced due to anthropogenic activities as well as nature.
		3	Able to identify the solutions to the environmental problems for the sake of healthy life by protecting our natural resources.
		4	Create awareness on the social issues, environmental protection acts.
1122	Applied/Engineering Chemistry Laboratory-I	1	Analyze the knowledge of volumetric analysis to find out the concentration of given compounds using various indicators.
		2	Demonstrate various analytical instruments used for quantitative analysis.
1114	English-Communication Skills Laboratory-I	1	To make students recognize the sounds of English through audio visual aids
		2	To help students build their confidence and help overcome their inhibitions and self-consciousness while speaking in English
		3	To familiarize the students with stress and intonation and enable them to speak English effectively.
1119	C Programming Laboratory	1	Understand various computer components, Installation of software. C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
		2	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
		3	Construct programs that demonstrate effective use of C features including arrays, strings, structures, pointers and files.
		4	Apply and practice logical ability to solve the real world problems.



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I Year Semester – II:

Subject Code	Subject Title	CO No	Course Outcomes
1201	English-II	1	Maximize the practice of four language learning skills – Listening, Speaking, Reading and Writing (LSRW Skills)
		2	Analyze the basic concepts of grammar and usage
		3	Build vocabulary to facilitate good communication
		4	Develop acceptable personality traits to become leaders
1202	Mathematics-II	1	Solve system of linear algebraic equations and Apply Newton's forward & backward interpolation for equal intervals, Lagrange's formulae for unequal intervals
		2	Describe the concept of numerical integration and numerical solutions of differential equations
		3	Apply Fourier series to the given function and also apply the concept of Fourier transform to evaluate the given integral
		4	Solve the problems of Wave, Heat and Laplace equation using partial differential equations
1203	Mathematics-III	1	Apply the Matrix methods to reduce a given Quadratic form into Canonical form
		2	Solve double and triple integrals to find areas and volumes
		3	Apply special functions to evaluate improper integrals
		4	Apply the concept of vector differentiation and vector integration theorems to find scalar potential
1207	Applied Physics	1	Able to apply the knowledge of different phenomena of light in daily life.
		2	Characterize the coherent sources over ordinary sources and gain knowledge in the basic concepts and different structures of crystals.
		3	Able to differentiate the properties of the materials based on the response in electric and magnetic fields.
		4	Analyse the theories developed in the study of electron transport mechanism of metals in the view of quantum picture of sub atomic world.
		5	Ability to gain the basic knowledge in semiconductor physics.
1208	Electrical Circuits Analysis-I	1	To Understand passive and active elements for electric networks
		2	To observe the waveforms for single phase circuits using AC
		3	To study the RLC series and parallel waveforms
		4	To Understand magnetic circuits using Dot convention
		5	To solve the Electric circuit problems using different theorems



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Subject Code	Subject Title	CO No	Course Outcomes
1206	Engineering Drawing	1	Construct polygons and draw curves used in engineering applications
		2	Construct scales, Apply concept of orthographic projection to project points and lines parallel to one reference planes.
		3	Produce orthographic projections of lines inclined to both the reference planes.
		4	Produce orthographic projections of planes inclined to both the reference planes.
		5	Produce orthographic projections of regular solids inclined to both the reference planes.
		6	Represent objects in 3D view through isometric views from orthographic views and vice versa
1221	English-Communication Skills Laboratory-II	1	To make students recognize the sounds of English through audio visual aids
		2	To help students build their confidence and help overcome their inhibitions and self consciousness while speaking in English
		3	To familiarize the students with stress and intonation and enable them to speak English effectively.
1225	Applied / Engineering Physics Laboratory	1	Apply the knowledge of different phenomena of light like interference, diffraction and handle various optical measuring instruments.
		2	Analyze various electronic circuits and its components and verify the laws of stretched string.
		3	Draw the relevance between theoretical knowledge and the means to imply it in a practical manner by performing various relative experiments
1224	Engg. Workshop & IT Workshop	1	Apply wood working knowledge in making simple wooden joints
		2	Apply the development of surfaces concept in producing simple sheet metal works
		3	Prepare simple fitting joints with the use of proper fitting tools



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**II Year Semester – I:**

Subject Code	Subject Title	CO No	Course Outcomes
21021	Electrical circuits analysis-II	1	Classify different forms of electrical circuits based on components, supply and structures
		2	Determine the response of different electrical circuits
		3	Analyze the response of Electrical circuits with different excitations
		4	Realize electrical equivalent network for the given transfer function & network parameters
		5	Apply Laplace and Fourier Transforms to electrical circuits.
21022	Electrical machines – I	1	Summarize the basics and principle of operation of DC machines and Transformer
		2	Explain the fundamental parts of DC machines and Transformer
		3	Analyze the Performance of DC machines and Transformer
		4	identify possible applications of different DC machines and Transformers for a given requirement
21023	Basic electronics and devices	1	Demonstrate the concepts of Semiconductor physics
		2	Illustrate the operational characteristics of various Semiconductor devices
		3	Analyze the operation of rectifiers ,filters ,Oscillators and Amplifiers.
		4	classify different power semiconductor devices
21024	Electromagnetic fields	1	Explain static electric and magnetic fields with basic mathematical concepts.
		2	Apply the principles of electrostatics to the solutions of problems relating to electric fields, potential, capacitance, and energy.
		3	Apply the principles of magnetostatics to the solutions of problems relating to Magnetic fields, force, torque, inductance, and energy.
		4	Explain time varying electric and magnetic fields.
		5	Apply Maxwell's equations to the solutions of problems relating to electromagnetic fields.
21025	Thermal and hydro prime movers	1	Explain the working principles of thermal and Hydro prime movers
		2	Analyze various thermodynamic processes undergone by steam, Vapor power cycles and Gas turbine cycles



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Subject Code	Subject Title	CO No	Course Outcomes
		3	Model the performance parameters of Thermal and Hydro Prime movers
		4	Develop the force exerted by jets on stationery and moving vanes
		5	Choose the loads on Hydroelectric power plants by considering various factors
21026	Managerial economics & Financial Analysis	1	Able to determine the objectives and able to know the nature and scope of Managerial Economics.
		2	Predict the demand of products and services by using different methods, Examine Optimum Production, economies of scale, production, production functions, and optimum size of the firm, cost, cost behavior and Break Even Point.
		3	Gain knowledge on price and market structure, behaviour of consumer and producer under competitive market situations.
		4	Differentiate the types of business organizations and scope the methodology involved in their establishment.
		5	Discuss the process & principles of accounting and prepare Journal, Ledger, Trial Balance, Manufacturing A/c, Trading A/c., Profit & Loss A/c. and Balance Sheet of an enterprise
		6	Outline the steps, methods & sources of raising capital by business undertaking.
21027	Thermal and hydro laboratory	1	Experiment with load tests on single cylinder diesel engines to identify Power and efficiencies
		2	Identify the economical speed by conducting experiment on a 4S 4 cylinder diesel engine
		3	Explain Boileries Engines and Steam engines
		4	Analyze the performance of hydraulic turbine and pumps under different working conditions
21028	Electrical circuits laboratory	1	Apply and verify the principles of various theorems
		2	Identify self and mutual inductance and various parameters for electrical network
		3	Model the characteristics of electrical resonant circuits and locus diagrams





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**II Year Semester – II:**

Subject Code	Subject Title	CO No	Course Outcomes
22021	Electrical measurements	1	Able to choose right type of instrument for measurement of voltage and current for ac and dc.
		2	Able to choose right type of instrument for measurement of power and energy – able to calibrate energy meter by suitable method.
		3	Able to test for the ammeter and potentiometer.
		4	Able to select suitable bridge for measurement of electrical parameters.
		5	Able to make use of the ballistic galvanometer and flux meter for magnetic measuring instruments and also to measure frequency and phase difference between signals using CRO.
22022	Electrical machines-II	1	Annotating the construction and principle of operation of different kinds of rotating AC machines
		2	Ability to experimenting on Ac Machines to find the performance characteristics.
		3	Appraise the purpose for parallel operation of generators and learn the conditions to be satisfied.
		4	Illustrate the construction, operation and characteristics of commonly used special purpose machines.
22023	Switching theory and logic design	1	Explain the concepts of Number Systems , logic gates realization.
		2	Apply the principles of Boolean algebra for the design of various Combinational circuits.
		3	Apply the concept of Combinational circuits for the design of various sequential circuits, i.e. synchronous and asynchronous sequential circuits.
		4	Compare the various combinational circuits and sequential circuits with respect to their applications.
22024	Control systems	1	Ability to derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs. Understand the control system Components.
		2	Capability to determine time response specifications of second order systems and to determine error constants. o Acquires the skill to analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.
		3	Capable to analyze the stability of LTI systems using frequency response methods.
		4	Able to design Lag, Lead, Lag-Lead compensators to improve system performance from Bode diagrams and root locus
		5	Ability to represent physical systems as state models and determine



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Subject Code	Subject Title	CO No	Course Outcomes
			controllability and observability of system.
22025	Power systems-I	1	Annotating the construction and principle of operation of different power generating stations
		2	Ability to explain the function of various sections of different power stations
		3	Ability to design and estimate different power substations
		4	Illustrate different economic aspects and tariff
22026	Management science	1	Able to apply the concepts & principles of management in real life industry, and Able to design & develop organization chart & structure for an enterprise.
		2	Able to apply PPC techniques, Quality Control, Work-study principles in real life industry. Able to maintain Materials departments, & Determine EOQ .
		3	Able to apply the concepts of HRM in Recruitment, Selection, Training & Development.
		4	Able to develop PERT/CPM Charts for projects of an enterprise and estimate time & cost of project.
		5	Able to develop Mission, Objectives, Goals & strategies for an enterprise in dynamic environment.
		6	Able to understand & apply modern management techniques MIS, ERP, MRP, TQM, CMM, SCM, BPO, BPR, Bench Marking and Balance Score Card wherever possible.
22027	Electrical machines-I laboratory	1	Examining the characteristics of different dc machines transformers and predict specific applications of those machines accordingly.
		2	compare the speed control method of different types of DC motors
		3	estimating the parameters of equivalent circuit of transformers
		4	Measuring various losses in dc machines and transformers by conducting suitable tests.
22028	Electronic devices & circuits Laboratory	1	Analyse the operation of devices like diodes, transistors and FETs practically
		2	Design electronic circuits using basic devices
		3	Design rectifier circuits with and without filters





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**III Year Semester – I:**

Subject Code	Subject Title	CO No	Course Outcomes
31021	Power Systems – II	1	Student is able to differentiate Various transmission systems and power distribution systems.
		2	Student is able to apply various methods for transmission line modeling and economic aspects
		3	Student is be able to determine Transmission line parameters, power loss due to corona of an electrical power system
		4	Student is able to Evaluate Potential distributions over a string Insulators. Insulation stress present in cables.
		5	Student is able to design power transmission towers for different voltage levels, insulators & climatic conditions.
31022	Renewable Energy Sources	1	Demonstrate the basic principle of generation of electricity from various renewable energy sources like solar, wind, tidal, biomass, geothermal, fuel cells etc.
		2	Estimate the solar energy and understand the Principles and devices involved in solar energy collection and conversion of it to electricity.
		3	Explore the wind patterns and concepts of wind energy conversion system by studying its components, types and performance
		4	Apply maximum power point techniques to improve the performance of PV and wind energy conversion systems
31023	Signals and systems	1	Characterize the signals and systems and principles of vector spaces, Concept of orthogonality
		2	Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform
		3	Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back
		4	Analyze the linear systems in time and frequency domains
		5	Apply z-transform to analyze discrete-time signals and systems
31024	Pulse & digital circuits	1	Recognize the need of linear and non-linear wave shaping circuits
		2	Describe the operation of time base generators and logic families
		3	Apply the concept of synchronization and frequency division in pulse circuits and implement logic gates using diodes and transistors.
		4	Distinguish different multivibrators with respect to biasing and triggering schemes
31025	Power electronics	1	Able to explain characteristics of various power electronic elements and able to build simple power electronic circuits
		2	Able to analyze the operation and waveforms for phase controlled converters.
		3	Able to analyze the operation and waveforms choppers , inverters



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Subject Code	Subject Title	CO No	Course Outcomes
			and AC-AC converters
		4	Able to apply knowledge of modulation techniques for inverters in real time projects
31026	Electrical machines-II laboratory	1	Explain the construction and operation of various ac machines
		2	Testing and operation of various ac electrical machines
		3	Analyzing the performance and operation of various electrical machines
31027	Control systems laboratory	1	Illustrate to find time response of given control system model
		2	Design of Lead, Lag, Lead-Lag systems in control systems
		3	Plot Root Locus and Bode plots for given control system model
		4	Examine the basic knowledge on practical control system applications on machines & electronic devices like ac servo motor, synchro and magnetic amplifier
		5	Design PID controllers for given control system model
31028	Electrical measurements Laboratory	1	Able to identify ac and dc analog meters
		2	Able to design ac and dc bridges
		3	Able to test for dielectric strength of various insulating oils
		4	Able to test for induction type energy meter and electro dynamo wattmeter
		5	Able to build various types of power measurement circuit by various methods



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**III Year Semester – II:**

Subject Code	Subject Title	CO No	Course Outcomes
32021	Power Electronics Controllers & Drives	1	Able to learn the fundamentals of electric drive and different electric braking methods
		2	Able to differentiate the converter control of dc motors in various quadrants.
		3	Able to Analyze the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters
		4	Able to Implement the speed control mechanism of synchronous motors
32022	Power System Analysis	1	Analyze Per Unit representation of Power System
		2	Formulation of network Matrix and describing Load flow Studies.
		3	Solve the Symmetrical Components and Unsymmetrical Components of Power system.
		4	Description of the various types of faults on an unloaded alternator.
		5	Enumerate the concepts of Power System Stability swing equation, critical clearing angle calculation elementary real world applications.
32023	Micro Processor & Micro Controllers	1	Ability to draw the basic architecture of 8086 microprocessor ,8051 and PIC microcontroller.
		2	Applying instruction set of 8086 ,8051 and PIC to solve the problems
		3	Ability to interfacing the data transfer, data conversion, interrupting, timing, display and other peripheral devices to 8086MP and 8051MC.
		4	Ability to design and develop 8086 Microprocessor and 8051 microcontroller based systems for real time applications using low level language like ALP.
32024	Data Structures	1	Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented inmemory and used by algorithm
		2	Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.
		3	Demonstrate different methods for traversing trees and Graphs
		4	Solve various algorithm design techniques for developing algorithms.
3202E	Open Elective Neural networks & Fuzzy Logic	1	Describe the structure and working of biological and artificial neurons and explain their various models.
		2	Describe various ANN architectures and explain their learning rules.
		3	Classify classical and fuzzy sets and explain properties, operations, and relations of fuzzy sets.
		4	Explain fuzzification and de-fuzzification methods of a Fuzzy logic controller



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Subject Code	Subject Title	CO No	Course Outcomes
		5	Apply Neural Networks and Fuzzy Logic to typical Electrical Engineering problems.
32026	Power Electronics Laboratory	1	To analyze the characteristics of various power electronic devices and analyze firing circuits
		2	To relate theoretical and practical analysis of single-phase converters with both resistive and inductive loads.
		3	To analyze the operation of AC voltage regulator with motor loads
		4	To explain the working of Buck converter, Boost converter and single phase inverter inverters.
32027	Micro Processor & Micro Controllers Laboratory	1	Ability to write assembly language program using 8086 micro processor
		2	Ability to interface 8086 and 8051 with I/O and other devices.
		3	Ability to write assembly language program using 8051 microcontroller
32028	Data Structures Laboratory	1	To develop skills to design and analyze simple linear and non linear data structures
		2	To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
		3	To Gain knowledge in practical applications of data structures



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IV Year Semester – I:

Subject Code	Subject Title	CO No	Course Outcomes
41021	Utilization of Electrical Energy	1	Students are able to Identify appropriate and desirable motors for electric drives in industrial applications
		2	Students are able to demonstrate different methods of heating and welding systems in industries
		3	Students are able to choose various illumination levels and different lighting schemes
		4	Students are able to recommend the most efficient illuminating sources and also be able to design different lightning systems
		5	Students are able to determine the Speed-Time characteristics and to estimate energy consumption of different types of traction motors
41022	Linear & Digital IC Applications	1	Acquire the basic operation & performance parameters of differential amplifiers.
		2	Analyze the measuring techniques of performance parameters of OP-AMP
		3	To analyze the linear and non-linear applications of operational amplifiers.
		4	To explain the analysis & design of different types of active filters using op amps
		5	To analyze the internal structure, operation and applications of different analog ICs
		6	To Acquire skills required for designing and testing integrated circuits
41023	Power System Operation & Control	1	Determine optimal scheduling of thermal and hydro-thermal power plants using Lagrange optimisation technique.
		2	Solve optimal unit commitment problem in power plants using Priority Ordering and Dynamic Programming techniques.
		3	Design an automatic active power/frequency controller (AGC/ALFC) for single area and two area power systems and analyse its performance.
		4	Evaluate how reactive power compensation improves the performance of transmission lines.
41024	Switchgear & Protection	1	Ability to demonstrate power system protection schemes, relays, switchgear and grounding
		2	Able to explain protection schemes of alternators, transmission lines, transformers, over voltage protection, groundings, relays and switchgear
		3	Able to compare protection scheme, groundings, relays technology and switchgear
		4	Able to sketch model grounding schemes, relays ,circuit breakers and over voltage protective devices



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Subject Code	Subject Title	CO No	Course Outcomes
		5	Able to identify which type of relay, circuit Breaker, over voltage protective devices and grounding methods are suitable for particular applications.
4102B	Advanced Control Systems	1	Formulate state model using state space analysis
		2	Design state feedback control through pole placement and describe the concepts of Controllability and Observability
		3	Analyse Nonlinear Control systems using describing function method, phase plane analysis, lypnov stability analysis.
		4	Formulation of Euler laugrange Equation for optimization
		5	Solving Linear quadratic optimal regulator problem and Riccati equation.
4102F	Electric Power Quality	1	Differentiate different types of power quality problems
		2	Detect sources of transients, voltage sags, swells, harmonics and long duration voltage variations and study power quality standards
		3	Propose solutions for power quality problems
		4	Demonstrate the relationship between distributed generation and power quality
		5	Analyze the power quality monitoring concepts and the usage of measuring instruments.
41027	Electric Simulation Laboratory	1	Ability to simulate integrator circuit, differentiator circuit, Boost converter, Buck converter, full convertor and PWM inverter.
		2	Ability to simulate transmission line by incorporating line, load and transformer models.
		3	Ability to perform transient analysis of RLC circuit and single machine connected to infinite bus(SMIB).
41028	Power Systems & Simulation Laboratory	1	Ability to apply iterative techniques for power flow analysis
		2	Ability to model and design stability and dynamics of single and two area bus system in power system
		3	Ability to acquire knowledge on Fault analysis.
		4	Solve the economic dispatch problems





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**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

IV Year Semester – II:

Subject Code	Subject Title	CO No	Course Outcomes
42021	Digital Control Systems	1	Interpret merits and demerits of digital control systems over analog control systems
		2	Illustrate various applications of digital control systems with the theory of z-transforms
		3	Acquire the knowledge to design a state feedback controller and to represent the discrete system in state space model
		4	Determine the stability of the discrete systems with various tests available
		5	Inspect the digital control systems in w-plane using conventional methods.
42022	HVDC Transmission	1	Able to explain concepts on hvdc systems, converters, harmonics, filters
		2	Able to illustrate control on power flow during normal and abnormal conditions
		3	Ability to compare hvdc systems, converters, converter faults, harmonics, filters
		4	Able to analyze the adverse effect of harmonics, converter faults, reactive power, filter design, converter circuit on hvdc system
		5	Able to predict best hvdc system, converters, control technique for power flow, filters for particular application
42023	Electrical Distribution Systems	1	Able to explain various factors of distribution system
		2	Able to design the substation and feeders.
		3	Able to explain the voltage drop and power loss
		4	Able to explain the protection and its coordination.
		5	Able to explain the effect of compensation for p.f improvement.
		6	Able to explain the effect of voltage control
202A	High Voltage Engineering	1	Explain electric field distribution in different electrode configurations and methods of computation.
		2	Analyse breakdown mechanism in gaseous, liquid, solid dielectrics
		3	Evaluate various methods of generation and measurement of AC, DC and impulse high voltages and high currents.
		4	Analyse various methods of non-destructive testing of materials and high voltage testing for electrical apparatus.



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Subject Code	Subject Title	CO No	Course Outcomes
4202B	Flexible Alternating Current Transmission	1	Analyse different types of FACTS controllers and their role in improving power flow control in transmission Lines
		2	Relate the performance and applications of VSI & CSI.
		3	Analyse role of shunt type FACTS controllers in improving the power system dynamics
		4	Analyse role of series type FACTS controllers in improving the power system dynamics
		5	Analyse the use of control schemes of UPFC in improving the power quality
42025	Seminar	1	Students are able to identify and analyze the real time system problems
		2	Students are able to adapt the latest technology and current trends in the field of respective areas
		3	Students able to analyze documents and present technical reports
		4	Students are able to participate in discussions for assessment of knowledge
		5	Students are able to adapt professional ethics
42026	Project	1	Apply the Electrical Knowledge to solve practical problems
		2	Designing the circuit to implement the projects
		3	Simulate and Emulate the Electrical and Electronics models
		4	Design and Implement Engineering Solutions for real time application

  
**HOD, EEE**  
 Head of the Dept.  
 Electrical and Electronics Engineering  
 Sir C.R. Reddy College of Engineering  
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