MALLAREDDY ENGINEERING COLLEGE AND MANAGEMENT SCIENCES
(Approved by AICTE New Delhi & Affiliated to JNTU Hyderabad)
Kistapur Village, Medchal, Medchal District–501401

			DEPT. OF ELECTRICAL & ELECTRONICS ENGINEERING			
			R-16 REGULATION - COURSE OUTCOMES			
S.No.	**CLASS**	**REGULATION**	**Subject**	**Course Code**	**CO's**	**Course Oucomes**
1	II/I	R-16	MATHEMATICS - IV	MA301BS	CO-1	analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
					CO-2	find the Taylor's and Laurent's series expansion of complex functions
					CO-3	the bilinear transformation
					CO-4	express any periodic function in term of sines and cosines
					CO-5	analyze one dimensional wave and heat equation
					CO-6	express a non-periodic function as integral representation
2	II/I	R-16	ELECTROMAGNETIC FIELDS	EE302ES	CO-1	Apply vector calculus to static electric – magnetic fields
					CO-2	Compute the force, fields & Energy for different charge & current configurations & evaluate capacitance and inductance
					CO-3	To obtain the electric and magnetic fields for simple configurations under static conditions
					CO-4	To analyze time varying electric and magnetic fields
					CO-5	Analyze Maxwell's equation in different forms (Differential and integral) in Electrostatic, Magnetic time varying fields
3	II/I	R-16	ELECTRICAL MACHINES – I	EE303ES	CO-1	Identify different parts of a DC machine & understand its operation
					CO-2	Carry out different testing methods to predetermine the efficiency of DC machines
					CO-3	Understand different excitation and starting methods of DC machines
					CO-4	Control the voltage and speed of a DC machines
					CO-5	Analyze single phase and three phase transformers circuits
4	II/I	R-16	NETWORK THEORY	EE304ES	CO-1	Analyze the Electrical Circuits with the concept of Network topology
					CO-2	Apply the concepts of Magnetic circuit & Analyze Magnetic circuits
					CO-3	Determine self and mutually induced EMF's for Magnetically coupled coils
					CO-4	Understand the importance of three phase circuits and Analyze the three phase circuits with Star & Delta connected balanced and unbalanced loads
					CO-5	Analyze the transient behavior of electrical networks for various excitations
					CO-6	Obtain the various network parameters for the given two port networks
					CO-7	Represent the transfer function for the given network
					CO-8	Determine the parameters for the design of various filters
5	II/I	R-16	ELECTRONIC CIRCUITS	EE305ES	CO-1	Apply the knowledge of BJT to design practical amplifier circuits
					CO-2	Design electronic sub systems such as feedback amplifiers, oscillators and power amplifiers to meet the required specifications.
					CO-3	Design linear and non linear wave shaping circuits with different inputs.
					CO-4	Ability to analyze PN junctions in semiconductor devices under various conditions
					CO-5	Analyze multi vibrators using transistors.
6	II/I	R-16	ELECTRICAL MACHINES LAB – I	EE306ES	CO-1	Start and control the Different DC Machines
					CO-2	Assess the performance of different machines using different testing methods
					CO-3	Identify different conditions required to be satisfied for self - excitation of DC Generators
					CO-4	Control the voltage and speed of a DC machines
					CO-5	Separate iron losses of DC machines into different components
7	II/I	R-16	ELECTRONIC DEVICES AND CIRCUITS LAB	EE306ES	CO-1	After Completion of the course the student is able to Apply various devices to real time problems.
					CO-2	Ability to analyze PN junctions in semiconductor devices under various conditions
					CO-3	Ability to design and analyze simple rectifiers and voltage regulators using diodes.
					CO-4	Ability to describe the behavior of special purpose diodes.
					CO-5	Solve complex electric circuits using network theorems.

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8	II/I	R-16	Networks Lab	EE307ES	CO-1	Analyze complex DC and AC linear circuits
					CO-2	Apply concepts of electrical circuits across engineering
					CO-3	To understand the working principle of various communication protocols.
					CO-4	To analyze the various routing algorithms.
					CO-5	Evaluate response in a given network by using theorems. To know the concept of data transfer between nodes
9	II/I	R-16	Environmental Science and Technology	*MC300ES	CO-1	Analyze complex DC and AC linear circuits
					CO-2	Apply concepts of electrical circuits across engineering
					CO-3	Evaluate response in a given network by using theorems
					CO-4	Identify environmental problems, evaluate problem solving strategies and develop science based solutions
					CO-5	understand the need to integrate relevant social sciences (eg: environmental planning, law, economics) in environmental problem solving

S.No.	CLASS	REGULATION	Subject	Course Code	CO's	Course Oucomes
1	III/I	R-16	ELECTRICAL MEASUREMENTS & INSTRUMENTATION	EE501PC	CO-1	Understand different types of measuring instruments, their construction, operation and characteristics
					CO-2	Identify the instruments suitable for typical measurements
					CO-3	Apply the knowledge about transducers and instrument transformers to use them effectively.
					CO-4	Examine AC bridges for the measurement of inductance, capacitance and frequency.
					CO-5	Apply the knowledge of smart and digital metering for industrial applications
2	III/I	R-16	POWER SYSTEMS - II	EE502PC	CO-1	Able to compute inductance and capacitance for different configurations of transmission lines.
					CO-2	Able to analyze the performance of transmission lines
					CO-3	Can understand transient's phenomenon of transmission lines.
					CO-4	Able to calculate sag and tension calculations.
					CO-5	Will be able to understand overhead line insulators and underground cables
3	III/I	R-16	MICROPROCESSORS AND MICROCONTROLLERS	EI503PC	CO-1	Understand the principle of operation of Intel 8086 microprocessor
					CO-2	Execute assembly language programs on Intel 8086 including ascending order and descending order of data, string operations
					CO-3	Integrate Intel 8086 processor with 8255, DMA controller, Intel 8259, USART to develop the microprocessor based system
					CO-4	Develop and run program of Intel 8051 microcontroller
					CO-5	Analyze architecture and interrupt structure of RISC microcontrollers
4	III/I	R-16	FUNDAMENTALS OF MANAGEMENT	SM504MS	CO-1	The students understand the significance of Management in their Profession.
					CO-2	Managers use problem-solving strategies and critical thinking skills in reallife situations
					CO-3	The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course
					CO-4	Managers implement successful planning
					CO-5	The students can explore the Management Practices in their domain area.
5	III/I	R-16	ELECTRICAL MEASUREMENTS & INSTRUMENTATION LAB	EE505PC	CO-1	Understand different types of measuring instruments, their construction, operation and characteristics
					CO-2	Identify the instruments suitable for typical measurements
					CO-3	Apply the knowledge about transducers and instrument transformers to use them effectively.
					CO-4	Apply the knowledge of smart and digital metering for industrial applications
					CO-5	Analyze and interpret experimental data for informed instrument selection and calibration, as well as assessing measurement accuracy.
6	III/I	R-16	BASIC ELECTRICAL SIMULATION LAB	EE506PC	CO-1	Understand the main features and importance of the MATLAB/ SCI LAB mathematical programming environment.
					CO-2	Apply working knowledge of MATLAB/ SCI LAB package to simulate and solve Electrical, Electronics circuits and Applications.
					CO-3	Solve, Simulate and Analyse various DC circuits.
					CO-4	Solve, Simulate and Analyse various AC circuits.
					CO-5	Solve, Simulate and Analyse simple Transformer and DC Generator circuits.
6	III/I	R-16	MICROPROCESSORS AND MICROCONTROLLERS LAB	EI507PC	CO-1	Demonstrate MASM assembler programming.
					CO-2	Develop an ALP in 8086 and its interfacing circuits.
					CO-3	Develop an ALP in 8051 for parallel ports and timers
					CO-4	Develop an ability in designing a microprocessor and microcontroller systems
					CO-5	Apply standard test and measurement equipment to evaluate digital interfaces.
9	III/I	R-16	PROFESSIONAL ETHICS	*MC500HS	CO-1	The students will understand the importance of Values and Ethics in their personal lives and professional careers
					CO-2	The students will learn the rights and responsibilities as an employee, team member and a global citizen
					CO-3	Students will understand the importance of Values and Ethics in their Personal lives and professional careers
					CO-4	The students will learn the rights and responsibilities 3 Responsibilities of employee, team member and a global citizen.
					CO-5	Students identify an ethical issue and analyze that issue in relationship to the specific topic of study or discipline

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1	II/II	R-16	SWITCHING THEORY AND LOGIC DESIGN	EC401ES	CO-1	Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray and BCD.
					CO-2	Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
					CO-3	Be able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
					CO-4	To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems
					CO-5	Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.
2	II/II	R-16	POWER SYSTEMS – I	EE402ES	CO-1	Draw the layout of hydro power plant, thermal power station, Nuclear power plant and gas power plant and explain its operation
					CO-2	Describe A.C. and D.C. distribution systems and its voltage drop calculations
					CO-3	Illustrate various economic aspects of the power plant erection, operation and different tariff methods
					CO-4	Able to calculate sag and tension calculations.
					CO-5	Understand power factor improvement methods and determine economical power factor
3	II/II	R-16	ELECTRICAL MACHINES – II	EE403ES	CO-1	Identify different parts of transformers and induction motors and specify their functions
					CO-2	Understand the operation of transformers and induction motors
					CO-3	Carry out different testing methods and assess the performance of transformers and induction motors
					CO-4	Assess the performance of different machines using different testing methods
					CO-5	Start and control the induction motor
4	II/II	R-16	CONTROL SYSTEMS	EE404ES	CO-1	Improve the system performance by selecting a suitable controller and/or a compensator for a specific application
					CO-2	Apply various time domain and frequency domain techniques to assess the system performance
					CO-3	Apply various control strategies to different applications (example: Power systems, electrical drives etc…)
					CO-4	Examine the system behavior using various stability analysis techniques
					CO-5	Test system Controllability and Observability using state space representation and applications of state space representation to various systems.
5	II/II	R-16	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	SM405ES	CO-1	The students will understand the various Forms of Business and the impact of economic variables on the Business
					CO-2	The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
					CO-3	The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course
					CO-4	Managers implement successful planning
					CO-5	The Students can study the firm's financial position by analysing the Financial Statements of a Company.
6	II/II	R-16	CONTROL SYSTEMS LAB	EE406ES	CO-1	How to improve the system performance by selecting a suitable controller and/or a compensator for a specific application
					CO-2	Apply various time domain and frequency domain techniques to assess the system performance
					CO-3	Examine the system behavior using various stability analysis techniques
					CO-4	Apply various control strategies to different applications(example: Power systems, electrical drives etc)
					CO-5	Test system controllability and observability using state space representation and applications of state space representation to various systems
7	II/II	R-16	ELECTRICAL MACHINES LAB – II	EE407ES	CO-1	Assess the performance of different machines using different testing methods
					CO-2	to convert the Phase from three phase to two phase and vice versa
					CO-3	Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods
					CO-4	Control the active and reactive power flows in synchronous machines
					CO-5	Start different machines and control the speed and power factor
8	II/II	R-16	ELECTRONIC CIRCUITS LAB	EE408ES	CO-1	Apply the concepts of amplifiers in the design of Public Addressing System
					CO-2	Generate Sinusoidal wave forms
					CO-3	Design stable system using feedback concepts.
					CO-4	To construct and simulate various electronics circuits using tools such as Pspice/multisim and study the response.
					CO-5	Design multi vibrator using transistor
9	II/II	R-16	GENDER SENSITIZATION LAB	MC400HS	CO-1	Students will have developed a better understanding of important issues related to gender in contemporary India.
					CO-2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature, and film.
					CO-3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
					CO-4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.
					CO-5	Men and women students and professionals will be better equipped to work and live together as equals.
					CO-6	Students will develop a sense of appreciation of women in all walks of life.
					CO-7	Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence

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1	III/II	R-16	POWER SYSTEMS ANALYSIS	EE601PC	CO-1	Able to find the fault currents for all types faults to provide data for the design of protective devices
					CO-2	Analyze load flow for various requirements of the power system
					CO-3	Analyze short circuit studies for the protection of power system
					CO-4	Able to understand the load flow solution of a power system using different methods.
					CO-5	Estimate stability and instability in power systems
2	III/II	R-16	POWER ELECTRONICS	EE602PC	CO-1	Understand the differences between signal level and power level devices.
					CO-2	Analyze controlled rectifier circuits.
					CO-3	Analyze the operation of DC-DC choppers.
					CO-4	Understand the working of various power electronic circuits and components used in industrial applications
					CO-5	Analyze the operation of voltage source inverters
3	III/II	R-16	SWITCH GEAR AND PROTECTION	EE603PC	CO-1	Understand the types of Circuit breakers and choice of Relays for appropriate protection of power system equipment.
					CO-2	Understand various types of Protective devices in Electrical Power Systems.
					CO-3	Interpret the existing transmission voltage levels and various means to protect the system against over voltages.
					CO-4	To understand the types of Circuit breakers and relays for protection of Generators, Transformers and feeder bus bar from Over voltages
					CO-5	Understand the importance of Neutral Grounding, Effects of Ungrounded Neutral grounding on system performance, Methods and Practices
4	III/II	R-16	ELECTRICAL AND ELECTRONICS INSTRUMENTATION	EE614PE	CO-1	Design and implement systems utilizing analog / digital control devices.
					CO-2	Apply the concepts of automatic control, including measurement, feedback, and feed forward regulation for the operation of continuous and discrete systems.
					CO-3	Solve technical problems and be proficient in the analysis, design, test, and implementation of instrumentation and control systems.
					CO-4	Apply the concepts of heat transfer to the design of process control systems.
					CO-5	Able to utilize modern and effective management skills for performing investigation, analysis, and synthesis in the implementation of automatic control systems
5	III/II	R-16	POWER SYSTEMS LAB	EE604PC	CO-1	Able to develop mathematical models for analysis
					CO-2	Able to select proper methodologies of load flow studies for the power network
					CO-3	Able to develop the understanding of contingency Analysis
					CO-4	Able to develop programs for power system studies.
					CO-5	Analyze the experimental data and draw the conclusions
6	III/II	R-16	POWER ELECTRONICS LAB	EE605PC	CO-1	Understand the operation of power electronic devices & its applications
					CO-2	Analyze the Characteristics of power electronic devices
					CO-3	Understand the operating principles of various power electronic converters.
					CO-4	Use power electronic simulation packages& hardware to develop the power converters.
					CO-5	Analyze and choose the appropriate converters for various applications
7	III/II	R-16	ADVANCED ENGLISH COMMUNICATION SKILLS LAB	EN606HS	CO-1	Acquire vocabulary and use it contextually
					CO-2	Listen and speak effectively
					CO-3	Develop proficiency in academic reading and writing
					CO-4	Increase possibilities of job prospects
					CO-5	Communicate confidently in formal and informal contexts

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1	IV/I	R-16	POWER SEMICONDUCTOR DRIVES	EE701PC	CO-1	Identify the drawbacks of speed control of motor by conventional methods.
					CO-2	Differentiate Phase controlled and chopper-controlled DC drives speed-torque characteristics merits and demerits
					CO-3	Understand Ac motor drive speed–torque characteristics using different control strategies its merits and demerits
					CO-4	Describe Slip power recovery schemes
					CO-5	Describe the operation and speed –torque characteristics of Separate control & self-control of synchronous motors using VSI, CSI and Cyclo converter.
2	IV/I	R-16	POWER SYSTEM OPERATION AND CONTROL	EE702PC	CO-1	Compare and contrast electromagnetic, static and microprocessor-based relays
					CO-2	Apply technology to protect power system components.
					CO-3	Select relay settings of over current and distance relays.
					CO-4	Summarize the protection schemes for power system components.
					CO-5	Analyze quenching mechanisms used in air, oil and vacuum circuit breakers
3	IV/I	R-16	DIGITAL SIGNAL PROCESSING	EE721PE	CO-1	Perform time, frequency, and Z -transform analysis on signals and systems.
					CO-2	Understand the inter-relationship between DFT and various transforms.
					CO-3	Understand the significance of various filter structures and effects of round off errors.
					CO-4	Design a digital filter for a given specification.
					CO-5	Understand the fast computation of DFT and appreciate the FFT processing.

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					CO-6	Understand the tradeoffs between normal and multi rate DSP techniques and finite length word effects.
4	IV/I	R-16	HVDC TRANSMISSION	EE731PE	CO-1	Compare EHV AC and HVDC system and to describe various types of DC links
					CO-2	Analyze Graetz circuit for rectifier and inverter mode of operation
					CO-3	Choose proper controller for the specific application based on system requirements
					CO-4	Describe various methods for the control of HVDC systems and to perform power flow analysis in AC/DC systems
					CO-5	Describe various protection methods for HVDC systems and classify Harmonics and design different types of filters
5	IV/I	R-16	ELECTRICAL DISTRIBUTION SYSTEMS	EE743PE	CO-1	Distinguish between transmission and distribution network and design the feeders
					CO-2	Compute power loss and voltage drop of the feeders
					CO-3	Design protection of distribution systems
					CO-4	Understand the importance of voltage control and power factor improvement
					CO-5	Understand the need for controlling the PF, Voltage and Power and the equipment used for mitigating them.
6	IV/I	R-16	ELECTRICAL SYSTEMS SIMULATION LAB	EE703PC	CO-1	Design and Analyze electrical systems in time and frequency domain
					CO-2	Analyze various transmission lines and perform fault analysis
					CO-3	Model Load frequency control of Power Systems
					CO-4	To Model, simulate and analyze the performance of DC Machines and Induction Motors.
					CO-5	Design various Power Electronic Converters and Drives.
7	IV/I	R-16	ELECTRICAL WORKSHOP	EE704PC	CO-1	Get practical knowledge related to electrical
					CO-2	fabricate basic electrical circuit elements/networks
					CO-3	Trouble shoot the electrical circuits
					CO-4	Design filter circuit for application
					CO-5	Get hardware skills such as soldering, winding etc.
					CO-6	Get debugging skills

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1	IV/II	R-16	FLEXIBLE A.C. TRANSMISSION SYSTEMS	EE861PE	CO-1	Choose proper controller for the specific application based on system requirements
					CO-2	Understand various systems thoroughly and their requirements
					CO-3	Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping
					CO-4	Understand the operations of different FACTS devices.
					CO-5	Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC
2	IV/II	R-16	POWER QUALITY	EE863PE	CO-1	Concept of improving the power quality to sensitive load by various mitigating custom power devices
					CO-2	Choose proper controller for the specific application based on system requirements
					CO-3	Understand various systems thoroughly and their requirements
					CO-4	Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping
					CO-5	Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC
3	IV/II	R-16	ELECTRONIC MEASURING INSTRUMENTS	EE863PE	CO-1	Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
					CO-2	Develop the knowledge of theoretical and mathematical principles of electrical measuring instruments.
					CO-3	Examine various real life situations in domestic or industrial scenario where measurements of electrical quantities are essential.
					CO-4	Measure various physical parameters by appropriately selecting the transducers.
					CO-5	Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals