AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)
NAAC "B++" Accredited Institute
Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.
www.aietg.ac.in email: principal.avanthi@gmail.com

Electrical & Electronics Engineering I & II SEM Course Outcomes(For R22 regulation)

S.no	Year/Sem	Course Name	Course Outcomes
1	II-I	numerical methods and complex variables	CO1:Express any periodic function in terms of sine and cosine
			CO2:Find the root of a given polynomial and transcendental equations
			CO3:Estimate the value for the given data using interpolation
			CO4:Find the numerical solutions for a given first order ODE's
			CO5:Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
			CO6:Taylor's and Laurent's series expansions in complex function
2	II-I	power systems 1	CO1:Understand the concepts of power systems
			CO2:Understand the operation of conventional generating stations and renewable sources of electrical power.
			CO3:Evaluate the power tariff method
			CO4:Determine the electrical circuit parameters of transmission lines
			CO5:Understand the layout of substation and underground cables and corona
3	II-I	Analog Electronics ciruits	CO1: Know the characteristics, utilization of various components
			CO2: Understand the biasing techniques Design and analyze various rectifiers, small signal amplifier circuits
			CO3: Design sinusoidal and non-sinusoidal oscillators
			CO4:A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linear integrated circuits
4	II-I	Electrical Machines-I	CO1: Identify different parts of a DC machine & understand its operation Carry out different testing methods to predetermine the efficiency of DC machines
			CO2:Understand different excitation and starting methods of DC machines
			CO3:Control the voltage and speed of a DC machines
			CO4:Analyze single phase and three phase transformers circuits
5	II-I	Electro Magnetic Field	**CO1**: Understand the basic laws of electromagnetism
			CO2: Obtain the electric and magnetic fields for simple configurations under static conditions
			CO3: Analyze time varying electric and magnetic fields
			CO4: Understand Maxwell's equation in different forms and different media
			CO5: Understand the propagation of EM waves
6	II-I	ELECTRICAL MACHINES LAB	CO1:to Start and control the Different DC Machines
			CO2;Assess the performance of different machines using different testing methods
			CO3:Identify different conditions required to be satisfied for self - excitation of DC Generators
			CO4:Separate iron losses of DC machines into different components
7	II-I	ANALOG ELECTRONIC CIRCUITS LAB	CO1: Know the characteristics, utilization of various components
			CO2 :Understand the biasing techniques
			CO3:Design and analyze various rectifiers, small signal amplifier circuits
			CO4:Design sinusoidal and non-sinusoidal oscillators
			CO5:A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linear integrated circuits
			.
8	II-I	ELECTRICAL SIMULATION TOOL LAB	CO1:Analyze complex DC and AC linear circuits
			CO2:Apply concepts of electrical circuits across engineering
			CO3:Evaluate response in a given network by using theorems
9	II-II	solid mechanics and hydraulic machines	CO1:Use the Laplace transforms techniques for solving ODE's
			CO2:Find the root of a given equation.
			CO3:Estimate the value for the given data using interpolation
			CO4:Find the numerical solutions for a given ODE's
			CO5:Analyze the complex function with reference to their analyticity, integration using Cauchy's
			CO6:integral and residue theorems Taylor's and Laurent's series expansions of complex function

10	II-II	ELECTRICAL MACHINES – II:	CO1: Understand the concepts of rotating magnetic fields
			CO2:Understand the operation of ac machines.
			CO3:Analyze performance characteristics of ac machines
11	II-II	DIGITAL ELECTRONICS	CO1:Understand working of logic families and logic gates
			CO2:Design and implement Combinational and Sequential logic circuits
			CO3:Understand the process of Analog to Digital conversion and Digital to Analog conversion
			CO4:Be able to use PLDs to implement the given logical problem.
12	II-II	measurements and instrumentation	CO1:Understand the modeling of linear-time-invariant systems using transfer function and statespace representations
			CO2:Understand the concept of stability and its assessment for linear-time invariant systems
			CO3:Design simple feedback controllers.
13	II-II	POWER SYSTEM - II	CO1:Analyze transmission line performance and Apply load compensation techniques to control reactive power.
			CO2:Understand the application of per unit quantities in power systems.
			CO3:Design over voltage protection, insulation coordination and determine the fault currents for symmetrical and unbalanced faults.
14	II-II	DIGITAL ELECTRONICS LAB	CO1:Understand working of logic families and logic gates
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15	II-II	ELECTRICAL MACHINES LAB – II	CO1: Assess the performance of different machines using different testing methods
			CO2: Convert the Phase from three phase to two phase and vice versa
			CO3: Compensate the changes in terminal voltages of synchronous generator after estimating
			CO4:the change by different methods Control the active and reactive power flows in synchronous machines
			CO5:Start different machines and control the speed and power factor
16	II-II	Measurements and instrumentation laboratory	CO1:How to improve the system performance by selecting a suitable controller and/or a compensator for a specific application
			CO2:Apply various time domain and frequency domain techniques to assess the system
			CO3:performance Apply various control strategies to different applications (example: Power systems, electrical drives etc)
			CO4:Test system controllability and observability using state space representation and applications of state space representation to various systems

Course Outcomes For R18 Regulation			
17	III-I	POWER ELECTRONICS	CO1:Understand the differences between signal level and power level devices
			CO2:Analyze controlled rectifier circuits
			CO3:Analyze the operation of DC-DC choppers
			CO4:Analyze the operation of voltage source inverters
18	III-I	POWER SYSTEM – II	CO1: Analyze transmission line performance
			CO2:Apply load compensation techniques to control reactive power
			CO3:Understand the application of per unit quantities
			CO4:Design over voltage protection and insulation coordination
			CO5:Determine the fault currents for symmetrical and unbalanced fault
19	III-I	EASUREMENTS AND INSTRUMENTATI	CO1:Understand different types of measuring instruments, their construction, operation
			CO2:characteristics Identify the instruments suitable for typical measurements
			CO3:Apply the knowledge about transducers and instrument transformers to use them effectively
			CO4:Apply the knowledge of smart and digital metering for industrial applications
20	III-I	COMPUTER ARCHITECTURE(Professional Elective - I)	CO1:Understand the concepts of microprocessors, their principles and practices
			CO2:Write efficient programs in assembly language of the 8086 family of microprocessors
			CO3: Organize a modern computer system and be able to relate it to real examples
			CO4: Develop the programs in assembly language for 80286, 80386 and MIPS processors in real
			CO5: and protected modes. Implement embedded applications using ATOM processor.
21	III-I	HIGH VOLTAGE ENGINEERING Professional Elective - I)	CO1:the basic physics related to various breakdown processes in solid, liquid
			CO2:gaseous insulating materials. Knowledge of generation and measurement of C., A.C
			CO3:Impulse voltages. Knowledge of tests on H. V. equipment and on insulating materials, as per the standards
			CO4: Knowledge of how over-voltages arise in a power system, and protection against these overvoltages
22	III-I	ELECTRICAL MACHINE DESIGN Professional Elective - I)	CO1: Understand the construction and performance characteristics of electrical machines
			CO2:Understand the various factors which influence the design: electrical, magnetic and thermal
			CO3: loading of electrical machines Understand the principles of electrical machine design and carry out a basic design of an acmachine
			CO4:Use software tools to do design calculations.
23	III-I	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	CO1:The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost Market Structure , Pricing
24	III-I	WER SYSTEM SIMULATION L	CO1:Perform various transmission line calculations
			CO2:Understand Different circuits time constants
			CO3:Analyze the experimental data and draw the conclusions.
25	III-I	POWER ELECTRONICS LAB	CO1:operating principles of various power electronic converters
			CO2:Use power electronic simulation packages
			CO3:hardware to develop the power converters
			CO4:Analyze and choose the appropriate converters for various applications
26	III-I	MEASUREMENTS AND INSTRUMENTATION LAB	CO1 :Describe measuring instruments.
			CO2:Understand and explain working of waveform generators, waveform analyzers, and transducers.
			CO3: To operate various measuring instruments.
			CO4:To analyze performance of waveform generators, waveform analyzers, transducers.

27	III-I	ADVANCED COMMUNICATION SKILLS LAB	CO1:To improve the students' fluency in English, through a well-developed vocabulary and enable
			CO2:them to listen to English spoken at normal conversational speed by educated English
			CO3:speakers and respond appropriately in different socio-cultural and professional contexts
			CO4;Further, they would be required to communicate their ideas relevantly and coherently in writing
			CO5:To prepare all the students for their placements
28	III-II	OPTIMIZATION TECHNIQUES Professional Elective - III	CO1:need of optimization of engineering systems
			CO2:understand optimization of electrical and electronics engineering problems
			CO3:apply classical optimization techniques, linear programming, simplex algorithm, transportation
			CO4;problem apply unconstrained optimization and constrained non-linear programming and dynamic
			CO5:programming Formulate optimization problems
29	III-II	POWER SEMICONDUCTOR DRIVES	CO1:Identify the drawbacks of speed control of motor by conventional methods
			CO2:Differentiate Phase controlled and chopper-controlled DC drives speed- torque characteristics
			CO3: merits and demerits Understand Ac motor drive speed–torque characteristics using different control strategies its
			CO4: merits and demerits Describe Slip power recovery schemes
30	III-II	WIND AND SOLAR ENERGY SYSTEMS Professional Elective - II	CO1:Understand the energy scenario and the consequent growths of the power generate renewable energy sources
			CO2:Understand the basic physics of wind and solar power generation
			CO3:Understand the power electronic interfaces for wind and solar generation
			CO4:Understand the issues related to the grid-integration of solar and wind energy Systems
31	III-II	SIGNALS AND SYSTEMS	CO1: to Differentiate various signal functions
			CO2:Represent any arbitrary signal in time and frequency domain
			CO3:Understand the characteristics of linear time invariant systems
			CO4:Analyze the signals with different transform technique
32	III-II	MICROPROCESSORS & MICROCONTROLLERS	CO1:Understands the internal architecture, organization and assembly language programming of 8086 processors
			CO2:Understands the internal architecture, organization and assembly language programming of 8051/controllers
			CO3:Understands the interfacing techniques to 8086 and 8051 based systems
			CO4:Understands the internal architecture of ARM processors and basic concepts of advanced ARM processors
33	III-II	POWER SYSTEM PROTECTION	CO1:Compare and contrast electromagnetic, static and microprocessor-based relays
			CO2:Apply technology to protect power system components
			CO3:Select relay settings of over current and distance relays
			CO4:Analyze quenching mechanisms used in air, oil and vacuum circuit breakers
34	III-II	POWER SYSTEM OPERATION AND CONTROL	CO1:Understand operation and control of power systems
			CO2:Analyze various functions of Energy Management System (EMS) functions
			CO3:Analyze whether the machine is in stable or unstable position
			CO4:Understand power system deregulation and restructuring
35	III-II	POWER SYSTEM LAB	CO1: Perform various load flow techniques
			CO2:Understand Different protection methods
			CO3:Analyze the experimental data and draw the conclusions
36	III-II	SIGNALS AND SYSTEMS LAB	CO1:Understand the concepts of continuous time and discrete time systems
			CO2:Analyse systems in complex frequency domain
			CO3:Understand sampling theorem and its implications

37	III-II	DIGITAL CONTROL SYSTEMS (Professional Elective - II)	CO1: the ability to Obtain discrete representation of LTI systems
			CO2:Analyze stability of open loop and closed loop discrete-time systems
			CO3:Design and analyze digital controllers
			CO4;Design state feedback and output feedback controllers
38	IV-I	ELECTRICAL AND HYBRID VEHICLES	CO1:demonstrate the ability to Understand the models to describe hybrid vehicles and their performance
			CO2:Understand the different possible ways of energy storage
			CO3:Understand the different strategies related to energy storage systems
39	IV-I	HVDC TRANSMISSION	CO1:to Compare EHV AC and HVDC system and to describe various types of DC links
			CO2:Analyze Graetz circuit for rectifier and inverter mode of operation
			CO3;Describe various methods for the control of HVDC systems and to perform power flow analysis
			CO4:in AC/DC systems Describe various protection methods for HVDC systems and classify Harmonics and design different types of filters
40	IV-I	POWER SYSTEM RELIABILITY	CO1: able to Estimate loss of load and energy indices for generation systems model
			CO2:Describe merging generation and load models
			CO3:Apply various indices for distribution systems
			CO4:Evaluate reliability of interconnected systems
41	IV-I	FUNDAMENTALS OF MANAGEMENT FOR ENGINEERS	CO1: The students understand the significance of Management in their Profession.
			CO2: Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course. The students can explore the Management Practices in their domain area
42	IV-I	ELECTRICAL & ELECTRONICS DESIGN LAB	CO1:Get practical knowledge related to electrical
			CO2:Fabricate basic electrical circuit elements/networks
			CO3:Trouble shoot the electrical circuits Design filter circuit for application
			CO4:Get hardware skills such as soldering, winding etc
43	IV-II	POWER QUALITY AND FACTS	CO1:Know the severity of power quality problems in distribution system
			CO2:Understand the concept of voltage sag transformation from up-stream (higher voltages
			CO3:devices Choose proper controller for the specific application based on system requirements
			CO4:Understand various systems thoroughly and their requirements
			CO5:Understand the control circuits of Shunt Controllers SVC& STATCOM for various functions viz
			CO6:Transient stability Enhancement, voltage instability prevention and power oscillation
44	IV-II	SMART GRID TECHNOLOGIES	CO1:Understand the features of small grid in the context of Indian grid
			CO2:Understand the role of automation in transmission and distribution
			CO3:Apply evolutionary algorithms for smart grid
			CO4:Understand operation and maintenance of PMUs, PDCs, WAMs, and voltage and frequency control in micro grid
45	IV-II	ELECTRICAL DISTRIBUTION SYSTEMS	CO1:to distinguish between transmission, and distribution line and design the feeders
			CO2:compute power loss and voltage drop of the feeders
			CO3:design protection of distribution systems
			CO4:understand the importance of voltage control and power factor improvement
46	IV-II	NON-CONVENTIONAL SOURCES OF ENERGY	CO1: Understand the basic concepts and operation of renewable energy systems
			CO2 : Remember the ideas and statistics of current RES availability and usage.
			CO3 :Analyze the problems in RES installation in real time
			CO4:Identify the other NCES and available sources improvement
			C05 :Apply the renewable energy systems in real time applications.