Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

Course Title		Course Outcomes(COs)
ALGEBRA AND CALCULUS	CO1	Apply the matrix algebra techniques for solving various linear equations.
	CO2	Analyze the linear transformations of quadratic forms and mean value theorems.
	CO3	Apply the fundamental concepts of partial derivatives for multi variable functions.
	CO4	Evaluate the multiple integrals in Cartesian, polar, cylindrical, and spherical co-ordinate systems.
	CO5	Evaluate the improper integrals using special functions like Beta and Gamma.
APPLIED PHYSICS	CO1	Understand the properties of light and electromagnetic waves.
	CO2	Analyze the fundamentals of Lasers and optical fibers.
	CO3	Analyze the properties of dielectric and magnetic materials.
	CO4	Analyze the charge carrier dynamics in semiconductors by implementing the equations of state.
	CO5	Apply the basic concepts of superconductors and nanomaterials for engineering problems.
COMMUNICATIVE ENGLISH	CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English (Listening and Writing)
	CO2	Apply grammatical structures to formulate sentences and correct word forms (Grammar)
	CO3	Analyze discourse markers to speak clearly on a specific topic in informal discussions (Speaking)
	CO4	Evaluate reading/listening texts and to write summaries based on global comprehension
	CO5	Create a coherent paragraph interpreting a figure/graph/chart/table (Writing)
ENGINEERING WORKSHOP PRACTICE	CO1	Understand workshop tools and operational capabilities.
	CO2	Apply wood working skills to prepare different joints.
	CO3	Apply sheet metal operations to prepare different components in real world applications.
	CO4	Apply fitting operations for various applications.
	CO5	Apply basic electrical engineering knowledge for house wiring practice.
PROBLEM SOLVING AND PROGRAMMING	CO1	Understand the Programming and Algorithms concepts to Perform Basic operations.
	CO2	Apply the problem solving approaches to generate different algorithms.
	CO3	Understand the various operators to perform mathematical operations.
	CO4	Apply the Pointers and Array Techniques to manipulate the data.
	CO5	Analyze the Sorting and Searching Techniques to arrange the data in sorted order.
COMMUNICATIVE ENGLISH LAB	CO1	Evaluate the awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO2	Understand the different aspects of the language with emphasis on LSRW skills and make use of different strategies in discussions.
	CO3	Apply the knowledge of vocabulary and skills in various language learning activities.
	CO4	Analyze the speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
	CO5	Evaluate the acceptable etiquette essentials in social and professional presentations.
APPLIED PHYSICS LAB	CO1	Analyze the properties of light for solving engineering problems.
	CO2	Understand the basic concepts of electromagnetic induction.
	CO3	Evaluate the crystallite size using X-ray diffraction.
	CO4	Analyze the basic properties of dielectric and magnetic behaviour of the given material.
	CO5	Evaluate the basic parameters of a given semiconductor material.
PROBLEM SOLVING AND PROGRAMMING LAB	CO1	Analyze the basics of computer and concepts of C for writing simple programs.
	CO2	Analyze the control statements for solving the problems using C
	CO3	Design the algorithm for implementing complex problems using C.
	CO4	Analyze the arrays to store and retrieve the elements.
	CO5	Apply the different sorting techniques for solving real world problems.
DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1	Analyze the mathematical concepts of ordinary differential equations of higher order.
	CO2	Apply the methods of linear differential equations related to various engineering problems.
	CO3	Analyze the partial differential equations of first and higher order.
	CO4	Understand the vector differential operators such as gradient, curl, divergent.
	CO5	Evaluate the vector integral theorems by using line, surface, and volume integrals.
CHEMISTRY	CO1	Understand the interaction of energy levels between atoms and molecules
	CO2	Apply the electrochemical principles to the construction of batteries, fuel cells and electrochemical sensors
	CO3	Analyze the preparation and mechanism of polymers
	CO4	Analyze the separation of gaseous and liquid mixtures using instrumental methods
	CO5	Apply the purification technique to remove hardness of water and to check the quality of water
BASICS OF CIVIL AND MECHANICAL ENGINEERING	CO1	Understand the principles of Stress, Strain, Shear force, Bending Moment and Torsion.
	CO2	Understand the basic principles and concepts of Strain Rosettes for strain measurement.

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO3	Understand the characteristics of common building materials used in construction
	CO4	Understand the working principles of various power plants
	CO5	Understand the concepts of power transmission process
	CO6	Understand the principles of CAD, CAM, CIM and functioning of robots in manufacturing.
INTERNET OF THINGS (IOT)	CO1	Understand the vision of IoT from the Global Context.
	CO2	Understand the concept of Market perspective in M2M and IoT
	CO3	Understand the M2M and IoT Technology Fundamentals using Devices, Networks & Gateways.
	CO4	Analyze the Architecture of IoT in ETSI, IETF, ITU-T
	CO5	Apply the Real world design Constraints and Industrial Automation
ENGINEERING GRAPHICS	CO1	Apply the concepts of engineering curves for technical drawing
	CO2	Understand the quadrant system to locate the position of points and projection of lines
	CO3	Analyze the projection of planes as well as solids located in quadrant system
	CO4	Analyze the sectional views and development of surfaces of regular solids
	CO5	Apply orthographic and isometric projections concepts to construct the given object.
BASICS OF CIVIL AND MECHANICAL ENGINEERING LAB	CO1	Analyze the elastic properties and torque of mild steel
	CO2	Analyze the displacements of steel using electrical strain gauges
	CO3	Analyze the compressive strength of brick
	CO4	Apply the AUTOCAD Design process for basic drawings
	CO5	Apply the AUTOCAD Design process for editing Modules
	CO6	Apply the dimensional principles and conventional representations
CHEMISTRY LAB	CO1	Analyze the hardness of ground water sample.
	CO2	Apply the internal and external indicators in volumetric analysis.
	CO3	Analyze the preparation and applications of advanced polymer materials.
	CO4	Apply the electro analytical technique to measure the strength of acids.
	CO5	Analyze the mixture of components by chromatographic techniques.
INTERNET OF THINGS (IOT) LAB	CO1	Analyze the parameter of Analog and digital sensors using Development board.
	CO2	Evaluate the various actuators using Bluetooth communication technology.
	CO3	Analyze the sensor data using socket Communication and Local Area Network.

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO4	Analyze the sensor and actuator data using cloud platform.
	CO5	Create a prototype design to solve local area issues.
CONSTITUTION OF INDIA	CO1	Understand the historical background of the Constitution making and its importance for building a democratic India.
	CO2	Remember the basic features of Indian Constitution
	CO3	Understand the fundamental rights and duties for becoming a good citizen of India.
	CO4	Understand the Powers and functions of Governor, President, and Judiciary.
	CO5	Understand the functions of local administration bodies.
TRANSFORM TECHNIQUES AND COMPLEX VARIABLES	CO1	Apply the Laplace transform techniques for solving differential equations.
	CO2	Evaluate the Fourier series of periodic signals and half range series.
	CO3	Apply the Fourier series and Fourier transforms for continuous functions.
	CO4	Apply the Z -transform techniques for solving discrete functions.
	CO5	Analyze the differentiation and integration of complex functions used in engineering fields.
ELECTRICAL CIRCUITS-I	CO1	Understand the basic concepts and analysis of electrical circuits.
	CO2	Apply the network theorems for electrical circuits to study its properties.
	CO3	Analyze the properties of series and parallel magnetic circuits.
	CO4	Analyze the steady state response of single phase A.C circuits.
	CO5	Analyze the properties of three phase balanced and unbalanced circuits.
ELECTRONIC DEVICES AND CIRCUITS	CO1	Understand the characteristics of PN junction diode and special electronic devices.
	CO2	Analyze the construction and operation of three rectifiers using without and with filters.
	CO3	Evaluate the transistor parameters from its characteristics in three configurations.
	CO4	Understand the transistor biasing methods and thermal stabilization concepts.
	CO5	Analyze the transistor amplifier using h-parameter models for three configurations.
POWER SYSTEMS-I	CO1	Understand the operation of thermal, gas and nuclear power Stations.
	CO2	Analyze the operation of A.C and D.C distribution systems.
	CO3	Analyze the operation of air and gas insulated substations.
	CO4	Apply the power factor improvement techniques and voltage control for effective distribution of electrical energy.
	CO5	Analyze the economic aspects of power generation and tariff.
ELECTRICAL MACHINES-I	CO1	Analyze the process of Electro-mechanical energy conversion.
	CO2	Understand the performance characteristics of D.C generators.
	CO3	Evaluate the performance characteristics of D.C motors.
	CO4	Understand the constructional features and operations of single-phase transformer.
	CO5	Analyze the methods of operation of auto transformer and three phase transformers.

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

ELECTRICAL CIRCUITS-I LAB	CO1	Apply the Ohms Law, KCL & KVL for the given electrical circuits.
	CO2	Apply the Mesh analysis & Nodal Analysis for the given electrical circuits.
	CO3	Analyze the Superposition, Thevenin and Norton Theorems for the given DC circuits.
	CO4	Analyze the maximum Power Transfer, Reciprocity, Compensation and Millman's theorems for the given DC circuits.
	CO5	Understand the active power and reactive Power measurements in three phase balanced circuits.
ELECTRONIC DEVICES AND CIRCUITS LAB	CO1	Analyze the V-I characteristics of PN Diode, Zener diodes, SCR and UJT.
	CO2	Evaluate the parameters of Rectifiers with and without filters.
	CO3	Evaluate the parameters from the characteristics of BJT and FET in different configurations.
	CO4	Analyze the operation of DC biasing circuits of Transistors.
	CO5	Analyze the frequency response of amplifiers using BJT and FET.
ELECTRICAL MACHINES-I LAB	CO1	Evaluate the magnetization characteristics of DC shunt generator.
	CO2	Evaluate the characteristics of D.C machine by conducting direct and indirect tests.
	CO3	Apply the speed control techniques for a D.C shunt motor.
	CO4	Evaluate the characteristics of D.C shunt and compound generators by conducting load test.
	CO5	Evaluate the performance parameters of single-phase transformer.
PRINCIPLES OF EFFECTIVE PUBLIC SPEAKING	CO1	Apply the knowledge of principles, concepts and skills learned in speech preparation.
	CO2	Analyze the techniques of knowing audiences and in refining the speech
	CO3	Understand the listening skills and styles in effective listening.
	CO4	Analyze the diverse methods of speech in speech composition
	CO5	Apply the supporting materials and presentation aids in speech preparation.
ENVIRONMENTAL STUDIES	CO1	Understand the multidisciplinary nature of environmental studies, various renewable and nonrenewable resources.
	CO2	Understand the ecosystem and biodiversity to solve complex environmental problems
	CO3	Apply the various types of pollution, solid waste management, and related preventive measures
	CO4	Apply the rainwater harvesting, watershed management, ozone layer depletion, and wasteland reclamation.
	CO5	Analyze the population explosion and impact of environmental health issues on human being.
BASICS OF PYTHON PROGRAMMING	CO1	Understand the Basic concepts of python programming to build scripts in IDLE.
	CO2	Apply the modularity techniques to invoke user defined functions.
	CO3	Apply the concept of Strings and Lists to perform iterative operations on data.
	CO4	Apply the Mutable and Immutable data types to perform python Programs.

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO5	Analyze the Oops concepts to develop applications with reusability.
ELECTRICAL CIRCUITS-II	CO1	Analyze the transient response of R-L, R-C and R-L-C circuits with D.C excitation.
	CO2	Analyze the transient response of R-L, R-C & R-L-C circuits with A.C excitation.
	CO3	Evaluate the two port network Z, Y, ABCD and hybrid parameters.
	CO4	Apply Fourier transforms for A.C and D.C circuit parameters.
	CO5	Design different types of filters and equalizers for electrical circuits.
ELECTRICAL MACHINES-II	CO1	Analyze the concept of armature reaction and various regulation methods of alternators.
	CO2	Understand the working principle and performance of synchronous motors.
	CO3	Analyze the concept of circle diagram and the performance characteristics of three phase Induction motor.
	CO4	Analyze different methods of starting and speed control of three phase Induction motors.
	CO5	Analyze the operation of single-phase Induction motors and special machines.
ENGINEERING ELECTROMAGNETICS	CO1	Analyze the different aspects related to static electric fields equations.
	CO2	Analyze the concept of conductors, dipole, dielectric and capacitance.
	CO3	Understand the fundamental laws related to magneto statics.
	CO4	Analyze the concepts of magnetic forces and magnetic potential.
	CO5	Understand the fundamentals of time varying fields.
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	CO1	Understand the fundamentals of managerial economics and demand concept.
	CO2	Understand the production and cost concepts to optimize the output
	CO3	Analyze the price output relationship in different markets.
	CO4	Evaluate the capital budgeting techniques to invest in various projects.
	CO5	Analyze the accounting statements to evaluate the financial performance of business entity.
UNIVERSAL HUMAN VALUES	CO1	Understand the essentials of human values, self-exploration, happiness and prosperity for value added education.
	CO2	Analyze the harmony in the human being as sentient 'I' and the material 'Body' in various aspects.
	CO3	Apply the nine universal human values in relationships for harmony in the family and orderliness in the society.
	CO4	Evaluate the interconnectedness of four orders of nature and holistic perception of harmony at all levels of existence.
	CO5	Apply the holistic understanding of harmony on professional ethics through augmenting universal human order.
	CO1	Analyze the basic concepts of Python Programming

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

BASICS OF PYTHON PROGRAMMING LAB	CO2	Apply the loops and conditional statements of python using IDLE and programs.
	CO3	Analyze the compound data using Lists, Tuples and dictionaries using functions.
	CO4	Apply the development applications using python datatypes to read and write data from files.
	CO5	Design the solutions using OOPs concepts for real world problems in python.
ELECTRICAL CIRCUITS-II LAB	CO1	Analyze the DC circuit properties using PSPICE.
	CO2	Evaluate the time constant for RL and RC series circuit using PSPICE.
	CO3	Analyze the frequency response for RLC series circuit using PSPICE
	CO4	Analyze the RL and RC series circuits with DC & AC excitation using PSPICE.
	CO5	Evaluate the Z, Y, h and ABCD parameters of two port networks.
ELECTRICAL MACHINES-II LAB	CO1	Analyze the performance of Three-Phase Induction motor by conducting direct and indirect tests.
	CO2	Analyze the performance of single-phase induction motor by conducting direct and indirect tests.
	CO3	Evaluate the Voltage regulation of alternator by EMF, MMF and ZPF methods.
	CO4	Evaluate the direct and quadrature axis reactance by conducting slip test.
	CO5	Evaluate the V and inverted V curves of three phase synchronous motor.
SIMULATION OF CIRCUITS USING PSIPCE	CO1	Analyze the features and programming basics of PSPICE.
	CO2	Apply the procedures for simulation of AC circuits using PSPICE.
	CO3	Apply the procedures for simulation of DC circuits using PSPICE.
	CO4	Apply the nodal analysis for the given circuits using PSPICE.
	CO5	Analyze the frequency response analysis of circuits using PSPICE.
ELECTRICAL MACHINES-III	CO1	Analyze the performance characteristics of permanent magnet brushless D.C motor.
	CO2	Understand construction and operation of Permanent Magnet Synchronous Motor.
	CO3	Analyze the performance characteristics of synchronous reluctance motors.
	CO4	Analyze the operation and control of switched reluctance motors.
	CO5	Understand the construction and operation of modern special machines.
POWER ELECTRONICS	CO1	Analyze the switching characteristics of Power semiconductor devices.
	CO2	Understand the operation of AC to DC converters and their control.
	CO3	Understand the operation of DC to DC Converters and their control.
	CO4	Analyze the 120^0 and 180^0 modes of operation of DC to AC Converters.
	CO5	Analyze the operation of AC to AC Converters and their control.
CONTROL SYSTEMS	CO1	Understand the mathematical modelling and transfer function of physical systems.

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO2	Apply the time response analysis to I order systems & controllers and their stability.
	CO3	Analyze the stability of a system using Routh-Hurwitz criteria and root locus.
	CO4	Evaluate the stability of a system using Bode and Nyquist plot methods.
	CO5	Apply state space analysis to study response of continuous system.
ANALOG AND DIGITAL IC APPLICATIONS	CO1	Understand the basics of operational amplifier and its applications.
	CO2	Analyze the Multivibrator circuits using IC555, A/D and D/A converters.
	CO3	Analyze the operation of various filters, oscillators and waveform generators using Op-amp.
	CO4	Evaluate the static and dynamic electrical behaviour of CMOS logic families.
	CO5	Understand the logic families of integrated circuits using TTL and CMOS.
PROGRAMMABLE LOGIC CONTROLLERS	CO1	Understand the purpose, functions, and operations of a PLC and identify the basic components of the PLC and how they function.
	CO2	Analyze the directory of processor files using PLC software.
	CO3	Understand the different types of devices to which PLC input and output modules are connected and various types of PLC registers.
	CO4	Create the ladder diagrams from process control descriptions.
	CO5	Apply the PLC timers and counters for the control of industrial processes.
OPERATING SYSTEMS	CO1	Understand the basic concepts of Operating Systems and its services.
	CO2	Apply the concepts of process synchronization and CPU scheduling by drawing Gantt chart
	CO3	Analyze the methods to handle deadlock and memory management
	CO4	Evaluate the various disk scheduling algorithms and file system interfaces
	CO5	Understand the issues and goals of protection various security
POWER SYSTEMS-II	CO1	Understand the types of conductors and transmission line parameters.
	CO2	Analyze the performance of short, medium and long length transmission lines.
	CO3	Analyze the power system transients and its effect on transmission lines.
	CO4	Analyze the properties of overhead lines, sag and tension calculations.
	CO5	Understand the types and construction of underground cables.
SIGNALS AND SYSTEMS	CO1	Understand the representation of continuous time and discrete time signals
	CO2	Analyze the signals in frequency domain using Fourier series and Fourier Transforms
	CO3	Apply the Sampling theorem to convert continuous time signals into discrete time signals
	CO4	Analyze the properties of systems and characteristics of LTI systems

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO5	Evaluate Continuous Time and Discrete Time LTI systems by using Laplace and Z-Transforms.
LINEAR SYSTEM ANALYSIS	CO1	Analyze the Spectral characteristics of CT periodic signal using Fourier series
	CO2	Analyze the spectrum of CT aperiodic signal using Fourier transform.
	CO3	Apply the Laplace transform to continuous time signals and systems.
	CO4	Apply the Z transform to continuous time signals and systems.
	CO5	Analyze the process of converting CT signal to DT signal using sampling Theorem
CONTROL SYSTEMS LAB	CO1	Analyze the transfer function and feedback control of D.C & A.C servo motors P, PD, PI and PID Controllers & Compensators.
	CO2	Analyze the stability of systems using PSPICE/MATLAB.
	CO3	Apply the programmable logic controllers to demonstrate industrial controls in the laboratory.
	CO4	Apply the time domain and frequency domain analysis for linear time invariant systems.
	CO5	Analyze the op-amp based circuits using PSPICE.
POWER ELECTRONICS LAB	CO1	Analyze the various characteristics of power electronic devices with gate firing circuits and forced commutation techniques.
	CO2	Analyze the operation of single-phase half & fully-controlled converters and inverters with different types of loads.
	CO3	Analyze the operation of dc-dc converters, single-phase ac voltage controllers.
	CO4	Analyze the operation of cyclo converters with different loads.
	CO5	Evaluate the performance of various power electronic converters using MATLAB.
INTRODUCTION TO PROGRAMMING WITH MATLAB	CO1	Understand the syntax, semantics, basic operators and matrix systems in MATLAB.
	CO2	Analyze the various functions and scripts in MATLAB.
	CO3	Apply the various tool box functions on MATLAB and execute simple simulations.
	CO4	Analyze the various statements, persistent variables and loop systems in MATLAB.
	CO5	Understand the data types and file systems in MATLAB.
BIOLOGY FOR ENGINEERS	CO1	Understand the structure of cells and basics in living organisms
	CO2	Understand the importance of various biomolecules and enzymes in living organisms
	CO3	Analyze the functioning of physiology in respiratory system and digestive system.
	CO4	Understand the DNA technology and gen cloning in living organisms.
	CO5	Apply the biological principles in different technologies for the production of medicines and pharmaceuticals.
ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	CO1	Understand the construction and operation of various measuring instruments.
	CO2	Analyze the measurement methods and instruments suitable for measurement of unknown resistance, capacitance, Inductance, Voltage and current.

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO3	Understand the construction and operation of wattmeter and energy meter.
	CO4	Analyze the A.C & D.C Bridge circuits used for measurement of unknown resistance, capacitance and Inductance.
	CO5	Apply the appropriate transducers for measurement of electrical and non-electrical quantities.
POWER SYSTEM ANALYSIS	CO1	Understand the concepts of per unit system and formation of Y bus for a power system network.
	CO2	Apply the Z bus building and modification algorithm for a power system.
	CO3	Analyze the power flow using Gauss-Seidel and Newton Raphson algorithms.
	CO4	Analyze the symmetrical and unsymmetrical faults occurring in a power system.
	CO5	Analyze steady sate, dynamic, transient state stabilities and methods to improve system stability.
SWITCH GEAR AND PROTECTION	CO1	Understand the operation of various types of fuses and breakers used for power system protection.
	CO2	Analyze the various types of Relay based power system protection systems.
	CO3	Analyze the various protection system for generators and transformers.
	CO4	Analyze the various types of the relays in protecting feeders, lines and bus bars.
	CO5	Understand the protection of a power system from over voltages.
POWER SEMICONDUCTOR DRIVES	CO1	Understand the electric drive system requirements based on their applications.
	CO2	Understand the operation of single and multi-quadrant electric drives.
	CO3	Analyze single phase and three phase rectifiers fed DC motors and chopper fed DC motors.
	CO4	Evaluate the motor and power converter requirements for a specific application.
	CO5	Analyze the speed control methods for AC-AC & DC-AC converters fed to Induction motors and Synchronous motors with closed loop and open loop operations.
MICROPROCESSORS AND MICROCONTROLLERS	CO1	Understand the basic concepts of 8085 architecture and Instruction set
	CO2	Understand the architecture details of 8086 processor.
	CO3	Apply various Instructions in assembly language programs by using 8086 Instruction set.
	CO4	Analyze the architectural features of different MSP 430 family processors.
	CO5	Evaluate the operational behavior of peripheral devices by using low power modes
POWER QUALITY	CO1	Understand the power quality issues in connection with standards.
	CO2	Analyze the voltage sags and transient over voltages.
	CO3	Analyze the harmonic sources and devices for controlling harmonic distortion
	CO4	Analyze the long duration voltage variations

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO5	Understand the power quality bench marking and monitoring.
ELECTRICAL MEASUREMENTS LAB	CO1	Analyze calibration of various electrical measuring instruments.
	CO2	Evaluate the values of inductance and capacitance using AC bridges.
	CO3	Analyze the coefficient of coupling between two coupled coils.
	CO4	Evaluate the values of very low resistances.
	CO5	Understand the working principles of displacement transducers.
POWER SYSTEM ANALYIS LAB	CO1	Evaluate sequence impedance and sub transient reactance of synchronous machine, fault currents.
	CO2	Create the equivalent circuit of three winding transformer.
	CO3	Understand MATLAB program for formation of Y and Z buses.
	CO4	Evaluate MATLAB program for Gauss-Seidel and Fast Decouple Load Flow studies.
	CO5	Apply SIMULINK model for single area load frequency problem.
SWITCH GEAR AND PROTECTION LAB	CO1	Understand the operation and characteristics of switch gear used in protection of power systems.
	CO2	Analyze the over voltage and over current relays.
	CO3	Evaluate the ABCD parameters of Transmission lines.
	CO4	Analyze the protection of parallel, radial feeders and over voltage induction relay.
	CO5	Analyze the functioning of various protection schemes using MATLAB.
NUMERICAL TECHNIQUES USING MATLAB	CO1	Understand the fundamental computer programming concepts used for numerical analysis in MATLAB.
	CO2	Analyze linear equations, difference equations and differential equations using MATLAB.
	CO3	Evaluate the roots for polynomials.
	CO4	Evaluate the polynomials using Euler, Runge-Kutta and LSC fitting methods.
	CO5	Analyze the time response of an RLC circuit using MATLAB.
PROFESSIONAL ETHICS AND HUMAN VALUES	CO1	Understand the sustained happiness through identifying the essentials of human values and skills.
	CO2	Understand the importance of Values and Ethics in their personal lives and professional careers.
	CO3	Understand the rights and responsibilities as an employee, team member and a global citizen.
	CO4	Understand the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO5	Understand appropriate technologies and management patterns to create harmony in professional and personal life.
FLEXIBLE AC TRANSMISSION SYSTEMS	CO1	Understand the basic types of FACTS devices.
	CO2	Analyze voltage and current sourced converters.
	CO3	Analyze the operation of shunt FACTS devices.
	CO4	Analyze the operation of series FACTS devices.
	CO5	Understand the operation of different power types of flow controllers.
ADVANCED CONTROL SYSTEMS	CO1	Analyze system stability using sate variable analysis.
	CO2	Design state observers and servo systems with integral control.
	CO3	Apply Z transforms for stability analysis of systems.

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO4	Understand the fundamental analysis of nonlinear systems.
	CO5	Understand the optimal estimator including Kalman filter
POWER SYSTEM OPERATION AND CONTROL	CO1	Understand the concept of economic scheduling of power systems.
	CO2	Analyze the coordination in hydro-thermal system and optimal power flow.
	CO3	Understand automatic generation control of power plants of a power system.
	CO4	Apply the compensation methods to control the reactive power.
	CO5	Develop the techniques to find market power and transfer capabilities in power system deregulation.
NEURAL NETWORKS AND FUZZY LOGIC	CO1	Understand the evolution and basic architecture of artificial neural networks.
	CO2	Analyze various learning process of Artificial Neural Networks.
	CO3	Analyze various learning rules used to train neural networks to produce desired results.
	CO4	Understand basic fuzzy logic operations and properties.
	CO5	Apply fuzzy logic control operations to real world applications.
DIGITAL SIGNAL PROCESSING	CO1	Analyze the discrete time signals and systems in time and frequency domains.
	CO2	Apply the Fast Fourier Transform algorithms for efficient computation of DFT.
	CO3	Analyze the steps in the design of analog and digital filters for the given specifications
	CO4	Evaluate the realizations of digital IIR and FIR filters by using various structures.
	CO5	Analyze the interpolation and decimation in multirate digital signal processing and applications
RENEWABLE ENERGY TECHNOLOGIES	CO1	Understand the necessity of different energy sources.
	CO2	Apply the solar energy concepts for generation of electricity
	CO3	Analyze the anaerobic digestion for bio-gas production and the wind energy for generation of electricity
	CO4	Apply the ocean thermal energy conversion and geothermal energy conversion for generation of electricity
	CO5	Analyze the properties of hydrogen as fuel, production and storage process of hydrogen energy
ENTREPRENEURSHIP DEVELOPMENT	CO1	Understand the concept and process of Entrepreneurship to develop entrepreneurial skills
	CO2	Analyze the different feasibility studies to start a new enterprise.
	CO3	Analyze the various sources of finance to entrepreneurs.
	CO4	Analyze the role of central government and state government in promoting women Entrepreneurship.
	CO5	Analyze the role of incubations in fostering startups.
EMBEDDED SYSTEMS	CO1	Understand the fundamental concepts of embedded systems, programming languages and tools.
	CO2	Analyze the architecture of TM4C, instruction set, and its addressing modes for developing embedded systems.
	CO3	Analyze the microprocessor interfacing concepts and the design cycle for embedded systems

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

	CO4	Analyze the microcontroller internal blocks for basic programming of embedded system
	CO5	Apply the real-world embedded communication protocols enabling microcontrollers to interact with external sensors and actuators external sensors and actuators.
PRINCIPLES OF MANAGEMENT	CO1	Understand the fundamental concepts of management and schools of thought.
	CO2	Analyze various types of plans and decision making techniques.
	CO3	Understand the types of organizational structures and related concepts.
	CO4	Analyze various motivational and leadership theories to direct employees.
	CO5	Analyze the various techniques of controlling and reporting methods in organizations.
DATABASE MANAGEMENT SYSTEMS	CO1	Understand the fundamentals of databases to design relational models.
	CO2	Apply the SQL and PL/SQL concepts to formulate queries.
	CO3	Apply the E-R model for data base design of real world applications.
	CO4	Analyze the query processing and optimization for data manipulation.
	CO5	Analyze the concurrent transactions and recover systems to prevent data loss in system crash.
COMPUTER NETWORKS	CO1	Understand the basics of data communications and networking by using OSI model.
	CO2	Apply the Data link Layer functionalities to solve real world problems.
	CO3	Analyze the various routing algorithms and protocols.
	CO4	Analyze the Transport Layer services by using TCP and UDP protocols.
	CO5	Understand the various services protocols offered by application layer.
ELECTRICAL DISTRIBUTION SYSTEM & AUTOMATION	CO1	Understand the concepts of distribution systems fundamentals.
	CO2	Analyze the distribution system substations and loads.
	CO3	Analyze the load flow solutions in the distribution system
	CO4	Evaluate voltage drop and power loss calculations.
	CO5	Understand the concepts of SCADA, automation distribution system and management.
HIGH VOLTAGE ENGINEERING	CO1	Analyze the levels of high voltages in electrical system and electric stress.
	CO2	Analyze the conduction and breakdown process in gases.
	CO3	Analyze the mechanisms of conduction and breakdown in liquid and solid dielectrics.
	CO4	Understand the generation and measurement of high voltages and high currents.
	CO5	Understand the over voltage and insulation coordination in electric power system.

Annamacharya Institute of Technology and Sciences, Tirupati
(AUTONOMOUS)
Department of Electrical and Electronics Engineering
Course Outcomes (COs)
AK20 Regulations

ELECTRIC VEHICLE TECHNOLOGIES	CO1	Analyze the basic concepts of electric vehicles, and their impact on environment.
	CO2	Understand the hybrid electric vehicles classification, operating principle and architectures.
	CO3	Analyze the drive-train topologies and advanced propulsion techniques.
	CO4	Analyze the hybrid energy storage methodologies.
	CO5	Understand the suitable power converter topologies for motor control and hybrid energy storage.
PROFESSIONAL COMMUNICATION	CO1	Understand the communication skills effectively for professional success.
	CO2	Analyze the communication skills clearly and concisely in formal and informal conversations.
	CO3	Apply the information through drafting, editing and presentation.
	CO4	Apply the interpersonal skills in appropriate manner towards the growth of best career.
	CO5	Apply the sentence structures using correct vocabulary and without any grammatical errors.
FUNDAMENTALS OF USING AI TOOLS	CO1	Analyze AI powered features for MS Office tools.
	CO2	Apply the required procedures and installation AI tools in desktop/laptop.
	CO3	Analyze the operation of Chat GPT tools for documentation applications.
	CO4	Apply AI Tools for research article drafting and generate an article.
	CO5	Apply AI tools to generate Python and MATLAB codes.
PROJECT WORK	CO1	Apply theoretical and practical knowledge in Electrical & Electronics engineering to design and develop innovative project.
	CO2	Analyze complex engineering problems, identify feasible solutions and implement the best possible approach using modern engineering tools and techniques.
	CO3	Create an effective plan, manage and execute project activities, ensuring adherence to timelines, resource constraints and project specifications.
	CO4	Develop strong communication skills by preparing detailed project reports, deliver concise presentation.
	CO5	Identify sustainable and eco-friendly engineering solutions, following ethical standards to deploy the project.