

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES - TIRUPATI
AUTONOMOUS
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE NAME	COURSE OUTCOMES	
Algebra and Calculus 19ABS9901	CO1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
	CO2	Utilize mean value theorems to real life problems.
	CO3	Familiarize with functions of several variables which is useful in optimization.
	CO4	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
	CO5	Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions
Applied Physics (19ABS9902)	CO1	Analyze the wave properties of light and the interaction of energy with the matter.
	CO2	Apply electromagnetic wave propagation in different guided media.
	CO3	Asses the electromagnetic wave propagation and its power in different media
	CO4	Analyze the conductivity of semiconductors.
	CO5	Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.
Problem Solving and Programming (19AES0501)	CO1	Construct his own computer using parts.
	CO2	Recognize the importance of programming language independent constructs
	CO3	Solve computational problems
	CO4	Select the features of C language appropriate for solving a problem
	CO5	Design computer programs for real world problems
	CO6	Organize the data which is more appropriated for solving a problem
Communicative English - I (19AHS9901)	CO1	Identify the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
	CO2	Formulate sentences using proper grammatical structures and correct word forms
	CO3	Speak clearly on a specific topic using suitable discourse markers in informal discussions
	CO4	Write summaries based on global comprehension of reading/listening texts
	CO5	Produce a coherent paragraph interpreting a figure/graph/chart/table
	CO6	Take notes while listening to a talk/lecture to answer questions
Electrical and Electronics Engineering Workshop (19ALC0201)	CO1	Demonstrate knowledge on different tools, abbreviations and symbols used in Electrical Engineering.
	CO2	Measure different electrical quantities using measuring instruments.
	CO3	Demonstrate how to trouble shoot the electrical equipment's (like fan, grinder, motor, etc.)
	CO4	Perform Wiring and Earthing for residential houses
Applied Physics Lab (19ABS9907)	CO1	Analyze the wave properties of light and the interaction of energy with the matter.
	CO2	Apply electromagnetic wave propagation in different guided media.
	CO3	Asses the electromagnetic wave propagation and its power in different media
	CO4	Analyze the conductivity of semiconductors.
	CO5	Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.

Problem Solving and Programming Lab (19AES0503)	CO1	Construct a Computer given its parts
	CO2	Select the right control structure for solving the problem
	CO3	Analyze different sorting algorithms
	CO4	Design solutions for computational problems
	CO5	Develop C programs which utilize the memory efficiently using programming constructs like pointers.
Communicative English - I Lab (19AHS9902)	CO1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
	CO2	Apply communication skills through various language learning activities
	CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
	CO4	Evaluate and exhibit acceptable etiquette essential in social and professional settings.
	CO5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
Basics of Civil & Mechanical Engineering 19AES0101	CO1	understand principles of Stress and Strain
	CO2	understand basic principles of Strain Measurement and apply the concepts of Strain Rosettes for strain measurement.
	CO3	understand common building materials used in construction and analyze characteristics of common building materials.
	CO4	Apply velocity ratio concepts in power transmission.
	CO5	Understand the principles of CAD, CAM & CIM. (L.2)
Differential Equations and Vector Calculus 19ABS9906	CO1	Apply the mathematical concepts of ordinary differential equations of higher order
	CO2	Solve the differential equations related to various engineering fields.
	CO3	Identify solution methods for partial differential equations that model physical processes.
	CO4	Interpret the physical meaning of different operators such as gradient, curl and divergence.
	CO5	Estimate the work done against a field, circulation and flux using vector calculus.
Chemistry (19ABS9904)	CO1	Understand the behaviour of, and interactions between matter and energy at both the atomic and molecular levels
	CO2	Compare the materials of construction for battery and electrochemical sensors
	CO3	Understand the preparation, properties, and applications of thermoplastics & thermo settings, elastomers & conducting polymers.
	CO4	HPLC and GC methods used for separation of gaseous and liquid mixtures.
	CO5	Understand the disadvantages of using hard water and select suitable treatments domestically and industrially.
Data Structures 19AES0502	CO1	To teach the representation of solution to the problem using algorithm
	CO2	To explain the approach to algorithm analysis
	CO3	To introduce different data structures for solving the problems
	CO4	To demonstrate modeling of the given problem as a graph
	CO5	To elucidate the existing hashing techniques
Engineering Workshop 19ALC0301	CO1	Apply wood working skills in real world applications.
	CO2	Build different parts with metal sheets in real world applications.
	CO3	Apply fitting operations in various applications.
	CO4	Apply different types of basic electric circuit connections.
	CO5	Demonstrate soldering and brazing.
	CO1	Draw various curves applied in engineering.
	CO2	Show projections of solids and sections graphically.

Engineering Graphics Lab (19AES0301)	CO3	Draw the development of surfaces of solids.
	CO4	Use computers as a drafting tool.
	CO5	Draw isometric and orthographic drawings using CAD packages.
Basic Civil & Mechanical Engineering Lab (19AES0102)	CO1	Understand principles of Bending Stress and Strain and
	CO2	Understand basic principles of Strain Measurement
	CO3	Understand common building materials used in construction and analyze characteristics of common building materials.
Chemistry Lab (19ABS9909)	CO1	To familiarize the students with the basic concepts of chemistry of materials
	CO2	Prepare advanced polymer materials
	CO3	Measure the strength of an acid present in secondary batteries
	CO4	To familiarize with digital and instrumental methods of analysis
Data Structures Lab 19AES0504	CO1	To introduce to the different data structures
	CO2	To elucidate how the data structure selection influences the algorithm complexity
	CO3	To explain the different operations that can be performed on different data structures
	CO4	To introduce to the different search and sorting algorithms.
Transform Techniques and Complex Variables 19ABS9912	CO1	Apply the Laplace transform for solving differential equations (continuous systems)
	CO2	Find the Fourier series of periodic signals
	CO3	Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
	CO4	Solve linear/nonlinear algebraic and transcendental equations using numerical methods
	CO5	Solve ordinary differential equations by Euler's method, modified Euler's method, Runge Kutta method, Predictor Corrector method and Milne's method
Communicative English II (19AHS9903)	CO1	Prioritize information from reading texts after selecting relevant and useful points
	CO2	Paraphrase short academic texts using suitable strategies and conventions
	CO3	Make formal structured presentations on academic topics using PPT slides with relevant graphical elements
	CO4	Participate in group discussions using appropriate conventions and language strategies
	CO5	Prepare a CV with a cover letter to seek internship/ job
	CO6	Collaborate with a partner to make presentations and Project Reports
Internet of Things (IoT) 19AES0505	CO1	Interpret the vision of IoT from a global context
	CO2	Determine the Market perspective of IoT
	CO3	Compare and Contrast the use of Devices, Gateways and Data Management in IoT
	CO4	Implement state of the art architecture in IoT
	CO5	Illustrate the application of IoT in Industrial Automation and identify Real World Design Constraints
Electrical Circuit Analysis 19APC0201	CO1	Apply network theorems for the analysis of electrical circuits.
	CO2	Determine the transient and steady-state response of electrical circuits
	CO3	Analyze circuits in the sinusoidal steady-state domain (single-phase and three phase).
	CO4	Analyze two port networks using network parameters
	CO5	Apply mesh and nodal analysis to solve electrical circuit problems
Electronic Devices & Circuits 19APC0401	CO1	Ability to understand the operation of diodes and special electronic devices with V-I characteristics.
	CO2	Ability to understand the operation of different rectifiers and filters.
	CO3	Ability to understand the construction, operation of BJT, FET in different configurations
	CO4	Ability to understand importance of biasing and design of DC biasing circuits.
	CO5	Ability to understand small signal model and design of amplifiers with BJTs and FETs.
Engineering	CO1	Understand basic principles, concepts and fundamental laws of electromagnetic fields.

Electromagnetics 19APC0202	CO2	Translate from one coordinate system to another.
	CO3	Describe electrostatics, magneto statics and time-varying fields
	CO4	Analyze the interaction between electricity and magnetism.
	CO5	Calculate the quantities associated with uniform plane wave motion in different media of Transmission.
Environmental Studies 19AMC9903	CO1	Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
	CO2	Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self-learning.
	CO3	Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4	Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5	To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting
Communicative English II Lab 19AHS9904	CO1	Prioritize information from reading texts after selecting relevant and useful points.
	CO2	Make formal structured presentations on academic topics using PPT slides with relevant graphical elements.
	CO3	Participate in Group discussions using appropriate conventions and language strategies.
	CO4	Paraphrase short academic text using suitable strategies and conventions.
	CO5	Collaborate with a partner to make presentations and Project
Internet of Things Lab (IoT Lab) 19AES0506	CO1	Choose the sensors and actuators for an IoTApplication.
	CO2	Select protocols for a specific IoTApplication.
	CO3	Utilize the cloud platform and APIs for IoTApplication.
	CO4	Experiment with embedded boards for creating IoTprototypes.
	CO5	Design a solution for a given IoTApplication
Electrical Circuit Analysis Lab 19APC0203	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
Electronic Devices & Circuits Lab 19APC0404	CO1	Ability to test and operate diodes and special electronic devices.
	CO2	Ability to construct and operate rectifiers without and with filters
	CO3	Ability to construct and operate BJT, FET in different configurations
	CO4	Ability to design DC biasing circuits for Transistors
	CO5	Ability to design amplifiersusing BJTs and FETs.
Numerical Methods and Probability 19ABS9916	CO1	Evaluate approximating the roots of polynomial and transcendental equations by different algorithms
	CO2	Apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations
	CO3	Apply discrete and continuous probability distributions
	CO4	Design the components of a classical hypothesis test
	CO5	Infer the statistical inferential methods based on small and large sampling tests
Basics of Python Programming 19AES0509	CO1	To learn the fundamentals of Python
	CO2	To elucidate problem-solving using a Python programming language
	CO3	To introduce a function-oriented programming paradigm through python
	CO4	To get training in the development of solutions using modular concepts
	CO5	To introduce the programming constructs of python
Design Thinking and Product Innovation 19AES0302	CO1	Summarize the basics of Engineering design process.
	CO2	Explain historical development of Physics and science to Engineering.
	CO3	Apply systematic approach to innovative designs.
	CO4	Identify new technologies and requirement for new product development.

	CO5	Explain and study of Product Development.
Electrical Machines – I 19APC0204	CO1	Apply the concepts of magnetic circuits to compute induced EMF and force in Electro-magnetic systems.
	CO2	Analyze the operation, conditions required of self excitation of DC Generators and parallel operation of DC Generators.
	CO3	Distinguish the operation of various dc motors and determine the performance of DC machine using the results of tests.
	CO4	Explain the principle, constructional features and evaluate the performance characteristics of single phase transformers by conducting various tests.
	CO5	Analyze the operations of Auto Transformer, Three Phase Transformer and parallel operation of Transformers.
Analog Electronic Circuits 19APC0406	CO1	Ability to understand multi stage amplifiers using BJT and FET.
	CO2	Ability to understand high frequency model and analyze its frequency responses.
	CO3	Ability to understand feedback amplifiers and oscillators along with design.
	CO4	Ability to understand power amplifiers.
	CO5	Ability to understand tuned amplifiers and their effect on bandwidth and stability
Digital Electronics Circuits 19APC0408	CO1	Ability to realize and implement Boolean and switching functions.
	CO2	Ability to minimize switching functions.
	CO3	Ability to design combinational circuits.
	CO4	Ability to design sequential logic circuits.
	CO5	Ability to understand concepts of Programmable Memories
Biology for Engineers 19AMC9901	CO1	Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
	CO2	Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.
	CO3	Brief about human physiology.
	CO4	Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
	CO5	Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals
Electrical Machines – I Lab 19APC0205	CO1	Identify the reason as to why D.C. Generator is not building up voltage
	CO2	Conduct experiments to obtain the no-load and load characteristics of D.C. Generators
	CO3	Conduct tests on D.C. motors for determination and predetermination of efficiency
	CO4	Control the speed of D.C. motor in a given range using appropriate method
	CO5	Conduct tests on transformers for predetermination of efficiency and load sharing
Basics of Python Programming Lab 19AES0510	CO1	Design solutions to mathematical problems.
	CO2	Organize the data for solving the problem.
	CO3	Develop Python programs for numerical and text based problems.
	CO4	Select appropriate programming construct for solving the problem.
	CO5	Illustrate object oriented concepts.
Design Thinking and Product Innovation Lab 19AES0303	CO1	
	CO2	
	CO3	
	CO4	
	CO5	
Analog and Digital Electronics Lab 19APC0409	CO1	Ability to design multi stage amplifiers, power amplifier and tuned amplifier
	CO2	Ability to design feedback amplifiers and oscillators along with design.
	CO3	Ability to verify all basic Logic gates
	CO4	Ability to design Combinational Circuits
	CO5	Ability to design flip flops and Counters

Power Systems – I 19APC0206	CO1	Acquire knowledge on thermal, gas and nuclear power plants operation.
	CO2	Understand the operation of AC and DC distribution systems.
	CO3	Understand the operation of Air Insulated & Gas Insulated (GIS) Substations.
	CO4	Familiarize with voltage control and power factor improvement techniques.
	CO5	Analyze economic aspects of power generation and different types of tariff methods.
Electrical Machines – II 19APC0207	CO1	Understand the fundamentals of windings, pulsating magnetic fields and revolving magnetic field.
	CO2	Understand the fundamentals and performance analysis of three phase and single-phase induction.
	CO3	Understand operation, various methods of starting, braking and speed control of induction motors.
	CO4	Analyze the phasor diagrams, parallel operation of alternators, synchronization and load division of synchronous generators.
	CO5	Analyze the phasor diagram, determination of V and inverted V curves and power circles of synchronous motor.
CONTROL SYSTEMS 19APC0208	CO1	Understand the basics of systems, modelling of various kind of systems, detection of transfer function from the pictorial representation.
	CO2	Acquire knowledge of open loop and closed loop systems.
	CO3	Learn to use block diagram to find the overall transfer function of first and second order systems.
	CO4	Understand transient and steady state response, time domain specifications and the concept of Root loci.
	CO5	Analyze frequency domain specifications, Bode diagrams and Nyquist plots.
Power Electronics 19APC0209	CO1	Understand the basic operating principles of power semiconductor switching devices.
	CO2	Analyze the operation of AC-DC and DC to DC converters and their control.
	CO3	Analyze the operation of DC-AC and AC to AC converters and their control.
	CO4	Understand the operation of cycloconverters.
SIGNALS AND SYSTEMS 19APC0403	CO1	Understand mathematical description and representation of continuous time and discrete time signals.
	CO2	Resolve signals in frequency domain using Fourier series and Fourier Transforms.
	CO3	Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.
	CO4	Understand the properties of systems, response of LTI systems and filters.
	CO5	Able to analyze LTI systems using Laplace and Z-Transforms.
ANALOG AND DIGITAL IC APPLICATIONS 19APC0425	CO1	Understand the basic building blocks of linear integrated circuits and its characteristics.
	CO2	Design the Multivibrator circuits using IC555 and determine the frequency of oscillation and time delay, and understand the concept of A/D and D/A Converters.
	CO3	Understand the concept of active filters and oscillators.
	CO4	Design of CMOS logic circuits and analysis of performance characteristics.
	CO5	Implementation of digital logic circuits with the estimation of power and speed.
LINEAR SYSTEM ANALYSIS 19APC0426	CO1	Analyse the spectral characteristics of continuous-time periodic and a periodic signals using Fourier analysis
	CO2	Represent CT and DT systems in the Frequency domain using CTFT, DTFT
	CO3	Apply the Laplace transform for analyze of continuous-time signals and systems
	CO4	Apply the Z- transform for analyze discrete-time signals and systems
	CO5	Understand the process of sampling and the effects of under sampling
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS 19AHSMB01	CO1	Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
	CO2	Apply the Concept of Production cost and revenues for effective Business decision
	CO3	Analyze how to invest their capital and maximize returns.
	CO4	Evaluate the capital budgeting techniques.
	CO5	Define the concepts related to financial accounting and management and able to develop the Accounting statements and evaluate the financial performance of business entity.

COMPUTER NETWORKS 19APC0510	CO1	understand the basics of data communications and networking
	CO2	classify the functionalities of two sub layers of Data link Layer
	CO3	know briefly about Network Layer through algorithms and protocols
	CO4	distinguish the services provided by Transport Layer
	CO5	recognize the services offered by Application Layer to the user
ANALOG AND DIGITAL COMMUNICATIONS 19APC0412	CO1	Describe of various amplitude modulation and demodulation techniques.
	CO2	Understand various angle modulation and demodulation techniques.
	CO3	Explain AM, FM Transmitters and Receivers.
	CO4	Analyze and design the various pulse modulation techniques.
	CO5	Design various digital carrier modulation techniques and baseband transmission.
CONSTITUTION OF INDIA 19AMC9902	CO1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4	Discuss the Powers and functions of Governor, President, Judiciary.
	CO5	Discuss the functions of local administration bodies.
Electrical Machines – II Lab 19APC0210	CO1	Analyze and apply load test, no-load and blocked-rotor tests for construction of circle diagram and equivalent circuit determination in a single-phase induction motor.
	CO2	Predetermine regulation of a three-phase alternator by synchronous impedance & m.m.f methods.
	CO3	Predetermine the regulation of Alternator by Zero Power Factor method X_d and X_q determination of salient pole synchronous machine.
	CO4	Evaluate and analyze V and inverted V curves of 3 phase synchronous motor
Control Systems Lab 19APC0211	CO1	Acquire knowledge of feedback control and transfer function of DC servo motor.
	CO2	Familiarize mathematical modelling of systems and design controllers and compensators.
	CO3	Get the knowledge on transient and steady state behaviour of second order systems.
	CO4	Determine the performance and time domain specifications of first and second order systems.
	CO5	Implement MATLAB analysis to real life systems.
Power Electronics Lab 19APC0212	CO1	Understand and analyze 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, cyclo-converters with different loads.
	CO4	Create and analyze various power electronic converters using MATLAB software.
POWER SYSTEMS – II 19APC0213	CO1	Understand the classification and parameters of conductors, transmission lines.
	CO2	Analyze power system transients and the effect on power systems.
	CO3	Understand the factors governing the performance of transmission lines.
	CO4	Analyze the properties of overhead lines and their types.
	CO5	Understand the types and construction of underground cables.
ELECTRICAL MEASUREMENTS AND INSTRUMENTATION 19APC0214	CO1	Understand different types of measuring instruments, their construction, operation and characteristics.
	CO2	Identify the instruments suitable for typical measurements.
	CO3	Apply the knowledge about transducers and instrument transformers to use them effectively.
	CO1	Remember and understand the concepts of per unit values, Y Bus and Z Bus

POWER SYSTEM ANALYSIS 19APC0215		formation.
	CO2	Apply the concepts of good algorithm for the given power system network and obtain the converged load flow solution.
	CO3	Analyse the symmetrical faults and unsymmetrical faults.
	CO4	Analyze algorithms for different networks and determine load flow studies and zero, positive and negative sequence impedances to find fault calculations.
	CO5	Understand and select efficient Circuit Breakers to improve system stability.
NEURAL NETWORKS AND FUZZY LOGIC 19APC0216	CO1	Understand the basic architecture of artificial neural network terminologies and techniques.
	CO2	Understand approaches and architectures of Artificial Intelligence.
	CO3	Perform the training of neural networks using various learning rules.
	CO4	Create different neural networks of various architectures both feed forward and feed backward.
	CO5	Application of ANN to System Identification and Pattern recognition.
MICROPROCESSORS AND MICROCONTROLLERS 19APC0417	CO1	Understand concepts of Intel x86 series of processors
	CO2	Do programming with 8086 microprocessors
	CO3	Understand concepts of MSP 430 Controllers
	CO4	Program MSP 430 for designing any basic Embedded System
	CO5	Design and implement some specific real time applications Using MSP 430 low power microcontroller.
Business Data Analytics 19AOE0511	CO1	Understand the fundamental of Business Intelligence and to design a customized solution.
	CO2	Familiarize on the concepts, techniques and reporting methods of descriptive analytics and predictive analytics
	CO3	Explore the methods used to analyze speech and text and implement optimized search engines
	CO4	Design and implement Decision Support systems
	CO5	Familiarize on the processes needed to develop, report, and analyze business data
Principles of Effective Public Speaking 19AHE9902	CO1	Apply knowledge of principles, concepts and skills learned in speech preparation.
	CO2	Develop skills in effective listening.
	CO3	Evaluate the delivery of speeches.
	CO4	Develop skills in speech composition.
	CO5	Use supporting materials and presentation aids in speech preparation.
OPTICS 19AHE9907	CO1	Analyze the wave properties of light.
	CO2	Interpret the interaction of energy with matter.
	CO3	Analyze the semiconductor photo devices.
	CO4	Interpret structural spectroscopic techniques.
	CO5	Analyze NMR and ESR spectra.
Quantum Mechanics 19AHE9909	CO1	Analyze the Classical theory of quantum mechanics and Different effects.
	CO2	Illustrate the experimental evidence of matter waves.
	CO3	Analyze Heisenberg's Uncertainty Principle and Experimental Verification.
	CO4	Analyze the Time dependent and independent Schrodinger's Equation.
	CO5	Evaluate the One Dimensional Potential Well and Barrier Potential.
Professional Ethics And Human Values 19AMC9904	CO1	It ensures students sustained happiness through identifying the essentials of human values and skills.
	CO2	The students will understand the importance of Values and Ethics in their personal lives and professional careers.
	CO3	The students will learn the rights and responsibilities as an employee, team member and a global citizen.
	CO4	Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO5	Students can able to develop appropriate technologies and management patterns to

		create harmony in professional and personal life.
POWER SYSTEMS LAB 19APC0217	CO1	Acquire practical knowledge on calculation of sequence impedance, fault currents, voltages and sub transient reactance's. Get the practical knowledge on how to draw the equivalent circuit of three winding transformer.
	CO2	Acquire knowledge on development of MATLAB program for formation of Y and Z buses.
	CO3	Acquire knowledge on development of MATLAB programs for Gauss-Seidel and Fast Decouple Load Flow studies.
	CO4	Acquire knowledge on development of SIMULINK model for single area load frequency problem
MICROPROCESSORS AND MICROCONTROLLERS LAB 19APC0420	CO1	To apply the assembly language instructions of 8086 microprocessor to describe the concept of programming and its applications to real world.
	CO2	To demonstrate the steps in executing an assembly language program using an assembler.
	CO3	Understand concepts of MSP 430 Controllers
	CO4	Program MSP 430 for designing any basic Embedded System
	CO5	Design and implement some specific real time applications Using MSP 430 low power microcontroller.
ELECTRICAL MEASUREMENTS LAB 19APC0218	CO1	Understand calibration of various electrical measuring instruments.
	CO2	Accurately determine the values of inductance and capacitance using AC bridges.
	CO3	Analyze coefficient of coupling between two coupled coils.
	CO4	Accurately determine the values of very low resistances.
	CO5	Understand the working principles of displacement transducers.
SWITCHGEAR AND PROTECTION 19APC0219	CO1	Acquire knowledge on various types of fuses, breakers and relays used for power system protection.
	CO2	Design protection system for generators and transformers.
	CO3	Identify various types of the relays in protecting feeders, lines and bus bars.
	CO4	Demonstrate the protection of a power system from over voltages.
HIGH VOLTAGE ENGINEERING 19APC0220	CO1	Discuss and analyze the various types of electrical stress control techniques in gas and vacuum insulation systems
	CO2	Derive and analyze the expression of current growth and breakdown voltage due to various mechanisms of gaseous breakdown in dielectrics/ insulation
	CO3	Derive and analyze the various mechanisms of breakdown in liquid and solid dielectrics breakdown
	CO4	Acquire knowledge on generation and measurement of high voltage and high current.
	CO5	Acquire knowledge on over voltage and insulation coordination in electric power systems.
EMBEDDED SYSTEMS 19APE0411	CO1	Understand the fundamental concepts of Embedded systems.
	CO2	Analyze TM4C Architecture, Instruction Set, addressing modes to develop programs for various applications using Assembly and Embedded C.
	CO3	Develop an embedded system by interfacing the microcontrollers and IDE tools.
	CO4	Figure out problems using TM4C On chip Resources such as Timer, Clock System, Low Power Modes/techniques and Interrupt Structure.
	CO5	Implement the protocols used by microcontroller to communicate with external sensors and actuators in real world.
DATABASE MANAGEMENT SYSTEMS 19APC0502	CO1	Demonstrate the basic elements of a relational database management system,
	CO2	Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respective data.
	CO3	Apply normalization for the development of application software.
	CO4	Define Transactions which preserve the integrity of database
	CO5	Ability to understand Storage and Indexing Techniques
Mechanics of Materials 19APC0101	CO1	Understand the system of forces on bodies.
	CO2	Determine the centroid and moment of inertia for different cross-sections.
	CO3	Understand the concepts of stress, strain, generalized Hooke's law, elastic moduli.
	CO4	Develop shear force and bending moment diagrams for different load cases.
	CO5	Compute the slope and deflection of simple beams

ELECTRICAL DISTRIBUTION SYSTEMS 19APE0201	CO1	Understand basics of distribution systems and substations.
	CO2	To understand about modelling of various loads.
	CO3	To perform distribution load flow solutions.
	CO4	To evaluate power loss and feeder cost.
	CO5	To know the principles of SCADA, Automation distribution system and management
POWER SEMICONDUCTOR DRIVES 19APE0202	CO1	Identify the choice of the electric drive system based on their applications.
	CO2	Explain the operation of single and multi quadrant electric drives.
	CO3	Analyze single phase and three phase rectifiers fed DC motors as well as chopper fed DC motors.
	CO4	Explain the speed control methods for AC-AC & DC-AC converters fed to Induction motors and Synchronous motors with closed loop, and open loop operations.
ADVANCED CONTROL SYSTEMS 19APE0203	CO1	Design state feedback controller and state observer.
	CO2	Understand and analyse linear and nonlinear systems using phase plane method.
	CO3	Understand and analyse nonlinear systems using describing function method.
	CO4	Understand and design optimal controller.
	CO5	Understand optimal estimator including Kalman Filter.
POWER SYSTEM OPERATION AND CONTROL 19APE0204	CO1	Understand to deal with problems in Power System as Power System Engineer.
	CO2	Understand to deal with AGC problems in Power System.
	CO3	Understand to deal the problems in hydro electric and hydro thermal problems.
	CO4	Understand the complexity of reactive power control problems and to deal with them.
	CO5	Understand the necessity of deregulation aspects and demand side management problems in the modern power system era.
FLEXIBLE AC TRANSMISSION SYSTEMS 19APE0205	CO1	Understand various control issues, for the purpose of identifying the scope and for selection of specific FACTS controllers.
	CO2	Apply the concepts in solving problems of simple power systems with FACTS controllers.
	CO3	Design simple FACTS controllers and converters for better transmission of electric power.
	CO4	Understand to deal with problems in Power System as Power System Engineer.
DIGITAL SIGNAL PROCESSING 19APC0418	CO1	Analyze discrete signals and systems in time and frequency domains.
	CO2	Apply FFT algorithms to efficient computation of DFT.
	CO3	Implement and realize various structures of IIR and FIR systems.
	CO4	Design & analyze various Analog Filters and Digital Filters.
	CO5	Understand and apply the basics of multi rate digital signal processing.
Technical Writing 19AHE9901	CO1	Participate actively in writing activities (individually and in collaboration) that model effective scientific and technical communication in the workplace.
	CO2	Understand how to apply technical information and knowledge in practical documents for a variety of a professional audiences (including peers and colleagues or management and b) public audiences.
	CO3	Practice the unique qualities of professional writing style, including sentence conciseness, readability, clarity, accuracy, honesty, avoiding wordiness or ambiguity, previewing, using direct order organization, objectivity, unbiased analyzing, summarizing, coherence and transitional devices.
Effective Technical Communication 19AHE9906	CO1	To develop awareness in students of the relevance and importance of technical communication and presentation skills.
	CO2	To prepare the students for placements
	CO3	To sensitize the students to the appropriate use of non-verbal communication
	CO4	To train students to use language appropriately for presentations and interviews
SOFT SKILLS	CO1	Recognize the importance of verbal and non-verbal skills
	CO2	Develop the interpersonal and intrapersonal skills
	CO3	Apply grammatical structures to formulate sentences and correct word forms.

19ASA0501	CO4	Create trust among people and develop employability skills
SWITCHGEAR AND PROTECTION LAB 19APC0221	CO1	Understand the operation and characteristics of switch gear used in protection of power systems.
	CO2	Analyze the protection of parallel, radial feeders & over voltage induction relay.
	CO3	Analyze the functioning of various protection schemes using MATLAB.