REGENT EDUCATION AND RESEARCH FOUNDATION GROUP OF INSTITUTIONS

Department of Electrical Engineering (2021-2022)

Program Code	Program Name	Course Code	Course Name	Course outcome	
				CO Sl. No.	CO's
EE-UG	Electrical Engineering (B.Tech)	BSCH101	Chemistry-I(Gr-B)	BSCH101.1	Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
				BSCH101.2	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
				BSCH101.3	Rationalise bulk properties and processes using thermodynamic considerations.
				BSCH101.4	Rationalise different periodic properties such as ionization potential, electronegativity, oxidation states, electronegativity etc among the elements.
				BSCH101.5	To find out the Structural representation of Molecules in three dimensions and major chemical reactions involved to synthesize molecules as well as common drugs.
EE-UG	Electrical Engineering (B.Tech)	BS M 102	Mathematics –IB	BS M 102.1	Apply the concept and techniques of differential and integral calculus to determine curvature and evaluation of different types of improper integrals.
				BS M 102.2	Understand the domain of applications of mean value theorems to engineering problems
				BS M 102.3	Learn the tools of power series and Fourier series to analyse engineering problems and apply the concept of convergence of infinite series in many approximation techniques in engineering disciplines
				BS M 102.4	Apply the knowledge for addressing the real life problems which comprises of several variables or attributes and identify extremum points of different surfaces of higher dimensions

				BS M 102.5	Apply the method of Gauss Jordan elimination to find the solution of systems of simultaneous linear equations.
EE-UG	Electrical Engineering (B.Tech)	ES - EE 101	Basic Electrical Engineering	ES - EE 101.1	To introduce the components of low voltage electrical installations
				ES - EE 101.2	To understand and analyze basic electric and magnetic circuits.
				ES - EE 101.3	To study the working principles of electrical machines and power converters
EE-UG	Electrical Engineering (B.Tech)	BS - CH 191	Chemistry-I Laboratory (Gr-B)	BS - CH 191.1	To understand the basic concepts of chemistry and use them for technological operation where appropriate.
				BS - CH 191.2	To exercise basic laboratory data analysis techniques, including graphical representation, error analysis etc.
				BS - CH 191.3	To correlate the theory with experimental method, result and conclusion
				BS - CH 191.4	Students will learn how to effectively carry out a work done either in single or as a team member in the laboratory.
EE-UG	Electrical Engineering (B.Tech)	ES - EE 191	Basic Electrical Engineering Laboratory	ES - EE 191.1	Identify appropriate equipment and instruments for the experiment
				ES - EE 191.2	Test the instrument for application to the experiment.
				ES - EE 191.3	Construct circuits with appropriate instruments and safety precautions
				ES - EE 191.4	Validate different characteristics of DC machine , methods of speed control of DC motor ,Synchronous machine and Induction motor
				ES - EE 191.5	Identify basic operation of power electronic
				ES - EE 191.6	Validate basic operation of power system.
EE-UG	Electrical Engineering (B.Tech)	ES - ME 191	Engineering Graphics & Design(Gr-B)	ES - ME 191.1	Introduction to engineering design and its place in society
				ES - ME 191.2	Exposure to the visual aspects of engineering design
				ES - ME	Exposure to engineering graphics

				191.3	standards
				ES - ME 191.4	Exposure to solid modelling
EE-UG	Electrical Engineering (B.Tech)	BS - PH 201	Physics-I (Gr-B)	BS - PH 201.1	Recognise different concepts of mechanics and extend these concepts to identify real-world problems
				BS - PH 201.2	Illustrate optical phenomena like interference, diffraction, polarisation, and lasing action with physical and compact mathematical models.
				BS - PH 201.3	Classify different magnetic and dielectric materials and explain their properties.
				BS - PH 201.4	Demonstrate various quantum mechanical phenomena and solve numerical problems associated with them.
				BS - PH 201.5	Illustrate different types of statistical mechanics and use them to predict the behaviour of real-world particles
				BS - PH 201.6	Analyse different physical and numerical problems based on the knowledge of physics
EE-UG	Electrical Engineering (B.Tech)	BS- M 202	Mathematics –IIB	BS- M 202.1	Learn the methods for evaluating multiple integrals and their applications to different physical problems.
				BS- M 202.2	Understand different techniques to solve first and second order ordinary differential equations with its formulation to address the modelling of systems and problems of engineering sciences
				BS- M 202.3	Find the complete solution of a differential equation with constant coefficients by variation of parameters and student will have a working knowledge of basic application problems described by second order linear differential equations with constant coefficients..

				BS- M 202.4	Learn different tools of differentiation and integration of functions of a complex variable that are used with various other techniques for solving engineering problems.
				BS- M 202.5	evaluate a contour integral using parametrization, fundamental theorem of calculus and Cauchy's integral formula and compute the residue of a function and use the residue theory to evaluate a contour integral or an integral over the real line;
EE-UG	Electrical Engineering (B.Tech)	ES -CS 201	Programming for Problem Solving	ES -CS 201.1	To formulate simple algorithms for arithmetic and logical problems.
				ES -CS 201.2	To translate the algorithms to programs (in C language).
				ES -CS 201.3	To test and execute the programs and correct syntax and logical errors.
				ES -CS 201.4	To implement conditional branching, iteration and recursion.
				ES -CS 201.5	To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
				ES -CS 201.6	To use arrays, pointers and structures to formulate algorithms and programs.
				ES -CS 201.7	To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
				ES -CS 201.8	To apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.
EE-UG	Electrical Engineering (B.Tech)	HM-HU 201	English	HM-HU 201.1	Develop confidence in the students so that they can acquire technical skills.
				HM-HU 201.2	Build to implement the you – view point in business writing.
				HM-HU 201.3	Demonstrate the role of communication at work place.
				HM-HU 201.4	Build strong interpersonal skills, understand behaviour of team members and practice empathy towards others.

				HM-HU 201.5	Explain four skills of English Language, Listening. Reading, speaking and writing.
EE-UG	Electrical Engineering (B.Tech)	BS PH -291	Physics-I Laboratory (Gr-B)	BS PH - 291.1	Examine various semiconductor and dielectric properties(Hall coefficient, Band gap, Dielectric constant)and relate the same to the theoretical laws they have learnt.
				BS PH - 291.2	Determine variousquantum mechanical constants (Stefan's-Boltzmann constant, Planck's constant, Lande-g factor, Rydberg constant)
				BS PH - 291.3	Apply the concept of electrical properties of matter to determine different characteristics of materials and electrical devices.
				BS PH - 291.4	Examinethecharacteristicsof electronic motion under the influence of thermal energy and magnetic field forthermometriccalibrationandcalculation ofspecific charge.
				BS PH - 291.5	Computedifferentfundamentalelasticconstants&generalpropertiesof matter.
				BS PH - 291.6	Applythe conceptof refraction, interferenceanddiffractiontocalculate the wavelengthoflightsources andoptical properties of matter.
EE-UG	Electrical Engineering (B.Tech)	ES-CS 291	Programming for Problem Solving Laboratory	ES-CS 291.1	To formulate simple algorithms for arithmetic and logical problems.
				ES-CS 291.2	To translate the algorithms to programs (in C language).
				ES-CS 291.3	To be able to correct syntax errors as reported by the compilers
				ES-CS 291.4	To be able to identify and correct logical errors encountered at run time
				ES-CS 291.5	To be able to write iterative as well as recursive programs
				ES-CS 291.6	To be able to represent data in arrays, strings and structures and manipulate them through a program
				ES-CS 291.7	To be able to declare pointers of different types and use them in defining self-referential structures.

				ES-CS 291.8	To be able to create, read and write to and from simple text files.
EE-UG	Electrical Engineering (B.Tech)	HM-HU 291	Language Laboratory	HM-HU 291.1	Develop 'Listening Skill' and its sub skills through Language Lab Audio device;
				HM-HU 291.2	Build 'Speaking Skill' and its sub skills
				HM-HU 291.3	Explain Linguistic/Paralinguistic features (Pronunciation/Phonetics/ Voice modulation/ Stress/ Intonation/ Pitch &Accent) of connected speech
				HM-HU 291.4	Improve 'Conversation Skill' using Language Lab Audio –Visual input; Conversational Practice Sessions (Face to Face / via Telephone, Mobile phone &Role Play Mode)
				HM-HU 291.5	Organize 'Group Discussion' through audio –Visual input and explain the key strategies for success.
				HM-HU 291.6	Develop 'Reading Skills' and its sub skills using Visual / Graphics/ Diagrams /Chart Display/Technical/Non-Technical Passages Learning Global / Contextual / Inferential Comprehension;
EE-UG	Electrical Engineering (B.Tech)	ES- ME 292	Workshop/ Manufacturing Practices(Gr-B)	ES- ME 292.1	fabricate components withtheirown hands.
				ES- ME 292.2	knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes
				ES- ME 292.3	produce small devices of their interest by assembling different components
EE-UG	Electrical Engineering (B.Tech)	PC-EE 301	ELECTRIC CIRCUIT THEORY	PC-EE-301.1	describe different type of networks, sources and signals with examples.
				PC-EE-301.2	explain different network theorems, coupled circuit and tools for solution of networks
				PC-EE-301.3	apply network theorems and different tools to solve network problems.
				PC-EE-301.4	select suitable techniques of network analysis for efficient solution.
				PC-EE-301.5	estimate parameters of two-port networks.

				PC-EE-301.6	design filter circuits.
EE-UG	Electrical Engineering (B.Tech)	PC-EE 302	ANALOG ELECTRONICS	PC-EE-302.1	To understand the analog electronic components and analog electronics circuits
				PC-EE-302.2	To explain the principle of operation of analog electronic components, filters, regulators and analog electronic circuits.
				PC-EE-302.3	To compute parameters and operating points of analog electronic circuits
				PC-EE-302.4	To determine response of analog electronic circuits
				PC-EE-302.5	To distinguish different types amplifier and different types oscillators based on application.
				PC-EE-302.6	To construct operational amplifier based circuits for different applications.
EE-UG	Electrical Engineering (B.Tech)	PC-EE 303	ELECTRO MAGNETIC FIELD THEORY	PC-EE-303.1	To relate different coordinate systems for efficient solution of electromagnetic problems.
				PC-EE-303.2	To describe mathematical s tools to solve electromagnetic problems.
				PC-EE-303.3	To explain laws applied to electromagnetic field.
				PC-EE-303.4	To apply mathematical tools and laws to solve electromagnetic problems.
				PC-EE-303.5	To analyze electromagnetic wave propagation.
				PC-EE-303.6	To estimate transmission line parameters.
EE-UG	Electrical Engineering (B.Tech)	ES-ME 301	ENGINEERING MECHANICS	ES-ME 301.1	explain the co-ordinate system, principle of three dimensional rotation, kinematics and kinetics of rigid bodies.
				ES-ME 301.2	elaborate the theory of general motion, bending moment, torsional motion and friction.
				ES-ME 301.3	develop free body diagram of different arrangements.
				ES-ME 301.4	solve problems with the application of theories and principle of motion , friction

					and rigid bodies.
				ES-ME 301.5	analyze torsional motion and bending moment.
EE-UG	Electrical Engineering (B.Tech)	BS-M 301	MATHEMATICS-III	**BS-M 301.1**	explain basics of probability theories, rules, distribution and properties of Z transform
				BS-M 301.2	describe different methods of numerical analysis.
				BS-M 301.3	solve numerical problems based on probability theories , numerical analysis and Z transform
				BS-M 301.4	apply numerical methods to solve engineering problems.
				BS-M 301.5	solve engineering problems using z transform and probability theory.
EE-UG	Electrical Engineering (B.Tech)	BS-301	BIOLOGY FOR ENGINEERS	**BS-301.1**	describe with examples the biological observations lead to major discoveries.
				BS-301.2	explain a. the classification of kingdom of life b. the building blocks of life c. different techniques of bio physics used to study biological phenomena. d. the role of imaging in the screening, diagnosis, staging, and treatments of cancer.
				BS-301.3	identify DNA as a genetic material in the molecular basis of information transfer
				BS-301.4	analyze biological processes at the reductionistic level.
				BS-301.5	apply thermodynamic principles to biological systems.
				BS-301.6	identify microorganisms.
EE-UG	Electrical Engineering (B.Tech)	MC-EE 301	INDIAN CONSTITUTION	**MC-EE 301.1**	describe a. different features of Indian constitution.. b. power and functioning of Union, state and local self-government. c. structure, jurisdiction and function of Indian Judiciary. d. basics of PIL and guideline for admission of PIL. e. Functioning of local administration

					starting from block to Municipal Corporation.
				MC-EE 301.2	identify authority to redress a problem in the profession and in the society.
EE-UG	Electrical Engineering (B.Tech)	PC-EE 391	ELECTRIC CIRCUIT THEORY LABORATORY	**PC-EE 391.1**	Determine transient response of different electrical circuit parameters of two port network frequency response of filters Laplace transform and inverse Laplace transform.
				PC-EE 391.2	Generate different signals in both discrete and analog form.
				PC-EE 391.3	Analyze amplitude and phase spectrum of different signals.
				PC-EE 391.4	Verify network theorems.
				PC-EE 391.5	Construct circuits with appropriate instruments and safety precautions.
				PC-EE 391.6	Simulate electrical circuit experiments using suitable software.
EE-UG	Electrical Engineering (B.Tech)	PC-EE 392	ANALOG ELECTRONICS LABORATORY	**PC-EE 392.1**	To determine characteristics of full wave rectifier with filter and without filter
				PC-EE 392.2	To determine characteristics of BJT and FET
				PC-EE 392.3	To determine characteristics of Zener diode as voltage regulator
				PC-EE 392.4	To construct V to I and I to V converter with Op amps.
				PC-EE 392.5	To construct timer circuit using 555 for monostable, astable and multistable
				PC-EE- 392.6	To construct linear voltage regulator using regulator IC chip.
EE-UG	Electrical Engineerin g (B.Tech)	PC-CS 391	AL METHOD S LABORA	**PC- CS391.1**	Develop numerical methods for approximately solving problems
				PC- CS391.2	Examine the accuracy of these methods

				PC-CS391.3	Examine the failure modes of these methods
				PC-CS391.4	Demonstrate knowledge and understanding of numerical methods to solve systems of linear equations, to compute quadrature and to solve Ordinary and Partial Differential Equations
EE-UG	Electrical Engineering (B.Tech)	PC-EE 401	ELECTRIC MACHINE-I	PC-EE-401.1	Describe the function of different components of magnetic circuit, DC machines and transformers.
				PC-EE-401.2	Explain the principle of operation of different types of DC machines and transformers
				PC-EE-401.3	Solve numerical problems of DC machines and transformers
				PC-EE-401.4	Estimate the parameters and efficiency of transformer
				PC-EE-401.5	Determine the characteristics of DC machines
				PC-EE-401.6	Recommend methods to control output of DC machines
EE-UG	Electrical Engineering (B.Tech)	PC-EE 402	DIGITAL ELECTRONICS	PC-EE 402.1	describe the function of different building blocks of digital electronics, semiconductor memories and programmable logic devices.
				PC-EE 402.2	explain the principle of operation of combinational and sequential digital circuits, A/D and D/A converter
				PC-EE 402.3	solve numerical problems of Boolean algebra, number system, combinational & sequential digital circuits and A/D and D/A converter.
				PC-EE 402.4	specify applications of combinational and sequential digital circuits.
				PC-EE 402.5	determine specifications of different digital circuits.
				PC-EE 402.6	design combinational and sequential digital circuits

EE-UG	Electrical Engineering (B.Tech)	PC-EE 403	ELECTRICAL & ELECTRONICS MEASUREMENTS	PC-EE-403.1	explain the terms accuracy, precision, resolution, speed of response, errors in measurement, loading effect.
				PC-EE-403.2	describe methods of measurement of power, energy by instruments and resistance, capacitance and inductance by bridges and potentiometer.
				PC-EE-403.3	explain the principle of operation of analog meters, instrument transformer, digital multimeter, digital voltmeter, digital frequency meter, signal generator, strain gauge, LVDT and temperature transducers.
				PC-EE-403.4	explain the different building block, principle of operation of oscilloscope and measurement techniques of voltage, current, frequency and phase by oscilloscope.
				PC-EE-403.5	solve numerical problems related to analog meters, instrument transformer, measurement of power, energy, resistance, inductance and capacitance.resistance, inductance and capacitance.
				PC-EE-403.6	specify applications of analog and digital measuring instruments, sensors and transducers.
EE-UG	Electrical Engineering (B.Tech)	ES-ME-401	THERMAL POWER ENGINEERING	ES-ME-401.1	describe the function of different components of boilers. Engines and turbines
				ES-ME-401.2	explain the principle of operation of different types of boilers, turbines, IC engines and Gas turbines.
				ES-ME-401.3	solve numerical problems of boilers, turbines, IC engines and Gas turbines.
				ES-ME-401.4	analyze the performance of boilers, engines and turbines.
				ES-ME-401.5	determine efficiency of boilers, engines and turbines.
				ES-ME-401.6	explain methods to control boiler, engines and turbines parameters.
EE-UG	Electrical Engineering (B.Tech)	HM-EE-401	S AND ETHICS IN PROFE	HM-EE-401.1	illustrate different aspects of human values, ethics, engineers' responsibility and duties

				HM-EE-401.2	explain different principles, different theories and laws of engineering ethics and social experimentation
				HM-EE-401.3	identify different factors in the light of Engineers' responsibility towards safety and risk
				HM-EE-401.4	correlate ethics of different work environment.
				HM-EE-401.5	explain the need for intellectual property rights.
EE-UG	Electrical Engineering (B.Tech)	MC-EE-401	ENVIRONMENTAL SCIENCE	MC-EE-401.1	understand the natural environment and its relationships with human activities
				MC-EE-401.2	apply the fundamental knowledge of science and engineering to assess environmental and health risk
				MC-EE-401.3	develop guidelines and procedures for health and safety issues obeying the environmental laws and regulations
				MC-EE-401.4	acquire skills for scientific problem-solving related to air, water, noise& land pollution.
EE-UG	Electrical Engineering (B.Tech)	PC-EE-491	ELECTRIC MACHINE-I LABORATORY	PC-EE-491.1	Identify appropriate equipment and instruments for the experiment
				PC-EE-491.2	Test the instrument for application to the experiment.
				PC-EE-491.3	Construct circuits with appropriate instruments and safety precautions
				PC-EE-491.4	Validate different characteristics of DC machine , methods of speed control of DC motor and parallel operation of the transformer
				PC-EE-491.5	work effectively in a team
EE-UG	Electrical Engineering (B.Tech)	PC-EE-492	DIGITAL ELECTRONICS LABORATORY	PC-EE-492.1	identify appropriate equipment and instruments for the experiment
				PC-EE-492.2	test the instruments for application to the experiment
				PC-EE-492.3	construct decoder , multiplexer, adder and subtractor circuits with appropriate instruments and precaution

				PC-EE-492.4	realize RS-JK and D flip flop, universal register with gates, multiplexer and flip-flops and asynchronous and synchronous up down counters
				PC-EE-492.5	validate the operation of code conversion circuit –BCD to Excess 3 & vice versa, 4 bit parity generator & comparator circuits,
				PC-EE-492.6	work effectively in a team
EE-UG	Electrical Engineering (B.Tech)	PC-EE-493	ELECTRICAL & ELECTRONICS MEASUREMENT LABORATORY	PC-EE-493.1	identify appropriate equipment and instruments for the experiment
				PC-EE-493.2	test the instrument for application to the experiment
				PC-EE-493.3	construct circuits with appropriate instruments and safety precautions
				PC-EE-493.4	evaluate and adjust the precision and accuracy of AC energy meter, moving iron and dynamometer type ammeter, voltmeter and wattmeter by potentiometer
				PC-EE-493.5	measure voltage, current, power, energy, phase , frequency, resistance, inductance, capacitance
				PC-EE-493.6	work effectively in a team
EE-UG	Electrical Engineering (B.Tech)	ES-ME-491	THERMAL POWER ENGINEERING LABORATORY	ES-ME-491.1	identify appropriate equipment and instruments for the experiment
				ES-ME-491.2	construct experimental setup with appropriate instruments and safety precautions
				ES-ME-491.3	indentify different parts of Lanchashire Boiler, Bahcock & Willcox Boiler, Cochran Boiler, Vertical Tubular Boiler, Locomotive Boiler, 4S Diesel Engine, 4S Petrol Engine, 2S Petrol engine
				ES-ME-491.4	test 4 stroke petrol engine by electrical load box and diesel engine by electrical load box and rope brake dynamometer
				ES-ME-491.5	find calorific value, flash point, fire point, cloud point, pour point of fuel.
				ES-ME-	work effectively in a team

				491.6	
EE-UG	Electrical Engineering (B.Tech)	PC-EE-501	ELECTRIC MACHINE-II	**PC-EE-501.1**	describe the arrangement of winding of AC machines.
				PC-EE-501.2	explain the principle of operation of Induction machines, Synchronous machines and special machines.
				PC-EE-501.3	solve numerical problems of Induction machines, Synchronous machines and Special machines.
				PC-EE-501.4	estimate the parameters and efficiency of Induction machines and Synchronous machines.
				PC-EE-501.5	determine the characteristics of Induction machines and Synchronous machines.
				PC-EE-501.6	select appropriate methods for starting , braking and speed control of Induction machines.
EE-UG	Electrical Engineering (B.Tech)	PC-EE-502	POWER SYSTEM-I	**PC-EE-502.1**	Illustrate the principle of generation of Electric power from different source.
				PC-EE-502.2	Determine parameters of transmission lines and its performance
				PC-EE-502.3	Explain the principle of formation of corona and methods of its reduction
				PC-EE-502.4	Conduct electrical tests on insulators
				PC-EE-502.5	Solve numerical problems related to overhead transmission line, cable, insulators and tariff
				PC-EE-502.6	Analyze overhead transmission line based on short medium and long lines.
EE-UG	Electrical Engineering (B.Tech)	PC-EE-503	CONTROL SYSTEM	**PC-EE-503.1**	Develop mathematical model of mechanical, electrical, thermal, fluid system and different control system components like servomotors,synchros, potentiometer, tacho-generators etc.
				PC-EE-503.2	Analyse stability of LTI system using routh-hurtwitz (RH) criteria, root locus techniques intime domain and bode plot and nyquist technique in frequency domain.

				PC-EE-503.3	Design different control law or algorithms like proportional control, proportional plus derivative(PD) control,proportional plus integration (PI) control,and proportional plus integration plus derivative (PID) control and compensators like lag, lead, lag-lead for LTI systems.
				PC-EE-503.4	Apply state variable techniques for analysis of linear systems.
				PC-EE-503.5	Analyse the stability of linear discrete system.
				PC-EE-503.6	Solve numerical problems on LTI system modelling, responses, error dynamics and stability .
EE-UG	Electrical Engineering (B.Tech)	PC-EE-504	POWER ELECTRONICS	PC-EE-504.1	Differentiate between signal level and power level devices.
				PC-EE-504.2	Construct triggering and commutation circuits of SCR.
				PC-EE-504.3	Explain the principle of operation of AC-DC, DC-DC and DC-AC converters.
				PC-EE-504.4	Analyse the performance of AC-DC, DC-DC and DC-AC converters.
				PC-EE-504.5	Apply methods of voltage control and harmonic reduction to inverters
				PC-EE-504.6	Solve numerical problems of switching devices, AC-DC, DC-DC and DC-AC converters
EE-UG	Electrical Engineering (B.Tech)	OE-EE-501B	OBJECT ORIENTED PROGRAMMING	OE-EE-501B.1	Specify simple abstract data types and design implementations, using abstraction functions to document them.
				OE-EE-501B.2	Recognise features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
				OE-EE-501B.3	Name and apply some common object-oriented design patterns and give examples of their use.
				OE-EE-501B.4	Design applications with an event-driven graphical user interface.

EE-UG	Electrical Engineering (B.Tech)	PE-EE-501C	RENEWABLE & NON CONVENTIONAL ENERGY	**PE-EE-501C.1**	Explain the principle of conversion of solar energy, wind energy, biomass, Geothermal energy, Ocean energy and Hydrogen energy to other form of energy.
				PE-EE-501C.2	Explain the principle of operation of magneto hydrodynamic power generation.
				PE-EE-501C.3	Use Solar energy, Wind energy , Biomass, Geothermal energy, Ocean energy, Hydrogen energy and fuel cell for different applications.
				PE-EE-501C.4	Suggest location to set up wind mill and biogas generation plant
				PE-EE-501C.5	Estimate conversion efficiency of fuel cell.
				PE-EE-501C.6	Solve numerical problems relating to conversion of Solar energy, Wind energy , Biomass, Ocean energy and Hydrogen energy to heat and electric energy.
EE-UG	Electrical Engineering (B.Tech)	PC-EE-591	ELECTRIC MACHINE-II LABORATORY	**PC-EE-591.1**	identify appropriate equipment and instruments for the experiment.
				PC-EE-591.2	test the instrument for application to the experiment.
				PC-EE-591.3	construct circuits with appropriate instruments and safety precautions.
				PC-EE-591.4	validate different characteristics of single phase Induction motor, three phase Induction motor, Induction generator and synchronous motor , methods of speed control of Induction motors and parallel operation of the 3 phase Synchronous generator.
				PC-EE-591.5	work effectively in a team
EE-UG	Electrical Engineering (B.Tech)	PC-EE-592	POWER SYSTEM-I LABORATORY	**PC-EE-592.1**	Identify appropriate equipment and instruments for the experiment.
				PC-EE-592.2	Test the instrument for application to the experiment.
				PC-EE-592.3	Construct circuits with appropriate instruments and safety precautions
				PC-EE-592.4	Validate different characteristics of transmission line.

				PC-EE-592.5	Determine earth resistance, dielectric strength of insulating oil, breakdown strength of solid insulating material and dielectric constant of transformer oil.
				PC-EE-592.6	Analyze an electrical transmission line circuit with the help of software.
				PC-EE-592.7	Work effectively in a team.
EE-UG	Electrical Engineering (B.Tech)	PC-EE 593	CONTROL SYSTEM LABORATORY	PC-EE 593.1	Identify appropriate equipment and instruments for the experiment.
				PC-EE 593.2	Test the instrument for application to the experiment.
				PC-EE 593.3	Construct circuits with appropriate instruments and safety precautions.
				PC-EE 593.4	Use MAT-Lab control system tool box, MAT-Lab- simulink tool box & PSPICE for simulation of systems.
				PC-EE 593.5	Determine control system specifications of first and second order systems.
				PC-EE 593.6	Validate step response & impulse response for type-0, type-1 & Type-2 system with unity feedback using MATLAB & PSPICE.
				PC-EE 593.7	Work effectively in a team.
EE-UG	Electrical Engineering (B.Tech)	PC-EE-594	POWER ELECTRONICS LABORATORY	PC-EE-594.1	Identify appropriate equipment and instruments for the experiment.
				PC-EE-594.2	Test the instrument for application to the experiment.
				PC-EE-594.3	Construct circuits with appropriate instruments and safety precautions
				PC-EE-594.4	Validate characteristics of SCR, Triac, and performance of phase controlled converter, DC-DC converter, inverters and resonant pulse converters
				PC-EE-594.5	Demonstrate the relation between the speed and firing angle of Universal motor
				PC-EE-594.6	Work effectively in a team

EE-UG	Electrical Engineering (B.Tech)	PC-EE-601	POWER SYSTEM-II	PC-EE-601.1	Represent power system components in line diagrams and learn PU system for the simplified calculations.
				PC-EE-601.2	Determine the location of distribution substation.
				PC-EE-601.3	Determine the performance of power system with the help of load flow studies
				PC-EE-601.4	Analyze faults in Electrical systems.
				PC-EE-601.5	Determine the stabilty of Power system.
				PC-EE-601.6	Explain principle of operation of different power system protection equipments.
				PC-EE-601.7	Solve numerical problems related to representation, load flow, faults, stabilty and protection of power system.
EE-UG	Electrical Engineering (B.Tech)	PC-EE-602	MICROPROCESSOR & MICROCONTROLLER	PC-EE-602.1	Explain the architecture of 8086 and 8051.
				PC-EE-602.2	Do assembly language programming of 8086, 8051
				PC-EE-602.3	Interface different peripheral with 8086 and 8051
				PC-EE-602.4	Develop micro processor/ microcontroller based systems
				PC-EE-602.5	Compare microprocessor, microcontroller, PIC and ARM processors
EE-UG	Electrical Engineering (B.Tech)	PE-EE-601A	DIGITAL CONTROL SYSTEM	PE-EE-601A.1	Explain the principle of sampling and reconstruction of analog signal.
				PE-EE-601A.2	Perform Z-transformation and inverse Z-transformation of systems.
				PE-EE-601A.3	Analyze and design digital control systems.
				PE-EE-601A.4	Design compensators for digital control system to achieve desired specifications
				PE-EE-601A.5	Represent digital control systems using state space models.
				PE-EE-601A.6	Analyze and design of discrete time control systems using z transform
EE-UG	al Engineering	-EE-601A	LITY	PE-EE-	Analyse uncompensated AC

				602B.1	transmission line
				PE-EE-602B.2	Explain the working principles of FACTS devices and their operating characteristics
				PE-EE-602B.3	Apply FACTS devices for power flow control and stabilty
				PE-EE-602B.4	Identify different issues of power quality in distribution system
				PE-EE-602B.5	Apply different compensation and control techniques for DSTATCOM
				PE-EE-602B.6	Explain working principle of dynamic voltage restorer and UPQC
EE-UG	Electrical Engineering (B.Tech)	OE-EE 601	DIGITAL SIGNAL PROCESSING	**OE-EE-601.1**	Represent signals mathematically in continuous and discrete-time and in the frequency domain.
				OE-EE-601.2	Analyse discrete-time systems using z-transform.
				OE-EE-601.3	Explain the Discrete-Fourier Transform (DFT) and the FFT algorithms
				OE-EE-601.4	Design digital filters for various applications.
				OE-EE-601.5	Apply digital signal processing for the analysis of real-life signals
EE-UG	Electrical Engineering (B.Tech)	HM-EE 601	ECONOMICS FOR ENGINEERS	**HM-EE 601.1**	evaluate the economic theories, cost concepts and pricing policies
				HM-EE 601.2	explain the market structures and integration concepts
				HM-EE 601.3	apply the concepts of financial management for project appraisal
				HM-EE 601.4	explain accounting systems , the impact of inflation, taxation, depreciation
				HM-EE 601.5	analyze financial statements using ratio analysis
				HM-EE 601.6	explain financial planning, economic basis for replacement, project scheduling, legal and regulatory issues applied to economic investment and project-management problems
EE-UG	Electrical Engineering (B.Tech)	PC-EE 691	POWER SYSTEM-II LABORA	**PC-EE 691.1**	Identify appropriate equipment and instruments for the experiment.
				PC-EE 691.2	Test the instrument for application to the experiment.

				PC-EE 691.3	Construct circuits with appropriate instruments and safety precautions.
				PC-EE 691.4	Validate the characteristics of under voltage relay, over current relay, earth fault relay, on load time delay relay, off load time delay relay, CT and PT.
				PC-EE 691.5	Validate protection schemes of transformer, generator, motor and feeder.
				PC-EE 691.6	Apply software tools to find bus voltage, currents and power flows throughout the electrical system.
				PC-EE 691.7	Work effectively in a team
EE-UG	Electrical Engineering (B.Tech)	PC-EE-692	MICROPROCESSOR AND MICROCONTROLLER LABORATORY	PC-EE 692.1	Identify appropriate equipment and instruments for the experiment
				PC-EE 692.2	Test the instrument for application to the experiment
				PC-EE 692.3	Construct circuits with appropriate instruments and safety precautions
				PC-EE 692.4	Program 8086 for arithmatic operation, sorting of array, searching for a number in a string andstring manipulation
				PC-EE 692.5	Interface ADC/DAC, 8255, 8251 to 8086 and LCD, keyboard to 8051
				PC-EE 692.6	Program 8051 using arithmatic, logical and bit manipulation instructions of 8051
				PC-EE 692.7	Work effectively in a team
EE-UG	Electrical Engineering (B.Tech)	PC-EE-681	ELECTRICAL AND ELECTRONICS DESIGN LABORATORY	PC-EE-681.1	explain basic concept of measurement, noise in electronic system, sensor and signal conditioning circuits
				PC-EE-681.2	implement PC based data acquisition systems
				PC-EE-681.3	construct circuits with appropriate instruments and safety precautions
				PC-EE-681.4	design heating elements, air core grounding reactor, power distribution system for small township, double circuit transmission line and Electric machines

				PC-EE-681.5	do wiring and installation design of a multistoried residential building with lift and pump
				PC-EE-681.6	design electronic hardware for controller of lift, speed of AC/DC motor, and for an application with analog, digital, mixed signal, microcontroller and PCB
EE-UG	Electrical Engineering (B.Tech)	PC-EE 701	ELECTRIC DRIVE	**PC-EE-701.1**	Explain the principle of operation of Electric Drive
				PC-EE-701.2	Describe different methods of starting and braking of Electric Drives
				PC-EE-701.3	Model and control DC Drives
				PC-EE-701.4	Control speed of Induction and Synchronous motors
				PC-EE-701.5	Recommend drives for different apllications
				PC-EE-701.6	Estimate ratings, variables and parameters of Electric Drives
EE-UG	Electrical Engineering (B.Tech)	PE-EE 701B	ELECTRICAL ENERGY CONSERVATION & AUDITING	**PE-EE 701B.1**	explain the basic of energy resources, energy security, energy conservation and pollution.
				PE-EE 701B.2	quantify the energy conservation opportunities in different thermal systems
				PE-EE 701B.3	quantify the energy conservation opportunities in different electrical systems
				PE-EE 701B.4	identify the common energy conservation opportunities in different energy intensive industrial equipments
				PE-EE 701B.5	explain the methods of energy management and audit.
				PE-EE 701B.6	analyse and report the outcome of energy audit.
EE-UG	Electrical Engineering (B.Tech)	OE-EE-701A	ARTIFICIAL INTELLIGENCE	**OE-EE-701A.1**	Explain the concept of knowledge representation and predicate logic and transform the real lifeinformation in different representation
				OE-EE-701A.2	Describe state space and its searching strategies
				OE-EE-701A.3	Demonstrate profciency in applying scientifc method to models of machine learning

				OE-EE-701A.4	Apply the machine learning concepts in real life problems
				OE-EE-701A.5	Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societalimplications
EE-UG	Electrical Engineering (B.Tech)	OE-EE 702C	COMPUTER NETWORK	OE-EE 702C.1	Infer a good understanding of the OSI Reference Model and in particular have a good knowledge of Layers Architecture.
				OE-EE 702C.2	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
				OE-EE 702C.3	Outline the basic knowledge using cryptography and network security.
				OE-EE 702C.4	Experiment with datagram and internet socket programming.
EE-UG	Electrical Engineering (B.Tech)	HM-EE 701	PRINCIPLE OF MANAGEMENT	HM-EE 701.1	explain the concepts and approaches of management.
				HM-EE 701.2	demonstrate the roles, skills and functions of management.
				HM-EE 701.3	diagnose and solve organizational problems.
				HM-EE 701.4	identify the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
				HM-EE 701.5	apply different methods of Customer, Operation and Technology management.
				HM-EE 701.6	acquire skills of good leader in an organization.
EE-UG	Electrical Engineering (B.Tech)	PC-EE 791	ELECTRIC DRIVE LABORATORY	PC-EE-791.1	Identify appropriate equipment and instruments for the experiment
				PC-EE-791.2	Test the instrument for application to the instrument
				PC-EE-791.3	Construct circuits with appropriate instruments and safety precautions
				PC-EE-791.4	Apply different methods of control of ELectric Drive in the laboratory
				PC-EE-	Analyse experimental data obtained in

				791.5	the laboratory
				PC-EE-791.6	Work effectively in a team
EE-UG	Electrical Engineering (B.Tech)	PC-EE 801	UTILIZATION OF ELECTRIC POWER	PC-EE 801.1	Explain the fundamentals of illumination and different lighting schemes.
				PC-EE 801.2	Explain the fundamental of Electrolytic processes, Electric heating and Welding.
				PC-EE 801.3	Able to select appropriate lighting, heating and welding techniques for specific applications.
				PC-EE 801.4	Apply different electrolysis process for different applications.
				PC-EE 801.5	Explain the principle of different aspect of Electric traction and control of traction motor.
EE-UG	Electrical Engineering (B.Tech)	PE-EE 801B	Power System Dynamics and Control	PE-EE 801B.1	Explain the model of power system components.
				PE-EE 801B.2	Select the appropriate model for required analysis.
				PE-EE 801B.3	Analyze the performance of the system with small signal analysis.
				PE-EE 801B.4	Evaluate the stability of the single and multi machine systems..
				PE-EE 801B.5	Develop measures for enhancing the stability of the system.
				PE-EE 801B.6	Solve numerical problems of linear dynamical system, modeling of different components and stability.
EE-UG	Electrical Engineering (B.Tech)	OE-EE 801D	Sensors And Transducers	OE-EE-801D.1	Explain the basic principle of operation of Transducers and Sensors.
				OE-EE-801D.2	Distinguish different sensors and transducers.
				OE-EE-801D.3	Identify suitable transducer by comparing different industrial standards and procedures for measurement of physical parameters.
				OE-EE-801D.4	Estimate the performance of different transducers.
				OE-EE-801D.5	Design real life electronics and instrumentation measurement systems.

| | | | | OE-EE-801D.6 | Apply smart sensors, bio-sensors, PLC and Internet of Things to different applications. |