Course Outcome (CO)

Department	Basic Science & Humanities
Course Code	**HU101**
Title of Course	**English Language & Technical Communication.**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	2L
Total Contact Hours	30
Course Out Come	**CO1:** Ability to communicate technical matters. **CO2:** Ability to communicate fluently & confidently on all spheres of every day matters.

Department	Basic Science & Humanities
Course Code	**CH101**
Title of Course	**Chemistry-1(Group-B)**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	33
Course Out Come	**CO1:** Ability to apply concept of Chemical Thermodynamic system with associated laws. **CO2:** Ability to understand Reaction Dynamics & Solid state Chemistry for detection of defects in metals and role of semiconductor. **CO3:** Ability to understand Electrochemistry, Structure and reactivity of Organic molecule **CO4:** Ability to understand the Industrial Chemistry and its applicability.

Department	Basic Science & Humanities
Course Code	**M101**
Title of Course	**Mathematics-1**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	33
Course Out Come	**CO1:** Ability to explain the Knowledge of Matrix, Eigen value problems. **CO2:** Ability to determine the solutions for differential equations which are useful in the Study of Circuit theory and oscillatory systems. **CO3:** Ability to understand Calculus of Functions of Several

	Variables Partial derivatives, Total differential equations for Electro-magnetic theory, Transmission lines and Vibrating membranes. **CO4:** Ability to use the convergence and Divergence of infinite series in the study of communication systems. **CO5:** Ability to understand Vector Algebra and Vector Calculus

Department	EE
Course Code	**ES101**
Title of Course	**Basic Electrical & Electronic Engineering –1 (Group A+Group B)**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	41
Course Out Come	**CO1:** Ability to explain the fundamentals of Physics. **CO2:** Ability to explain the basic knowledge of Electrical and Electronics Engineering. **CO3:** Ability to apply DC network theorem and Kirchhoff's law on different electrical circuits. **CO4:** Ability to determine AC fundamentals like generation of ac voltages, waveforms, average and RMS values, peak factor, form factor, series and parallel resonance circuits. **CO5:** Ability to explain principles of electromagnetism and associated laws. **CO6:** Ability to identify various semiconductors and ability to design and analyse different electrical circuits using different semiconductors.

Department	ME
Course Code	**ME101**
Title of Course	**Engineering Mechanics**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	48
Course Out Come	**CO1:** Ability to use principles of mechanics, laws of vector algebra and two-dimensional forces to solve different problems related to mechanics. **CO2:** Ability to apply laws of equilibrium forces in two-dimension and laws of frictional properties of matter. **CO3:** Ability to use equilibrium properties of rigid body and find out moment of inertia on different planes and different theorems related to moment of inertia; and explain elastic properties of different bodies and related laws. **CO4:** Ability to explain different laws related to dynamics and motion of bodies.

	CO5: Ability to use knowledge of Newton's second law, De-Alembert's principle to analyse conservation of energy; power and efficiency.

Department	Basic Science & Humanities
Course Code	**CH191**
Title of Course	**Chemistry-1(Group-B)**
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	30
Course Out Come	**CO1:** Ability to apply concept of Solvent Extraction Procedure **CO2:** Ability to understand pH metric and conduct metric method of determination for acidity and alkalinity of a solution **CO3:** Ability to understand various parameter for the water analysis **CO4:** Ability to understand the **viscometric** method for determination of solution.

Department	EE
Course Code	**ES191**
Title of Course	**Basic Electrical & Electronic Engineering– 1 (Lab) (Group A + Group B)**
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	30
Course Out Come	**CO1:** Ability to perform different experiments of Basic Electrical and Electronics Engineering. **CO2:** Ability to perform different experiments to verify network theorems.

Department	ME
Course Code	**ME-191**
Title of Course	**Basic Engg. Drawing & Computer Graphics. (Group B)**
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	1L+3P

Total Contact Hours	48
Course Out Come	**CO1:** Ability to explain isometric view and isometric projection. **CO2:** Ability to explain plane scale and diagonal scale. **CO3:** Ability to explain point, straight line and surface projection.

Department	Basic Science & Humanities
Course Code	**HU181**
Title of Course	**Language Laboratory**
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	17
Course Out Come	**CO1:** Ability to develop skills of Technical Communication in English through Language Lab. Practice Sessions. **CO2:** Ability to communicate confidently and competently in English Language in all spheres.

Department	Basic Science & Humanities
Course Code	**XC-181**
Title of Course	**Extra Curriculum Activities (NSS/NCC/NSO etc)**
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	20
Course Out Come	**CO1:** Ability to develop awareness in social issues. **CO2:** Ability to participate in mass education programmes. **CO3:** Ability to learn prepare proposal for local slum area development. **CO4:** Ability to develop environmental awareness & Waste disposal. **CO5:** Ability to accustom with relief & rehabilitation work during Natural calamities.

Department	CSE
Course Code	**CS201**
Title of Course	**Basic Computation & Principles of Computer Programming**
Nature of Course	Compulsory

Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	42
Course Out Come	CO1: Ability to apply basic computer programming languages as applicable in different problems. CO2: Ability to apply "C" language and explain its application in different problems. CO3: Ability to explain basic concepts of operating systems like MS DOS. MS WINDOWS etc. CO4: Ability to analyse the anatomy of computer systems, primary and secondary memory, input and output devices. CO5: Ability to apply array, pointers, structures, unions and file handling.

Department	Basic Science & Humanities
Course Code	**PH201**
Title of Course	**Physics – 1 (Group B)**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	42
Course Out Come	**CO1:** Ability to understand the general property of matters and the Oscillation property. **CO2:** Ability to know optics property. **CO3:** Ability to learn basics of Quantum Physics. **CO4:** Ability to understand Crystallography and will get the idea of crystal structure and will understand the property and behavior of X-Ray.

Department	Basic Science & Humanities
Course Code	**M201**
Title of Course	**Mathematics-2**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	40
Course Out Come	**CO1:** Ability to learn Ordinary differential equations with higher order and first degree. **CO2:** Ability to learn Basics of Graph Theory which are useful in the Study of Circuit theory. **CO3:** Ability to learn Laplace Transform which is useful in the study of communication systems.

Department	EE
Course Code	**ES201**
Title of Course	**Basic Electrical &Electronic Engineering-II**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	44
Course Out Come	**CO 1:** Ability to explain electrical properties and simple electrical devices. **CO 2:** Ability to explain construction and mechanism of working of different DC machine, 1-phase transformer and 3-phase induction motor. **CO3:** Ability to understand the basic concepts of 3-phase system and structure of power system. **CO4:** Students must acquire to express binary numbers, convert binary to decimal and vice-versa, draw truth table of various applications, design gates and simple digital circuits using different gates. **CO5:** Ability to distinguish the different gate isolation techniques; explain the V-I characteristics of FETs, OP-AMP etc.

Department	ME
Course Code	**ME201**
Title of Course	**Engineering Thermodynamics & Fluid Mechanics**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	48
Course Out Come	**CO1:** Ability to apply the principles of thermodynamics, heat and work, ideal gas and real gas and properties of pure substances. **CO2:** Ability to explain 1st law of thermodynamics and apply it in different cases. **CO3:** Ability to explain 2nd law of thermodynamics and apply it in different cases to find entropy, efficiency of Carnot cycle etc. **CO4:** Ability to explain air standard cycle for internal combustion engine and Rankine cycle of steam. **CO5:** Ability to explain properties of fluids and its classifications and apply the principle to find out different parameters of liquid flow.

Department	CSE
Course Code	**CS291**
Title of Course	**Basic Computation & Principles of Computer Programming(Lab)**
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	14
Course Out Come	**CO1:** Ability to apply DOS System commands and Editors (Preliminaries). **CO2:** Ability to apply UNIX system commands and vi (Preliminaries). **CO3:** Ability to write simple programs to find different outputs like simple and compound interest, palindrome number etc. **CO4:** Ability to develop programs to demonstrate control structure: text processing etc. **CO5:** Ability to develop programs involving functions and recursion. **CO6:** Ability to develop programs involving the use of arrays with subscripts and pointers. **CO7:**Ability to design programs using structures and files.

Department	Basic Science & Humanities
Course Code	**PH291**
Title of Course	**Physics – 1(Group B)**
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	30
Course Out Come	**CO1:** Ability to understand the general property of matters like viscosity, Young's Modulus and Modulus of Rigidity. **CO2:** Ability to know optical property. **CO3:** Ability to learn electrical property. **CO4:** Ability to understand thermal conductivity.

Department	EE
Course Code	**ES291**
Title of Course	**Basic Electrical & Electronic Engineering – II(Lab)**
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	

Course Out Come	**CO1:** Ability to calibrate ammeter and voltmeter and analyse shot circuit and open circuit properties of 1-phase transformer. **CO2:** Ability to explain the different properties of DC machines and 3-phase circuit.

Department	ME
Course Code	**ME-291**
Title of Course	**Workshop Practice (Group B)**
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	1L+3P
Total Contact Hours	
Course Out Come	**CO1:** Ability to use different machines/devices/tools in the workshop and prepare bodies of different shapes by casting, rolling etc. **CO2:** Ability to join different parts by different types wielding and explain different parameters of machines.

Department	EE (Electrical Engineering)
Course Code	**M (CS) 301**
Title of Course	**Numerical Methods**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	2L+1T
Total Contact Hours	28
Course Out Come	**CO1:** Ability to understand numerical computation & Interpolation. **CO2:** Ability to learn Numerical integration & solution of linear equations. **CO3:** Ability to solve Numerical solution of Algebraic & differential equation.

Department	EE (Electrical Engineering)
Course Code	**M302**
Title of Course	**Mathematics-III**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	42
Course Out Come	**CO1:** Ability to understand Fourier Series & Fourier Transform. **CO2:** Ability to learn Calculus of Complex Variable. **CO3:** Ability to understand Probability. **CO4:** Ability to solve Partial Ordinary Differential Equation (ODE).

Department	EE (Electrical Engineering)
Course Code	**EC(EE)301**
Title of Course	**Analog Electronic circuits**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L
Total Contact Hours	36
Course Out Come	**CO1:** Ability to identify different types of filters and explain the properties and concepts of SMPS. **CO2:** Ability to explain different properties of transistors and different circuits prepared by use of transistors. **CO3:** Ability to explain different types of feedback amplifiers and oscillators. **CO4:** Ability to explain the characteristics of Op-Amps, and apply it in different circuits. **CO5:** Ability to explain and analyse different types of power amplifiers and its properties. **CO6:** Ability to explain workings of multivibrators and different special function circuits.

Department	EE (Electrical Engineering)
Course Code	**EC(EE)302**

Title of Course	**Digital Electronic circuit**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L
Total Contact Hours	34
Course Out Come	**CO1:** Ability to explain number system: binary, octal, hexadecimal, decimal and their conversion **CO2:** Ability to explain various logic gates and truth tables using Boolean algebra. **CO3:** Ability to explain logic families, adder, sub tractor, decoder, encoder, multiplexer, DE multiplexer and memory system.

Department	EE (Electrical Engineering)
Course Code	**EE-301**
Title of Course	**Electric Circuit theory**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	40
Course Out Come	**CO1:** Ability to describe different types of circuits and networks . **CO2:** Ability to explain various types of coupled circuits, its parameters and modelling of circuits. **CO3:** Ability to employ the rules of Laplace transforms to analyse the properties of different circuits. **CO4:** Ability to explain Fourier method of waveform analysis in different circuits. **CO5:** Ability to apply network equation in loop method, node methods and network theorems. **CO6:** Ability to apply graph theory in networks. **CO7:** Ability to analyse two port networks and explain its different parameters. **CO8:** Ability to explain, analyse and synthesize different types of filter circuits using Op-Amps.

Department	EE (Electrical Engineering)
Course Code	**EE-302**
Title of Course	**Field theory**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	37
Course Out Come	**CO1:** Ability to use different operators of vector calculus in different coordinate systems. **CO2:** Ability to explain different laws of electrostatic, boundary conditions, solving of Poisson's & Laplace's equation. **CO3:** Ability to explain and use different laws of electrostatic to find magnetic torques, energy. **CO4:** Ability to explain laws of electromagnetic theory. Maxwell's equations, time varying potential etc. **CO5:** Ability to explain properties of wave propagation and its different parameters. **CO6:** Ability to analyse different parameters of transmission line.

Department	EE (Electrical Engineering)
Course Code	**EC(EE)391**
Title of Course	**Analog& Digital Electronic circuit (Lab)**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3P
Total Contact Hours	36
Course Out Come	**CO1:** Ability to determine different characteristics of full wave rectifier with and without capacitor filter. **CO2:** Ability to analyse the function of Zener diode as linear voltage regulator. **CO3:** Ability to design and develop two stages RC coupled amplifier & analyse its gain and bandwidth. **CO4:** Ability to explain class A, C & Push pull amplifier. **CO5:** Ability to use Op-Amp as V-I, I-V converter. **CO6:** Ability to analyse a timer circuit using NE 555 and configuration of Monostable and AstableMultivibrator.

	CO7: Ability to analyse and explain DAC & ADC. **CO8:** Ability to design and fabricate basic gates circuits using universal logic gates. **CO9:** Ability to design and fabricate R-S, J-K, T& D flip-flops using logic gates. **CO10:** Ability to design combinational circuit for BCD to decimal conversion using multiplexer. **CO11:** Ability to explain asynchronous and synchronous up/down counters. **CO12:** Ability to build simple decoder & multiplexer circuits using logic gates. **CO13:** Ability to design an adder circuit using shift register & full adder.

Department	EE (Electrical Engineering)
Course Code	**M (CS) 391**
Title of Course	**Numerical Methods(Lab)**
Nature of Course	Compulsory
Type of Course	Lab
Contact Hours	2P
Total Contact Hours	36
Course Out Come	**CO1:** Ability to understand numerical computation & Interpolation. **CO2:** Ability to learn Numerical integration & solution of linear equations. **CO3:** Ability to solve Numerical solution of Algebraic & differential equation.

Department	EE (Electrical Engineering)
Course Code	**EE-391**
Title of Course	**Electric Circuit theory(Lab)**
Nature of Course	Compulsory
Type of Course	Lab
Contact Hours	3P
Total Contact Hours	36

Course Out Come	**CO1:** Ability to explain transient responses of R-L-C series & parallel circuits using software. **CO2:** Ability to determine the Impedance (Z) and Admittance (Y) parameter of two port network by simulation /hardware. **CO3:** Ability to explain the frequency responses of LP, HP, BP and BR filters by simulation / hardware. **CO4:** Ability to determine the Laplace transform and Inverse Laplace transform using software. **CO5:** Ability to explain amplitude and phase spectrum analysis of different signals using software. **CO6:** Ability to verify network theorems using software. **CO7:** Ability to generate different types of analog and discrete signals using software.

Department	EE (Electrical Engineering)
Course Code	**HU 381**
Title of Course	**Technical Report Writing & Language Lab Practice**
Nature of Course	Compulsory
Type of Course	Lab
Contact Hours	3P
Total Contact Hours	38
Course Out Come	**CO1:** Ability to inculcate a sense of confidence in the students. **CO2:** Ability to help them become good communicators both socially and professionally. **CO3:** To assist them to enhance their power of Technical Communication.

Department	EE (Electrical Engineering)
Course Code	**HU-401**
Title of Course	**Values and Ethics in Profession**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L
Total Contact Hours	
Course Out Come	**CO1:** Ability to understand effects of Technological Growth with its limitation. **CO2:** Ability to learn ethics of Profession in Engineering field. **CO3:** Ability to understand Profession and recognize Human Values.

Department	EE (Electrical Engineering)
Course Code	**PH(EE)-401**
Title of Course	**Physics-II**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	41
Course Out Come	**CO1:** Ability to learn Dielectric properties and magnetic properties of solids. **CO2:** Ability to understand free electron theory of metals **CO3:** Ability to understand Quantum Mechanics & Statistical Mechanics.

Department	EE (Electrical Engineering)
Course Code	**ME(EE)-411**
Title of Course	**Thermal Power Engineering**
Nature of Course	Compulsory
Type of Course	Theory

Contact Hours	3L
Total Contact Hours	4 Periods per week
Course Out Come	**CO1:** Ability to explain working of different types of boilers. **CO2:** Ability to explain and analyse different types of rotary thermodynamics devices. **CO3:** Ability to classify and analyse various characteristics of SI and IC engines and properties of gas turbines.

Department	EE (Electrical Engineering)
Course Code	**CH-401**
Title of Course	**Basic Environmental Engineering & Elementary Biology**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L
Total Contact Hours	39
Course Out Come	**CO1:** Ability to understand Basic ideas of environment, Ecology. **CO2:** Ability to learn Air, Water, Land, & Noise pollution and control. **CO3:** Ability to gain knowledge about the Environmental Management which includes Environmental Impact Assessment, Environmental Audit, laws and protection act of India, Different international environmental treaty/agreement/ protocol.

Department	EE (Electrical Engineering)
Course Code	**EE 401**
Title of Course	**Electric Machine-I**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L+1T
Total Contact Hours	40
Course Out Come	**CO1:** Ability to explain the fundamentals of electrical machines. **CO2:** Ability to explain and analyse construction, operational mechanism and test different characteristics of DC machines. **CO3:** Ability to explain and analyse construction, operational

	mechanism and test different characteristics of 3-phase induction machines. **CO4:** Ability to explain and analyse construction, operational mechanism and test different characteristics of 3 phase Transformer.

Department	EE (Electrical Engineering)
Course Code	**EE-402**
Title of Course	**Electrical & Electronic measurement**
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L
Total Contact Hours	41
Course Out Come	**CO1:** Ability to appraise about methods of measurement and working of analog meter. **CO2:** Ability to appraise advantages and disadvantages of different instrument transformer. **CO3:** Ability to explain operating principle of power, energy and resistance measurement devices. **CO4:** Ability to explain and analyse different types of potentiometer in AC bridges. **CO5:** Ability to use CRO for measurement of voltage, current, frequency etc. **CO6:** Ability to use different electronic instruments and sensor and transducers and explain their working principle.

Department	EE (Electrical Engineering)
Course Code	**PH(EE)-491**
Title of Course	**Physics-II (Lab)**
Nature of Course	Compulsory
Type of Course	Lab
Contact Hours	3P
Total Contact Hours	36
Course Out Come	**CO1:** Ability to understand Lande g factor of electron, specific charge of electron and energy band gap of semiconductor. **CO2:** Ability to study Hall effect of semiconductors and characteristics of solar photovoltaic cell.

Department	EE (Electrical Engineering)
Course Code	**ME(EE)481**
Title of Course	**Thermal Power Engineering (Lab)**
Nature of Course	Compulsory
Type of Course	Lab
Contact Hours	3P
Total Contact Hours	36
Course Out Come	**CO1:** Ability to analyse cut models of Boilers IC Engines like Lanchashire Boiler, Bahcock&Willcox Boiler, Cochran Boiler, Vertical Tubular Boiler, Locomotive Boiler, 4S Diesel Engine,4S Petrol Engine,2S Petrol Engine. **CO2:** Ability to perform load test, study heat balance and analyse valve timing diagram of 4 Stroke Petrol Engine & Diesel Engine by Electrical Load Box as well as Rope Brake Dynamometer. **CO3:** Ability to find the Calorific Value of Diesel Fuel & Coal by Bomb Calorimeter. **CO4:** Ability to find the Flash Point, Fire Point, cloud point and pour point of Petrol as well as Diesel Fuel. **CO5:** Ability to find Carbon Particle Percentage in Diesel Engine Exhaust Smoke by Smoke meter and trace the BHP vs. percentage Carbon Curve. **CO6**: Ability to measure of the Quality of Steam – Enthalpy & Dryness fraction. **CO 7:** Ability to find boiler performance by determining boiler efficiency and boiler evaporation rate. **CO8:** Ability to apprise on Boiler, Furnace, turbine etc visiting thermal power station.

Department	EE (Electrical Engineering)
Course Code	**EE-491**
Title of Course	**Electric Machine-I (Lab)**
Nature of Course	Compulsory
Type of Course	Lab
Contact Hours	3P
Total Contact Hours	36

Course Out Come	**CO1:** Ability to examine the characteristics of various DC motors and analyse methods of speed control of DC motors. **CO2:** Ability to analyse characteristics of DC compound generator. **CO3:** Ability to study of equivalent circuit of a single phase transformer and perform its polarity test and different connection. **CO4:** Ability to examine of equivalent circuit of a three phase induction motor by different methods. **CO5:** Ability to test performance of wound rotor type induction motor under load. **CO6:** Ability to perform characteristics of 3-phase squirrel cage induction motor and determination of iron loss, friction and windage losses.

Department	EE (Electrical Engineering)
Course Code	**EE-492**
Title of Course	**Electrical & Electronic measurement(Lab)**
Nature of Course	Compulsory
Type of Course	Lab
Contact Hours	3P
Total Contact Hours	36
Course Out Come	**CO1:** Ability to explain constructions and working principles of PMMC, Dynamometer, Electro-thermal etc. **CO2:** Ability to calibrate moving iron, electrodynamometer and AC energy meter type ammeter/voltmeter by potentiometer. **CO3:** Ability to measure resistance, inductance, power, frequency and capacitance.

Department	EE
Course Code	HU-501
Title of Course	Economics for Engineers
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	
Course Out Come	CO1: Ability to appraise economic decision making processes, cost and estimation processes, cash flow, interest and equivalence processes. CO2: Ability to perform worth analysis, rate of return analysis and estimate future uncertainty in different economic processes. CO3: Ability to calculate depreciation and perform replacement analysis. CO4: Ability to explain inflation and accounting processes.

Department	EE
Course Code	EE501
Title of Course	Electric machineII
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+1T
Total Contact Hours	40
Course Out Come	CO1: Ability to examine the speed torque characteristics of 1phase induction motor and analyse equivalent circuit parameters of 1phase induction motor. CO2: Ability to appraise working principle, voltage regulation and operating characteristics of alternator.

	CO3: Ability to explain characteristics of synchronous motor and analyse V curve, hunting phenomenon etc. CO4: Ability appraises the working principle of various types of special electromechanical devises.

Department	EE
Course Code	EE502
Title of Course	Power system I
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+1T
Total Contact Hours	40
Course Out Come	CO1: Ability to analyse the parameters of overhead transmission line and appraise different types of overhead lineconstruction. CO2: Ability to classify types of insulators and application of corona. CO3: Ability to analyse the performance of different types of cables. CO4: Ability to analyse the performance of overhead transmission line. CO5: Ability to analyse different type of electric power generations and different types of tariffs.

Department	EE
Course Code	EE503
Title of Course	Control System I
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+1T
Total Contact Hours	40
Course Out Come	CO1: Ability to appraise different control mechanism, functioning of different control devices and components of control system. CO2: Ability to develop mathematical model of different dynamical systems.

	CO3: Ability to perform time domain analysis of 2nd order closed loop system and determination of different transient parameters. CO4: Ability to analyse time and frequency domain stability of a closed loop control system by different methods and measure performance of control system.

Department	EE
Course Code	EE504A.
Title of Course	Data structure & algorithm
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain the concept of data structure, algorithm, programs, stack, queue and principle of recursion. CO2: Ability to explain and analyse nonlinear data structure such as trees and graphs. CO3: Ability to use searching and sorting algorithms.

Department	EE
Course Code	EE504B.
Title of Course	Computer Organization
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain basic concept of organization of stored program and operation sequence for execution of program in computer. CO2: Ability to explain design of address-ripple carry and carry-look ahead principle, design of ALU, floating point IEEE 754 standard.

	CO3: Ability to analyse memory unit design, memory organization, static and dynamic memory, cache memory and virtual memory. CO4: Ability to explain design of control unit-hardware, instruction pipelining, risk architecture, IO operation and interrupt.

Department	EE
Course Code	EE 504C.
Title of Course	Microprocessor & Microcontroller
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain the architecture of 8085 microprocessor, bus configuration, CPU model, instruction set, memory interfacing, interrupts and interrupts handling, programmable peripheral devices, analog input output. CO2: Ability to explain use of compiler and assembler 8086 architecture, microcontroller architecture and instruction set, Features of 8031/8051 popular controller.

Department	EE
Course Code	EE591
Title of Course	Electric machine II (Lab)
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to analyse different starting methods of 3phase cage type Induction motors and drawn their comparison. CO2: Ability to analyse speed control of 3 phase squirrel cage and slip ring induction motor by different methods and drawn their

	comparison. CO3: Ability to examine voltage regulation of Synchronous machine using various methods, viz. Potier reactance method, Synchronous Impedance method. CO4: Ability to examine of equivalent circuit of a single phase induction motor. CO5: Ability to perform the Load test on single phase Induction motor as well as wound rotor induction motor to obtain their performance characteristics. CO6: Ability to analyse the direct axis resistance [Xd] &quadrature axis reactance [Xq] of a 3 phase synchronous machine by slip test. CO7: Ability to make connection diagram to full pitch &fractional slot winding of 18 slot squirrel cage Induction motor for 6 poles & 4 pole operation. CO8: Ability to examine the performance of Induction generator. CO9: Ability to examine the parallel operation of 3 phase Synchronous generators. CO10: Ability to examine the. Vcurve of Synchronous motor.

Department	EE
Course Code	EE592
Title of Course	Power systemI (Lab)
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to determine of the efficiency of long transmission line using A, B, C, D constants. CO2: Ability to analyse DC distribution network by network analyzer. CO3: Ability to examine the earth resistance by earth tester. CO4: Ability to analyse the dielectric strength of solid material and transformer oil.

	CO5: Ability to calculate different parameter by power circle diagram. CO6: Ability to categorise different types of insulator. CO7: Ability to appraise active and reactive power control of analternator. CO8: Ability to analysis an electrical transmission line. CO9: Ability to determine dielectric constant, tan delta, resistivity test of transformer oil.

Department	EE
Course Code	EE593
Title of Course	ControlsystemI(Lab)
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to familiar with basic MATLab control system tool box and its usefulness. CO2: Ability to perform step response of first and Second order system and calculate different transient parameters. CO3: Ability to analyse step response and impulse response for type0, type1 & Type2 system with unity feedback. CO4: Ability to analyse the stability of a control system using Root locus, Bode plot, Nyquist plot plot and calculate different performance specifications. CO5: Ability to analyse the effect of PI, PD and PID controller action on first order control system. CO6: Ability to appraise the steady state error, setting time, percentage peak overshoot, gain margin, phase margin with addition of lead compensator.

Department	EE
Course Code	EE594A.

Title of Course	Data structure &algorithm(Lab)
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to Implement of array operation. CO2: Ability to demonstrate Stack and queue operation: adding, deleting elements. Circular Queue: adding &deleting elements, Merging problems. CO3: Ability to evaluate of expression operation on multiple stack & queues. CO4: Ability to implement link lists, stack and queue using link list, sparse matrices, threaded binary tree, application of sorting and searching algorithm.

Department	EE
Course Code	EE 594B.
Title of Course	Computer Organization(Lab)
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to use different IC chips for building (a) Multiplexer (b) Decoder (c) Encoder (d) Comparator CO2: Ability to design an adder/sub tractor composite unit. CO3: Ability to use of a multiplexer unit to design a composite ALU. CO4: Ability to use of an ALU chip for multibit arithmetic operation. CO5: Ability to implement read write operation using RAM IC.

	CO6: Ability to cascade two RAM ICs for vertical and horizontal expansion.

Department	EE
Course Code	EE 594C.
Title of Course	Microprocessor & Microcontroller(Lab)
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to develop assembly language program using 8085 trainer kit. CO2:Ability to interface with I/O modules and writing programs for table look up, basic arithmetic and logic operation tasks using the kit.

Department	EE (Electrical Engineering)
Course Code	EE 581
Title of Course	Seminar
Nature of Course	Compulsory
Type of Course	Sessional
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to write in a group a project on some current issues on environment, society or technical, as well as present it orally in front of the faculty members.

Department	EE
Course Code	HU 601
Title of Course	Principle of Management
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	2L
Total Contact Hours	20
Course Out Come	CO1: Ability to explain the basic concepts of management and functions of management. CO2: Ability to explain the concept and style of leadership, tools and techniques of decision making. CO3: Ability to explain economic, financial and quantitative analysis and operation and technology management.

Department	EE

Course Code	EE 601
Title of Course	Control System II
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+1T
Total Contact Hours	40
Course Out Come	CO1: Ability to explain the concept of state variable model of continuous dynamics system. CO2: Ability to analyse the discrete time systems using Ztransform. CO3: Ability to analyse nonlinear systems and evaluate thestability of the system using different methods.

Department	EE
Course Code	EE 602
Title of Course	Power System II
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+1T
Total Contact Hours	44
Course Out Come	CO1: Ability to analyse of per unit system and distinguish different type of substations. CO2: Ability to analyse different type of load flow studies. CO3: Ability to analyse different faults in electrical system. CO4: Ability to analyse power system stability. CO5: Ability to classify, applications of different relays and circuit breakers

Department	EE
Course Code	EE 603

Title of Course	Power Electronics
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+1T
Total Contact Hours	40
Course Out Come	CO1: Ability to appraise the basic concept and practical implementation of different types of modern electronic components. CO2: Ability to analyse the construction, characteristics and applications of thyristors and its attributes. CO3: Ability to analyses and explain the construction, operating mechanism and various applications of different converters. CO4: Ability to appraise different applications of power electronics devices in different areas.

Department	EE
Course Code	EE 604A.
Title of Course	Software Engineering
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain system analysis and design, development of program, testing and implementation. CO2: Ability to analyse system project management including quality assurance and project monitoring. CO3: Ability to analyse fundamentals of object oriented design in UML.

Department	EE
Course Code	EE 604B.
Title of Course	Data Base Management System
Nature of Course	Elective

Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	29
Course Out Come	CO1: Ability to analyse the concept of data model, entity relationship model, SQL and integrity constraints, stored procedure and triggers. CO2: Ability to explain relational data based design, transaction processing and file organization and index structures.

Department	EE
Course Code	EE 604C.
Title of Course	Object Oriented Programming.
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to analyse object oriented programming language, relationship among object, meta class, OOP and conventional programming, class, object, inheritance etc. CO2: Ability to explain basic concept object oriented programming using JAVA, applet programming (using SWING).

Department	EE
Course Code	EE604D.
Title of Course	Embedded Systems.
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain embedded system architecture, CISC and RISC, PIC microcontroller (16F877).

	CO2: Ability to explain software architecture and RTOs, basic design using real time operating system. CO3: Ability to analyse software development tools and debugging techniques.

Department	EE
Course Code	EE 605A.
Title of Course	Digital Signal Processing
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain and analyse the basic concept of discrete time signals and systems. CO2: Ability to analyse Z transform, DTFT, DFT and FFT. CO3: Ability to analyse and explain the concept of filter design and digital signal processor.

Department	EE
Course Code	EE 605B.
Title of Course	Communication Engineering.
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to analyse communication system, basic principle of amplitude modulation, frequency modulation, sampling theorem, analog pulse modulation. CO2: Ability to explain digital transmission and digital carrier modulation & demodulation techniques. CO3: Ability to analyse and explain the basic concept of coding

	theory, like news value and information contain, entropy, ShanonFano algorithm, principle of error control and coding.

Department	EE
Course Code	EE 605C.
Title of Course	VLSI & Microelectronics
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to analyse VLSI design, MOS structure, scaling in MOSFET and CMOS. CO2: Ability to explain microelectronics process for VLSI fabrication and hardware description language.

Department	EE
Course Code	EE 691
Title of Course	Control System II (Lab)
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to perform practical position control system and drawn closed loop step response to find different performance specifications. CO2: Ability to compute P, PI and PID controller settings using ZN method and analyse transient and steady state performance of the closed loop system using designed controller(s). CO3: Ability to establish different compensator circuit using suitable methods and analyse step response of the system. CO4: Ability to analyse transfer function of a given system from state

	variable model and vice versa. CO5: Ability to analyse step response of a closed loop system using state variable method. CO6: Ability to analyse the performance of discrete time system and compare closed loop step response of a continuous system with a digital controller and S/H circuit. CO7: Ability to discuss the effects of nonlinearity in a feedback controlled system using time response. CO8: Ability to establish the stability of a nonlinear control system using phase plane plots and analysis of possibility of existence of limit cycle.

Department	EE
Course Code	EE692
Title of Course	Power System II (Lab)
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to analyses the different characteristics of ON and OFF relays. CO2: Ability to analyse of different characteristics of CT and PT. CO3: Ability to analyse different characteristics of under voltage, over current and earth fault relay. CO4: Ability to calculate different bus parameters for AC and DC load flow using various methods. CO5: Ability to optimise of economic load dispatch using classical or derivative methods. CO6: Ability to analyse different transformer, alternator, motor, feeder protection using simulation.

Department	EE

Course Code	EE693
Title of Course	Power Electronics(Lab)
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to analyse and explain different characteristics of SCR and TRIAC. CO2: Ability to explain and analyse working principle of various controlled and uncontrolled converter (half wave, full wave) under different loading conditions. CO3: Ability to explain the performance of single phase controlled converter with and without source impedance. CO4: Ability to explain and analyse chopper circuit using different power electronics switches. CO5: Ability to analyse test/performance of PWM bridge inverter and AC cycloconverter.

Department	EE
Course Code	EE 694A.
Title of Course	Software Engineering(Lab)
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to analyse and explain the design of a project proposal like library management system and employee pay roll system. CO2: Ability to prepare the requirement documents for proposed project in standard format and scheduling it using tools like MSP project and generation of Gnatt and PERT chart. CO3: Ability to explain the design of test scripts and test plan (both black box and white box approach). And generation of test results to perform defect cause analysis.

Department	EE
Course Code	EE 694B.
Title of Course	Data Base Management System(Lab)
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to create data base, INSERT table and record in the data base and retrieve data from data base. CO2: Ability to perform data base management using different clauses.

Department	EE
Course Code	EE694C.
Title of Course	Object Oriented Programming. (Lab)
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1. Ability to explain class, overloading, inheritance, assignments wrapper and arrays. CO2. Ability to perform assignments on developing interfaces, creating and accessing packages, multithreaded programming, applet programming using JAVA.

Department	EE

Course Code	EE 694D.
Title of Course	Embedded Systems.(Lab)
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to analyse microcontroller kit to enter and execute a program. CO2: Ability to generate triangular wave by PWM technique. CO3: Ability to interface an ADC and data transfer by software polling. CO4: Ability to perform stepper motor position control using a microcontroller, serial communication between microcontroller and PC and temperature control (PD and PID controller).

Department	EE
Course Code	EE-701
Title of Course	ELECTRIC DRIVES
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	4L
Total Contact Hours	40
Course Out Come	CO1: Ability to analyse and explain the concept, classification, and advantages of electric drive. CO2: Ability to analyse the motor power rating for thermal model of motor for heating and cooling, determination of motor rating for continuous, short time and intermitted duty. CO3: Ability to analyse different types of starting and braking of electric drives. CO4: Ability to explain different types of electric drive like DC motor drive, induction motor drive, synchronous motor drive and their applications in industries.

Department	EE
Course Code	EE-702
Title of Course	UTILISATION OF ELECTRIC POWER
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L + 1T
Total Contact Hours	40
Course Out Come	CO1: Ability to explain electric traction system and illumination theory. CO2: Ability to analyse electric heating and welding system and electrolytic process.

Department	EE
Course Code	EE-703 A
Title of Course	Power System III

Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain the objective of power system operation and environmental aspect of electric power generation. CO2: Ability to explain the economic operation of power system like hydrothermal scheduling, unit commitment etc. and appraise the theory of automatic generation control.. CO3: Ability to analyse different types of power system transients and compensation.

Department	EE
Course Code	EE-703 B
Title of Course	Control System III
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	30
Course Out Come	CO1: Ability to analyse and explain different methods of state feedback linearization. CO2: Ability to explain sliding mode control including stabilization of second order system. CO3: Ability to explain and analyse optimal control system using equality and inequality problems, Lagrange, Mayer and Bolza problems etc.

Department	EE
Course Code	EE-703 C
Title of Course	Electric Machine III
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L

Total Contact Hours	36
Course Out Come	CO1: Ability to explain generalized theory of electric machines CO2: Ability to analyse transients and dynamics of DC machine, AC machines. CO3: Ability to explain space vector and its application in induction motor and appraise harmonic behaviour and motor behaviour under asymmetrical voltage supply.

Department	EE
Course Code	EE-704 A
Title of Course	HIGH VOLTAGE ENGINEERING
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain breakdown phenomenon of gases, secondary emission, minimum breakdown voltage, effect of polarity on corona inception, breakdown of solids and breakdown of liquids. CO2: Ability to explain the generation of high voltage both AC and DC, advantages of series resonance circuit in testing of cables, impulse generator. CO3: Ability to explain measurement of high voltage both AC and DC, transients in power system, protection of electrical apparatus over high voltage, protection of substations, volt-time characteristics of protective devices, high voltage testing as per Indian standard specifications.

Department	EE
Course Code	EE-704 B
Title of Course	POWER PLANT ENGINEERING
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain the fundamentals of power and energy including power plant economics and selections.

	CO2: Ability to explain details of steam power plant, critical and supercritical boilers, diesel power plants operation and efficiency including heat balance. CO3: Ability to explain the principle of nuclear energy, basic components of nuclear power plant, nuclear waste disposal, and also hydroelectric station and nonconventional power plant.

Department	EE
Course Code	EE-704 C
Title of Course	POWER GENERATION ECONOMICS
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to determine optimum cost of power generation for thermal-hydro-nuclear power plant with or without constraints of unit commitment, load factor, diversity factor, implementation of state estimation and load forecasting for static or dynamic consideration. CO2: Ability to estimate different types of tariffs.

Department	EE
Course Code	EE-704 D
Title of Course	RENEWABLE & NON CONVENTIONAL ENERGY
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to analyse the importance and planning for future generation of power from renewable and non-renewable energy sources and impact of these sources on environment. CO2: Ability to analyse importance of different energy sources (solar, wind, biomas, geothermal, oceans, MHD, hydrogen), design and develop proper equipment's for trapping energy from the sources, analyse impact on environment and techniques of cost minimization. CO3: Ability to explain design and operational principle of different types of fuel cells, determine conversion efficiency and applications.

Department	EE
Course Code	EE-705-A
Title of Course	COMPUTER NETWORKS
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain overview of data communication and networking, categories of network, protocols and standards, OSI reference model, TCP/IP. CO2: Ability to explain different layers of communication like data link layer, medium access sub-layer, network layer, transport layer, application layer.

Department	EE
Course Code	EE-705-B
Title of Course	AI & Soft Computing
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain the basic of intelligent agents and different types of searching techniques like backtracking search, local search etc. CO2: Ability to explain different types of learning process like inductive learning, reinforcement learning etc.

Department	EE
Course Code	EE-705-C
Title of Course	DIGITAL COMMUNICATION
Nature of Course	Elective
Type of Course	Lecture

Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain probability theory and random process like conditional probability, random variable continuous and discrete, coordination coefficient, correlation function and its probability, random binary wave, power spectral density and also signal vector representation and digital power transmission like sampling, pulse amplitude modulation, pulse code modulation etc. CO2: Ability to explain digital modulation techniques like coherent and non-coherent binary modulation techniques, digital carrier modulation technique, performance issue for digital modulation techniques conceptual idea for vector signal analyser.

Department	EE
Course Code	EE-705-D
Title of Course	DIGITAL IMAGE PROCESSING
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain digital image processing system like image formation human eye, image sensing and acquisition, storage and processing, details of image transforms (implementation), also details of image enhancement in the spatial and frequency domain. CO2: Ability to explain image data compression like coding, fidelity criterion, image compression models, image compression standards and details of morphological image processing like dilation, erosion, morphological algorithm on binary images and details of image segmentation, representation and description

Department	EE
Course Code	EE-781
Title of Course	Seminar on Industrial Training.
Nature of Course	Compulsory
Type of Course	Practical

Contact Hours	3P
Total Contact Hours	
Course Out Come	CO1: Ability to analyse the theoretical knowledge to implement it in industrial applications and to solve the practical problems.

Department	EE
Course Code	EE-791
Title of Course	Electric Drive
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to perform thysistor controlled DC drive. CO2: Ability to perform AC Single phase motor-speed control using TRIAC. CO3: Ability to perform V/f control operation of 3phase induction motor drive. CO4: Ability to perform PWM Inverter fed 3phase induction motor control using Software. CO5: Ability to perform the speed control of 3phase induction motor using PLC. CO6: Ability to perform traffic light control using PLC. CO7: Ability to perform speed control of DC motor with 1 phase or 3phase fully controlled rectifier using software.

Department	EE
Course Code	EE-792 (A)
Title of Course	Computer network laboratory
Nature of Course	Elective
Type of Course	Practical

Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to perform IPC (Message queue) CO2: Ability to perform NIC Installation & Configuration. CO3: Ability to perform TCP/UDP Socket Programming CO4: Ability to perform Multicast & Broadcast Sockets CO5: Ability to implement of a Prototype Multithreaded server.

Department	EE
Course Code	EE-792 (B)
Title of Course	AI & Soft Computing
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to write program in PROLOG & LISP

Department	EE
Course Code	EE-792 (C)
Title of Course	Digital Communication Laboratory
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to perform PAM and demodulation. CO2: Ability to perform PCM and demodulation. CO3: Ability to perform delta modulator and demodulator. CO4: Ability to perform BPSK, BFSK, ASK, QPSK modulator and demodulator.

Department	EE

Course Code	EE-792 (D)
Title of Course	DIGITAL IMAGE PROCESSING LABORATORY
Nature of Course	Elective
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to perform the display of grayscale and color images. CO2: Ability to perform Histogram Equalization, Nonlinear Filtering and edge detection using Operators. CO3: Ability to perform 2D DFT and DCT. CO4: Ability to perform filtering in frequency domain. CO5: Ability to perform conversion between color spaces. CO6: Ability to perform DWT of images. CO7: Ability to perform segmentation using watershed transform.

Department	EE
Course Code	EE-782
Title of Course	ELECTRICAL SYSTEMS Design-I
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	CO1: Ability to design heating element with specific wattage and voltage at minimum cost. CO2: Ability to design ONAN distribution transformer, 3phase squirrel cage induction motor. CO3: Ability to design wiring and installation of a multi storage residential building.

Department	EE (Electrical Engineering)
Course Code	EE 783
Title of Course	Project-I
Nature of Course	Compulsory

Type of Course	Practical
Contact Hours	3P
Total Contact Hours	36
Course Out Come	**CO1:** Ability to write technical project in a group on some topics prescribed by supervisor.

Department	EE
Course Code	HU801A
Title of Course	Organisational Behaviour
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	2L
Total Contact Hours	24
Course Out Come	CO1: Ability to describe personality and attitudes. CO2: Ability to explain perception, decision making and motivation. CO3: Ability to describe group behaviour and establish good

	communication system. CO4: Ability to analyse leadership organisation politics, conflict management, organization design.

Department	EE
Course Code	EE801A
Title of Course	HVDC TRANSMISSION
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain the dc power transmission, planning for HVDC transmission and distinguished dc and ac transmission. CO2: Ability to analyse HVDC convertors and control scheme of HVDC converters. CO3: Ability to explain harmonics developed by the converters including their characteristics and use of filter to diminished the harmonics. CO4: Ability to appraise different types of faults and their protection scheme and explain various multi-terminal HVDC systems.

Department	EE
Course Code	EE-801B
Title of Course	ILLUMINATION ENGINEERING
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to understand the basic of day light, artificial light source, energy radiation. CO2: Ability to measure light.

Department	EE
Course Code	EE-801C

Title of Course	ENERGY MANAGEMENT & AUDIT
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	38
Course Out Come	CO1: Ability to learn energy management and audit. CO2: Ability to learn energy conversion act2001

Department	EE
Course Code	EE-801D
Title of Course	DIGITAL SPEECH SIGNAL PROCESSING
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to learn production of acoustic signals, articulation of human speech. CO2: Ability to learn discrete time speech signal processing, anatomy and Physiology of speech production categorization.

Department	EE
Course Code	EE-802A
Title of Course	POWER PLANT INSTRUMENTATION & CONTROL
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to distinguish of energy conversion and measurement requirements for different types of thermal, hydro and nuclear power plant. CO2: Ability to design and construct of different thermal power plant instruments.

Department	EE
Course Code	EE-802B
Title of Course	SENSORS & TRANSDUCERS
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to analyse and explain the concept of mechanical and electromechanical sensors, like Strain gauge, inductive sensor, LVDT and proximity sensor etc. CO2: Ability to appraise the theory of capacitive sensors, thermal sensors and magnetic sensors..

Department	EE
Course Code	EE-802C
Title of Course	BIO-MEDICAL INSTRUMENTATION
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to analyse sociological system, biological signals, fundamentals of elect sociology, biological sensors, biological amplifier. CO2: Ability to explain life support and treatment for cardiac support, electro physiotherapy, lesser in treatment and surgery, Xrays, ultrasonography.

Department	EE
Course Code	EE-802D
Title of Course	PROCESS CONTROL
Nature of Course	Elective

Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Ability to explain general overview of process control and automation, servo and regulatory control, process modelling and characteristics of different modes of control action. CO2: Ability to explain process reaction curves, various tuning mechanism of controllers, different control strategies like ratio control, cascade control, feed forward control etc. CO3: Ability to explain and analyse different types of actuators, basic architecture and functions of PLC, DCS and design PLC programs.

Department	EE (Electrical Engineering)
Course Code	EE -881
Title of Course	Project
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	12P
Total Contact Hours	144
Course Out Come	**CO1:** Ability to verbally present written project work in a team

Department	EE
Course Code	EE-882
Title of Course	Electrical system Lab-II
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	6P
Total Contact Hours	
Course Out Come	CO1: Ability to design the power distribution system for a small township. CO2: Ability to design 3phase slip ring induction motor. CO3: Ability to design a controller for speed control of DC motor.

Department	EE
Course Code	EE-883
Title of Course	Grand Viva
Nature of Course	Compulsory
Type of Course	
Contact Hours	
Total Contact Hours	
Course Out Come	CO1: Ability to face technical interview.