Course Outcome (CO) [1st Year & 2nd Year New Syllabus] Session 2018-19, 2019-20

SEM1:

Department	Basic Science & Humanities
Course Code	BS-CH-101 [For EE]
Title of Course	Chemistry-1
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L + 1T
Total Contact Hours	42
Course Out Come	CO1:Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. CO2: Rationalise bulk properties and processes using thermodynamic considerations. CO3: **:** Distinguish the range of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques. CO4: Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. CO5: List major chemical reactions that are used in the synthesis of molecules.

Department	Basic Science & Humanities
Course Code	BS-M-102 (For EE)
Title of Course	Mathematics -IB
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L + 1T
Total Contact Hours	42

Course Out Come	**CO1**: Apply the concept integral calculus to determine curvature and evaluation of different types of improper integrals. **CO2:** Understand the domain of applications of mean value theorems, limit and maxima-minima to engineering problems. **CO3:** Learn the tools of power series and Fourier series to analyse engineering problems and apply the concept of sequence and convergence of infinite series in many approximation techniques in engineering disciplines. **CO4:** Apply the knowledge for addressing the real life problems which comprises of several variables or attributes and identify extremum points if different surfaces of higher dimensions and concept of vector differentiation. **CO5:** Understand the concept of determinant and learn different types of matrices, their eigen values, eigen vectors, rank and also their orthogonal transformations which are essential for understanding physical and engineering problems.

Department	EE
Course Code	ES-EE101
Title of Course	Basic Electrical Engineering
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L + 1T
Total Contact Hours	42
Course Out Come	**CO1:** To understand and analyze basic electric and magnetic circuits. **CO2:** To study the working principles of electrical machines and power converters. **CO3:** To introduce the components of low voltage electrical installations.

Department	Basic Science & Humanities
Course Code	BS-CH-191 [For EE]
Title of Course	Chemistry-1 Lab
Nature of Course	Compulsory
Type of Course	Practical

Contact Hours	3P
Total Contact Hours	30
Course Out Come	**CO1:** Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. **CO2:** Rationalise bulk properties and processes using thermodynamic considerations. **CO3:** Distinguish the range of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques. **CO4:** Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electro negativity. **CO5:** List major chemical reactions that are used in the synthesis of molecules.

Department	For all B.Tech 1st year (EE, AEIE, ECE,CSE,IT,CE and ME)
Course Code	ES-EE191
Title of Course	Basic Electrical Engineering Laboratory
Nature of Course	Compulsory
Type of Course	Laboratory
Contact Hours	2P
Total Contact Hours	20
Course Out Come	CO1: To learn about the operation, calibration and application of different electrical elements, instruments respectively and observe the constructional details of different electrical machines. CO2: To learn about the RLC circuit behaviour under AC and DC excitation. CO3: To learn about the characteristics features of a single-phase transformer CO4: To learn about three phase circuit analysis. CO5: To learn about the characteristic behaviours of different rotating electrical machines. CO6: To learn about the operation of different converters and LT switchgear.

Department	Electrical Engineering
Course Code	ES-ME191
Title of Course	Engineering Graphics & Design
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	4P+1L
Total Contact Hours	48
Course Out Come	CO1: Introduction to engineering design and its place in society CO2: Exposure to the visual aspects of engineering design CO3: Exposure to engineering graphics standards CO4: Exposure to solid modelling

SEM2

Department	Basic Science & Humanities
Course Code	BS-PH-201 [For EE]
Title of Course	Physics-I
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L + 1T
Total Contact Hours	44
Course Out Come	CO1: Ability to know the basic concepts of mechanics and oscillation. CO2: Elaborate the concept of optics and introduction to the principle of laser. CO3: Ability to understand electromagnetism, dielectric and magnetic properties of materials. CO4: Familiarize with the basic laws of quantum mechanics introduction to Schrodinger wave equation. CO5: Understand the basic concept of Statistical mechanics.

Department	Basic Science & Humanities
Course Code	BS-M-202 (For EE)
Title of Course	Mathematics -IIB
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L + 1T
Total Contact Hours	40
Course Out Come	**CO1**: Learn the methods for evaluating multiple integral and their applications to different physical problems. **CO2:** 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. **CO3:** Learn different tools of differentiation and integration of functions of a complex variable and application of different types of transformation between two 2- dimensional planes for analysis of engineering problems.

Department	EE
Course Code	ES-CS201
Title of Course	Programming for Problem Solving
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	41
Course Out Come	CO1: To recall, recognize and relate the History and different Generations of Computers; Classify the Computers; describe the Basic Anatomy of Computer Systems including Primary & Secondary Memory, Processing Unit and I/O devices. CO2: To define and accordingly apply the Binary & Allied number systems including signed and unsigned numbers; Demonstrate, discriminate and justify the concepts of BCD & ASCII, Binary Arithmetic & logic gates. CO3: To explain the basic concepts of computer programming; Represent real life problems in terms of C programs and accordingly solve them. CO4: To write C programs for developing basic applications viz. inventory management system, billing systems etc. and basic games viz. snakeladder, tick-tack-toe etc. CO5: To illustrate some system level programming like batch programming, registry programming etc.

Department	Basic Science & Humanities
Course Code	HM HU 201 [For EE]

Title of Course	English
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	2L
Total Contact Hours	25
Course Out Come	CO1: Acquire basic proficiency in English including reading and listening comprehension, writing and speaking Skills.

Department	Basic Science & Humanities
Course Code	BS-PH-291 [For EE]
Title of Course	Physics-I Laboratory
Nature of Course	Compulsory
Type of Course	Lecture
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 Quantum Physics with the help of experiments like Energy band gap of semiconductor, Planck constant and Characteristics of Solar Photovoltaic cell. **CO5**: Ability to learn Electricity and Magnetism with the help of experiments like Hall Effect of semiconductors, Specific charge of electron.

Department	EE
Course Code	ES-CS291

Title of Course	Programming for Problem Solving
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	4P
Total Contact Hours	40
Course Out Come	CO1: To operate on DOS, UNIX with preliminary commands. CO2: To write and execute C programs for solving basic problems viz. prime number generations, computing GCD or LCM etc. CO3: To develop real life applications viz. inventory management system, billing systems etc. through C programming.

Department	Electrical Engineering
Course Code	ES-ME 292
Title of Course	Workshop/Manufacturing Practices
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	4P+1L
Total Contact Hours	48
Course Out Come	**CO1:**Introduction to manufacturing processes and its application insociety. **CO2:** Applying practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes. **CO3**: Exposure of assembling different components.

Department	Basic Science & Humanities (EE)
Course Code	HM HU 291
Title of Course	Language Laboratory
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	19
Course Out Come	CO1: Acquire basic proficiency in English including reading and listening comprehension, writing and speaking Skills.

SEM3

Department	Electrical Engineering
Course Code	PC-EE 301
Title of Course	ELECTRIC CIRCUIT THEORY
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L + 1T
Total Contact Hours	40
Course Out Come	CO1: Describe different type of networks, sources and signals with examples. CO2: Explain different network theorems, coupled circuit and tools for solution of networks. CO3: Apply network theorems and different tools to solve network problems. CO4: Select suitable techniques of network analysis for efficient solution. CO5: Estimate parameters of two-port networks. CO6: Design filters circuits.

Department	EE
Course Code	PC-EE391
Title of Course	Electric Circuit Theory Lab
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	20
Course Out Come	CO1: Determine of transient response of different electrical circuit, parameters of two port network, frequency response of filters,

	Laplace transform and inverse Laplace transform. CO2: Generate different signals in both discrete and analog form CO3:Analyze amplitude and phase spectrum of different signals. CO4: Verify network theorems. CO5: Construct circuits with appropriate instruments and safety precautions. CO6: Simulate electrical circuit experiments using suitable software.

Department	EE
Course Code	PC-EE 302
Title of Course	Analog Electronics
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Describe analog electronic components and analog electronics circuits. CO2: Explain principle of operation of analog electronic components, filters, regulators and analog electronic circuits. CO3: Compute parameters and operating points of analog electronic circuits. CO4: Determine response of analog electronic circuits. CO5: Distinguish different types amplifier and different types oscillators based on application. CO6: Construct operational amplifier based circuits for different applications.

Department	EE
Course Code	PC-EE392
Title of Course	Analog electronic laboratory
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	20
Course Out Come	CO1: Determine • characteristics of full wave rectifier with filter and without filter • characteristics of BJT and FET • characteristics of Zener diode as voltage regulator • characteristics of class A, C and push pull amplifiers CO2: Verify function of DAC and ADC CO3. Construct • function generator using IC • R-C coupled amplifier • linear voltage regulator using regulator IC chip. •timer circuit using 555 for monostable, astable and multi stable multi vibrator. • V to I and I to V converter with Op amps. CO4: Work in a team CO5: Validate theoretical learning with practical

Department	EE
Course Code	PC-EE 303
Title of Course	Electrometric field theory

Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: To learn the basic mathematical tools to deal with Electromagnetic field. CO2: To understand properties and application of Electric and magnetic field. CO3: To analyze electromagnetic wave propagation in transmission line. CO4: To acquire problem solving skills related to Electromagnetic field.

Department	Electrical Engineering
Course Code	ES-ME301
Title of Course	Engineering Mechanics
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	36
Course Out Come	**CO1**: Understanding and applying the vector and tensor algebra and related topics like coordinate transformation of vectors and tensors for the kinematic and kinetic analysis of motion (both in two dimensions and three dimensions) of rigid bodies in particular and system of particles in general. Gaining knowledge of the fundamentals of linear algebra for further application to related engineering and scientific problems solving. **CO2**: Thorough understanding of the motion of rigid bodies both in plane and space motions. An ability is developed to analyse or solve a given engineering problem or to create/ innovate new engineering objects. **CO3**: Developments of concepts of quantities/ properties like mass/ area moments of inertia, product of inertia, centroid, centre of mass, centre of gravity, their relations, differences etc. Ability to calculate these properties for different standard and non-standard engineering objects about any axis by the application of theorems like perpendicular and/or parallel axes theorems or by applying the

	rotational transformation of axes. **CO4**: Understanding of the kinematic and kinetic constraints of different types of supports in free body diagram and to analyse planar motion, general 3D motions and gyroscopes. **CO5**: Determination of shear force and bending moment and producing shear force and bending moment diagrams of different types of beams and relationship between them. **CO6**: Derivation and application of the torsion equation of solid and hollow circular shaft and understanding of Coulomb's law of friction, angle of repose and coefficient of friction.

Department	Basic Science & Humanities (EE)
Course Code	BS-M 301 (For EE)
Title of Course	Mathematics – III
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: Learn the ideas of probability and random variables, various discrete and continuous probability distributions with their properties and their applications in physical and engineering environment. CO2:Apply numerical methods to solve engineering problems. CO3: Learn to solve engineering problems using z transform.

Department	Basic Science & Humanities (EE)
Course Code	PC-CS 391 [For EE]
Title of Course	Numerical Methods Lab
Nature of Course	Compulsory
Type of Course	Lecture

Contact Hours	2P
Total Contact Hours	20
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, transcendental equations & ordinary differential equations.

Department	Basic Science & Humanities (EE)
Course Code	BS-302
Title of Course	Biology for Engineers
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	40
Course Out Come	CO1: To know Darwinian evolution, molecular perspective and classification, Phylogenetic trees, study of inter- and intra –species relationships. CO2: Highlight Cellular structure and function, cellular assembly and central dogma of molecular Biology. CO3: Convey about Organismal physiology-Energy and energetic constraints. 3-D structure and function of large biological molecules. CO4: Study Techniques in bio physics and bio chemistry and Immunology- Self vs Non-self, pathogens, human immune system, antigen-antibody reactions. CO5: Study Cancer biology, gene regulation, aging, apoptosis and stem cell. CO6: Identify Drug

Department	Electrical Engineering
Course Code	MC-EE-301
Title of Course	INDIAN CONSTITUTION
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	3 Hours/week
Course Out Come	CO1: Describe • Different features of Indian constitution. • Power and functioning of Union, state and local self-government. • Structure, jurisdiction and function of Indian Judiciary. • Basics of PIL and guideline for admission of PIL. • Functioning of local administration starting from block to Municipal Corporation. CO2: • identify authority to redress a problem in the profession and in the society.

SEM4

Department	EE (Electrical Engineering)
Course Code	PC-EE-401
Title of Course	Electrical Machine-I
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	35
Course Out Come	CO1: describe the function of different components of magnetic circuit, DC machines and transformers CO2:explain the principle of operation of different types of DC machines and transformers CO3: solve numerical problems of DC machines and transformers. CO4: estimate the parameters and efficiency of transformer. CO5: determine the characteristics of DC machines CO6: recommend methods to control output of DC machines.

Department	EE
Course Code	PC-EE-402
Title of Course	DIGITAL ELECTRONICS
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	35
Course Out Come	CO1:describe the function of different building blocks of digital electronics, semiconductor memories and programmable logic devices. CO2: explain the principle of operation of combinational and sequential digital circuits, A/D and D/A converter CO3: solve numerical problems of Boolean algebra, number system, combinational & sequential digital circuits and A/D and D/A converter. CO4: specify applications of combinational and sequential digital circuits. CO5: determine specifications of different digital circuits.

	CO6: design combinational and sequential digital circuits

Department	EE
Course Code	PC-EE-403
Title of Course	ELECTRICAL & ELECTRONICS MEASUREMENTS
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	35
Course Out Come	CO1: explain the terms accuracy, precision, resolution, speed of response, errors in measurement, loading effect CO2: describe methods of measurement of power, energy by instruments and resistance, capacitance and inductance by bridges and potentiometer CO3: 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 CO4: explain the different building block, principle of operation oscilloscope and measurement techniques of voltage, current, frequency and phase by oscilloscope CO5: solve numerical problems relating to measurements and instruments mentioned in PCEE403. CO6: specify applications of different measuring instruments, sensors and transducers mentioned inPC-EE403

Department	Electrical Engineering
Course Code	ES-ME401
Title of Course	Thermal Power Engineering
Nature of Course	Compulsory
Type of Course	Theory
Contact Hours	3L
Total Contact Hours	35
Course Out Come	CO1: Exposure to operation of different types of boilers, turbines,

	IC engines and Gas turbines. CO2: To analyze the performance of boilers, engines and turbines. CO3: To acquire problem solving skills to solve problems of boilers, turbines, IC engines and Gas turbines.

Department	EE
Course Code	HM-401
Title of course	VALUES & ETHICS IN PROFESSION
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	35
Course out come	CO1: Ability to know the Effect of Technological Growth, Energy crisis, Environmental degradation and pollution, Eco-friendly Technologies, Environmental Regulations. CO2: Ability to know the problems of man, machine, interaction, Impact of assembly line and automation, Human centered Technology. CO3: Ability to know the Ethics of Profession, Ethical issues in Engineering practice, Conflicts between business demands and professional ideals, codes of professional ethics. CO4: Ability to know the Profession and Human Values, Values Crisis in contemporary society, Nature of values, Psychological values, societal values, Aesthetic values.

Department	Basic Science & Humanities (EE)
Course Code	MC-EE-401
Title of Course	Environmental Science
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L
Total Contact Hours	35

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 includesEnvironmental impact assessment, Environmental Audit, laws and protection act of India, Different international environmental treaty/agreement/ protocol.

Department	EE (Electrical Engineering)
Course Code	PC-EE-491
Title of Course	Electric Machine-I (Lab)
Nature of Course	Compulsory.
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	20
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 transformerand perform its polarity test and different connection of three phase Transformer. **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
Course Code	DIGITAL ELECTRONICS LABORATORY
Title of Course	PC-EE492
Nature of Course	Compulsory
Type of Course	Practical

Contact Hours	2P
Total Contact Hours	20
Course Out Come	CO1: identify appropriate equipment and instruments for the experiment CO2:test the instruments for application to the experiment CO3: construct decoder , multiplexer, adder and subtractor circuits with appropriate instruments and precaution CO4: realize RS-JK and D-flip flop, Universal register with gates and multiplexer and flip flops and asynchronous and synchronous up down counters. CO5:validate the operation op code conversion circuit-BCD to excess3 and vice versa, 4-bit parity generator and comparator circuits CO6: work effectively in a team

Department	EE
Course Code	PC-EE493
Title of Course	ELECTRICAL & ELECTRONICS MEASUREMENT LABORATORY
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	20
Course Out Come	CO1: identify appropriate equipment of instruments for the experiment CO2: test the instrument for application to the experiment CO3: construct circuit with appropriate instruments and safety precautions CO4: evaluate and adjust the precision and accuracy of ac energy meter, moving iron and dynamometer type ammeter, voltmeter and wattmeter by potentiometer CO5: measure voltage , current, power, energy, phase, frequency, resistance, inductance, capacitance CO6: Work effectively in a team.

Department	Electrical Engineering
Course Code	ES-ME491
Title of Course	Thermal Power Engineering Laboratory
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	20
Course Out Come	CO1: To learn about the operation and application of different types of boilers & IC engines. CO2: To test the performance of IC engines. CO3: To find the properties of fuel.

Department	EE
Course Code	PC-EE-501
Title of Course	Electrical Machine-II
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+0T
Total Contact Hours	40
Course Out Come	CO1: describe the arrangement of winding of AC machines. CO2: explain the principle of operation of Induction machines, Synchronous machines and special machines. CO3: solve numerical problems of Induction machines, Synchronous machines and Special machines. CO4: estimate the parameters and efficiency of Induction machines and Synchronous machines. CO5: determine the characteristics of Induction machines and Synchronous machines.

	CO6: select appropriate methods for starting , braking and speed control of Induction machines.

Department	EE
Course Code	PC-EE-502
Title of Course	Power system-I
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+0T
Total Contact Hours	40
Course Out Come	CO1: explain the principle of generation of Electric power from different sources. CO2: determine parameters of transmission lines and its performance. CO3: explain the principle of formation of corona and methods of its reduction. CO4: conduct electrical tests on insulators.. CO5: solve numerical problems related to overhead transmission line, cable, insulators and tariff. CO6: analyze overhead transmission line based on short medium and long lines.

Department	EE
Course Code	PC-EE-503
Title of Course	Control System
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+0T
Total Contact Hours	45
Course Out Come	CO1: Develop mathematical model of mechanical, electrical, thermal, fluid system and different control system components like servomotors, synchros, potentiometer, tacho-generators etc.. CO2: analyse stability of LTI system using routh-hurtwitz (RH) criteria, root locus techniques in time domain and bode plot and nyquist technique in frequency domain. CO3: 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. CO4: apply state variable techniques for analysis of linear systems. CO5: analyze the stability of linear discrete system. CO6: solve numerical problems on LTI system modelling, responses, error dynamics and stability.

Department	EE
Course Code	PC-EE-504
Title of Course	Power Electronics
Nature of Course	Compulsory
Type of Course	Lecture
Contact Hours	3L+0T
Total Contact Hours	40
Course Out Come	CO1: differentiate between signal level and power level devices. . CO2: construct triggering and commutation circuits of SCR. CO3: explain the principle of operation of AC-DC, DC-DC and DC-AC converters. CO4: analyse the performance of AC-DC, DC-DC and DC-AC converters.. CO5: apply methods of voltage control and harmonic reduction to inverters. CO6: solve numerical problems of switching devices, AC-DC, DC-DC and DC-AC converters. .

Department	EE
Course Code	PC-EE-591
Title of Course	ELECTRIC MACHINE-II LABORATORY
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	20
Course Out Come	CO1: identify appropriate equipment and instruments for the experiment.

	CO2: test the instrument for application to the experiment. CO3: construct circuits with appropriate instruments and safety precautions. CO4: 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. CO5:work effectively in a team.

Department	EE
Course Code	PC-EE-592
Title of Course	POWER SYSTEM-I LABORATORY
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	20
Course Out Come	CO1: identify appropriate equipment and instruments for the experiment. CO2: test the instrument for application to the experiment. CO3: construct circuits with appropriate instruments and safety precautions. CO4: validate different characteristics of transmission line. CO5: determine earth resistance, dielectric strength of insulating oil, breakdown strength of solid insulating material and dielectric constant of transformer oil. CO6: analyze an electrical transmission line circuit with the help of software. CO7: work effectively in a team.

Department	EE
Course Code	PC-EE-593
Title of Course	CONTROL SYSTEMLABORATORY
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P

Total Contact Hours	20
Course Out Come	CO1: identify appropriate equipment and instruments for the experiment. CO2: test the instrument for application to the experiment. CO3: construct circuits with appropriate instruments and safety precautions. CO4: use MAT-Lab control system tool box, MAT-Lab- simulink tool box & PSPICE for simulation of systems. CO5: determine control system specifications of first and second order systems. CO6: validate step response & impulse response for type-0, type-1 & Type-2 system with unity feedback using MATLAB & PSPICE. . CO7: work effectively in a team.

Department	EE
Course Code	PC-EE-594
Title of Course	POWER ELECTRONICSLABORATORY
Nature of Course	Compulsory
Type of Course	Practical
Contact Hours	2P
Total Contact Hours	20
Course Out Come	CO1: identify appropriate equipment and instruments for the experiment. CO2: test the instrument for application to the experiment. CO3: construct circuits with appropriate instruments and safety precautions. . CO4: validate characteristics of SCR, Triac, and performance of phase controlled converter, DC-DC converter, inverters and resonant pulse converters. CO5: demonstrate the relation between the speed and firing angle of Universal motor. CO6: work effectively in a team.

Department	EE
Course Code	OE-EE-501A
Title of Course	DATA STRUCTURE & ALGORITHM
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3 hrs/week
Total Contact Hours	40
Course Out Come	CO1: differentiate how the choices of data structure & algorithm methods enhance the performance of the program. CO2: solve problems based upon different data structure & also write programs. CO3: write programs based on different data structure CO4: identify appropriate data structure & algorithmic methods in solving problem. CO5: discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing CO6: compare the benefits of dynamic and static data structures implementations. .

Department	EE
Course Code	OE-EE-501B
Title of Course	OBJECT ORIENTED PROGRAMMING
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3 hrs/week
Total Contact Hours	40
Course Out Come	CO1: specify simple abstract data types. CO 2: recognise features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity. CO 3: apply common object-oriented design patterns

	CO 4: specify uses of common object oriented design patterns with examples. CO 5: design applications with an event-driven graphical user interface.

Department	EE
Course Code	OE-EE-501C
Title of Course	COMPUTER ORGANISATION
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3 hrs/week
Total Contact Hours	36
Course Out Come	CO1: explain basic structure of digital computer, stored program concept, different arithmetic and control unit operations, operating systems and compiler/assembler, memory and I/O operations. CO 2: differentiate between RISC vs CISC architectures, cache memory, virtual memory. CO 3: perform fixed point multiplication and division. CO 4: apply restoring and non-restoring algorithms, floating point - IEEE 754 standard. CO 5: design adder, memory unit and control unit, data path for read/write access.

Department	EE
Course Code	PE-EE-501A
Title of Course	HIGH VOLTAGE ENGINEERING
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3hrs/week
Total Contact Hours	40
Course Out Come	CO1: explain breakdown phenomenon of gas, liquid and solid and vacuum CO 2: suggest methods for generation and measurement of high voltage and currents. CO 3: determine the basic insulation level of substation equipment.

	CO 4: apply methods for protection of electrical apparatus against over voltage CO 5: test insulators, bushings, isolators, circuit breakers, cables and power transformers. CO 6: solve numerical problems of breakdown phenomena, generation and measurement of high voltage and currents, over voltage phenomena and high voltage testing.

Department	EE
Course Code	PE-EE-501B
Title of Course	POWER PLANT ENGINEERING
Nature of Course	Elective
Type of Course	Lecture
Contact Hours	3 hrs./week
Total Contact Hours	40
Course Out Come	CO1: explain the principle of operational of Steam, Hydroelectric, Diesel, Gas turbine, Nuclear power and non-conventional power plant. CO 2: identify the cause of pollution for power generation and its remedy. CO3: suggest location to set up Steam, Hydroelectric, Diesel, Gas turbine and Nuclear power plant. CO 4: compare Steam, Hydroelectric, Diesel, Gas turbine, Nuclear power and non-conventional power plant. CO 5: suggest methods of maintenance of Steam, Gas and Hydroelectric power plants CO 6: solve numerical problems of load estimation and economics of power plants.

Department	EE
Course Code	PE-EE-501C
Title of Course	RENEWABLE & NON CONVENTIONAL ENERGY
Nature of Course	Elective
Type of Course	Lecture

Contact Hours	3 hrs./week
Total Contact Hours	42
Course Out Come	CO1: explain the principle of conversion of solar energy, wind energy , biomass, Geothermal energy, Ocean energy and Hydrogen energy to other form of energy. CO 2: explain the principle of operation of magneto hydrodynamic power generation: CO 3: use Solar energy, Wind energy , Biomass, Geothermal energy, Ocean energy, Hydrogen energy and fuel cell for different applications. CO 4: suggest location to set up wind mill and biogas generation plant CO 5: estimate conversion efficiency of fuel cell.