On completion of these courses, the students will be able to:

Table 3.1: Outcomes of courses in curriculum

Sr. No.	Semester	Course Name	CO Nos.	Course Outcomes
1	1	Calculus	C2110014.1	Describe how to add together infinitely many numbers, differentiable function f(x) as an infinite sum of powers of x and convergence or divergence of a wide class of series.
			C2110014.2	Explain the concepts of concavity of graph and finding points of inflection, behavior of function f(x) as x goes to infinity/ negative infinity and evaluate indeterminate forms using L'Hospital's rule.
			C2110014.3	Solve the convergence or divergence of integral when integral is not easily evaluated using known techniques.
			C2110014.4	Calculate the volume of solids such as pyramid, sphere by slicing method, Generate the solid by rotating region about an axis in its plane and hence calculating the volume of solid, by disk method and washer method.
			C2110014.5	Develop the ability to solve some practical problems, such as constrained optimization problems and other problems involving Partial differentiation.
			C2110014.6	Evaluate double integral in polar coordinates, reverse the order of integration for a double integral and evaluate a triple integral to find volume in rectangular coordinates, cylindrical coordinates, and spherical coordinates
2		Communication Skills	C2110002.1	Examine the process of communication and its components.
			C2110002.2	Construct basic and intermediate skills in English language.
			C2110002.3	Practice the language skills i.e. Listening, Speaking, Reading and Writing (LSRW).
			C2110002.4	Connect to literature sensibility and relate to life skills.
			C2110002.5	Establish phonetic competence and

				comprehension, presentation and group discussion skills.
			C2110002.6	Ascertain confidence for communicating in English and recommend for the life-long learning of English language.
3		Elements of Electrical Engineering	C2110005.1	To remember about electrical current, potential difference, power and energy, sources of electrical energy, resistance and its behavior with temperature
			C2110005.2	To understand basic laws of Electrical Engineering, Single phase as well as three phase circuit concepts
			C2110005.3	To assess Electrostatics and Electromagnetic
			C2110005.4	To analyze Electric field and magnetic field
			C2110005.5	Appraise the role of safety and the precaution to be taken while working with electrical equipments and accessories
			C2110005.6	To develop phasor diagram and waveforms for different configuration of an ac circuits
4		Elements of Mechanical Engineering	C2110006.1	Students will collect the fundamentals of mechanical systems.
			C2110006.2	Students can understand the basic idea of every field in mechanical engineering
			C2110006.3	Students will apply basic of mechanical engineering in inter disciplinary area and their routine life.
			C2110006.4	Students of core discipline can identify their area of interest in futuristic project work.
			C2110006.5	Students will compile the information of basic properties of different engineering materials.
			C2110006.6	Students can understand and explain the topics by developing effective oral presentation skill.
5		Engineering Graphics	C2110013.1	To recognize and understand the conventions and the methods of engineering drawing.
			C2110013.2	Interpret engineering drawings using

				fundamental technical mathematics.
			C2110013.3	Construct basic and intermediate geometry.
			C2110013.4	To appraise their visualization skills so that they can apply these skills in developing new products.
			C2110013.5	To assess their technical communication skill in the form of communicative drawings.
			C2110013.6	Integrate the theories of Engineering Graphics to understand technical drawing.
6		Environmental Studies	C2110007.1	Identify different types of environmental pollution and control measures.
			C2110007.2	Comprehend the importance of ecosystem, biodiversity and natural bio geo chemical cycle.
			C2110007.3	To predict the exploitation and utilization of conventional and non-conventional resources.
			C2110007.4	To correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevention
			C2110007.5	Summarize the multi-disciplinary nature of the environment, its components, and inter-relationship between man and environment.
			C2110007.6	Conclude the relevance and importance of the natural resources in the sustenance of life on earth and living standard
7	2	Vector Calculus & Linear Algebra	C2110015.1	To define types of matrices, Inverse of a Square Matrix.
			C2110015.2	To describe basis, span and dimension of vector space.
			C2110015.3	To apply linear transformation in computer graphics.
			C2110015.4	To calculate Eigen values and Eigen vectors of matrix.
			C2110015.5	To explain inner product space, orthogonally and orthonormality of the given set of vectors.
			C2110015.6	To evaluate gradient of scalar field, directional derivative, divergence and curl of vector field, arc length, curvature, torsion
8		Computer	C2110003.1	Know fundamental principles of problem

		Programming and Utilization		solving in softwareengineering
			C2110003.2	Understand various hardware components of computer system and it's working
			C2110003.3	Solve various complex problems using computer oriented numerical techniques
			C2110003.4	Analyze C principles/structures and apply C principles/structures to solve complex engineering equations
			C2110003.5	Explain basic terminology and concepts used in computer programming
			C2110003.6	Develop analytical skills for solving complex engineering problems
9		Physics	C2110011.1	Ability to think in core concept of their engineering application by studying various topics involved in branch specific applications.
			C2110011.2	Identity the use of an appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
			C2110011.3	Apply suitable techniques to design and conduct experiments, as well as to analyze and interpret data in order to prepare coherent reports of his or her findings.
			C2110011.4	Demonstrate an ability to identify, formulate, and solve engineering problems.
			C2110011.5	Collect a literature search, to make use of appropriate computational or laboratory skills, and to make an effective written or oral presentation of the results of the project.
			C2110011.6	Summarize to use the techniques, skills, and modern engineering tools necessary for engineering practice.
10		Electrical & Electronics Workshop	C2110012.1	To remember electrical circuit parameters and equations for current, voltage and power in a circuit
			C2110012.2	To understand the supply arrangements and their limitations, knowledge of standard voltages and their tolerance, safety aspects of electrical systems and important of protective measures in wiring system
			C2110012.3	To assess simple lightning circuits for domestic buildings, distinguish between light and power circuits

			C2110012.4	To analyze the types of wires, cables and other accessories used in wiring. Creating awareness of energy conservation in electrical systems
			C2110012.5	To develop backup power supply in domestic installation
			C2110012.6	Appraise the role of safety with precaution when working with live wires
11		Contributor Personality Development	C2990001.1	Identify a larger vision of their own career within the students.
			C2990001.2	Construct the attitudes associated with long term success such as value creation, team building and sustainability.
			C2990001.3	Develop more acceptability as well as employability
			C2990001.4	Analyze results more authentically to their employers.
			C2990001.5	Formulate a correlation between the inner contentment and external achievement in the longer run.
			C2990001.6	Ascertain and justify their role and contribution in the act of collective institution and nation building.
13	3	Advance Engineering Mathematics	C2130002.1	To identify periodic functions and some special functions
			C2130002.2	To solve Laplace transform and differential equations using tool like Laplace transform and Fourier series.
			C2130002.3	To construct ordinary differential equation and partial differential equation.
			C2130002.4	To analyze the real world problem relating ordinary differential equation and partial differential equation
			C2130002.5	To categorize the problems of ordinary differential equation and partial differential equation.
			C2130002.6	To evaluate expansion of functions in terms of basic trigonometric functions and power series solutions for differential equations.
14		Engineering Economics and Management	C2130004.1	To remember different aspects of banking.
			C2130004.2	To understand the concept of management.
			C2130004.3	To understand the fundamentals of engineering economics.

			C2130004.4	To describe the concept of national income.
			C2130004.5	To explain the basic components of marketing mix.
			C2130004.6	To Analyse basic economics problems of India.
15		Circuits & Networks	C2130901.1	To understand basic circuit elements terminology
			C2130901.2	To understand various types of multi terminal elements and power –energy relations between them.
			C2130901.3	To apply various circuit laws like Ohm's Law, KVL, KCL, and on this basis apply apply node and mesh circuit analysis,source transformation techniques, conversion techniques, Superposition, Thevenin, Norton, Reciprocity, Maximum Power Transfer, Millman's Theorem, etc..
			C2130901.4	To apply dot convention technique for analysis of transformer based circuits.
			C2130901.5	To calculate two port parameters such as y, z, h, ABCD, etc. for the given two port network.
			C2130901.6	To apply Laplace Transform for circuit analysis and to analyze behavior of first & second order passive circuits..
16		Analog Electronics	C2130902.1	Identify the different configurations of transistor and amplifiers.
			C2130902.2	Discuss the positive and negative feedback amplifiers.
			C2130902.3	Develop the ability to design analog electronic circuits using discrete components.
			C2130902.4	Calculate the output of various analog circuits to compare experimental results in the laboratory with theoretical analysis.
			C2130902.5	Explanation of various Non-linear IC applications of Op-amp

			C2130902.6	To summarize all the linear and non-linear applications of Op-amp
17		Electrical Measurement and Measuring Instruments	C2130903.1	Analyze the errors in the reading and calibrate the instruments as per the type of error.
			C2130903.2	Compare performance of MC, MI and Dynamometer types of measuring instruments and Energy meters
			C2130903.3	Compute the errors in CTs and PTs.
			C2130903.4	Determine the circuit parameters using AC and DC bridges.
			C2130903.5	Understand operating principles of electronic measuring instruments.
			C2130903.6	Select transducers for the measurement of temperature, displacement and strain.
18		DC Machines and Transformer	C2130904.1	Describe the basic energy conversation principle in electrical machine field, working principle, performance, control and applications of DC Machines and Transformer.
			C2130904.2	Illustrate the operating range and efficiency for each machine running under different operating conditions.
			C2130904.3	Demonstrate the connection diagram, test and conduct performance experiments on DC machine and Transformer.
			C2130904.4	Analyze, Identify, formulates and solve DC machine and Transformer related problems.
			C2130904.5	To motivate the student towards designing of the machines by providing them Design based problems/ Open ended Problems that they can enhance the real application of machine.
			C2130904.6	Evaluate the performance knowledge of the students by giving them open ended problems.
19		Design Engineering - I A	C2130005.1	To Describe a problem with the specific domain.
			C2130005.2	To Discuss about the application areas of the selected domain
			C2130005.3	To prepare the canvases based on their selected domain.
			C2130005.4	To identify the research papers for their selected domain.
			C2130005.5	To identify the research papers for their selected domain.

			C2130005.6	To Summaries the report including all the phases.
20	4	Digital Electronics	C2140910.1	To identify different number systems and its inter-conversions
			C2140910.2	Distinguish the concept of Boolean algebra and its different theorems, properties etc.
			C2140910.3	To examine the construction and working of different combinational circuits etc.
			C2140910.4	Classification of different types of flip-flops and logic circuits of sequential circuits and counters.
			C2140910.5	Explain different types of memories and its applications.
			C2140910.6	To develop digital IC based small system as an open ended project.
21		AC Machines	C2140906.1	Identify the different AC machines on the bases of their application in industry
			C2140906.2	Explain the construction, working principle, performance and applications of Poly-phase induction motor, single phase motors, synchronous generator (Alternator), synchronous motor and Commutator motors.
			C2140906.3	Carry out test and conduct performance experiments on AC machines.
			C2140906.4	Identify the operating range and efficiency for each machine running under different operating conditions.
			C2140906.5	Summarize the causes and effects of different parameters on the performance of AC machines.
			C2140906.6	Evaluate the performance of the students by providing them Design based problems/ Open ended Problems that they can enhance the real application of machine.
22		Applied Thermal and Hydraulic Engineering	C2140907.1	To comprehend the concepts of Heat transfer, Fluid mechanics, engineering thermodynamics and Hydraulic machines.
			C2140907.2	To correlate the fundamentals of Heat transfer, Fluid mechanics, Thermodynamics and Hydraulic engineering with various mechanical system.
			C2140907.3	To understand various thermodynamic cycle, working of various mechanical equipments and use of various charts

				used in Thermal science.
			C2140907.4	To understand working and design parameters of different types of pump.
			C2140907.5	To understand fundamentals of Heat exchangers.
			C2140907.6	To know different refrigeration systems.
23		Electrical Power Generation	C2140908.1	To remember the Conversion of Electrical Energy from conventional sources like coal, gas, water, etc.. and neutral earthing, structure of substations.
			C2140908.2	To estimate various economic aspects of different types of Tariffs rates.
			C2140908.3	To compute economic analysis for Commercial/ Industrial/ Residential solar PV energy conservation
			C2140908.4	Analyse the load curves for residential, industrial load and I-V characteristics of Sola cell/module/Array modelling.
			C2140908.5	Summaries optimum power generation plant
			C2140908.6	Propose Suitable energy conservation System for Commercial/ Industrial/ Residential load.
24		Field Theory	C2140909.1	Afterthecompletion ofthis course the studentwillhave the **knowledge**ofelectrostatic and magneto static fields whichin future willhelp tounderstandits applications in Electrostatic generators, Electric powertransmission, Lightingprotection, Electro deposition, Magnetic separators, Developmentof motors,Transformers, Electromagnetic pump and so on.
			C2140909.2	Ability to apply knowledge of mathematics, science, and engineering to the analysis and design of systems involving electric and magnetic fields as well as electromagnetic waves.
			C2140909.3	Ability to understand, formulate, and solve engineering problems in the area of electric and magnetic fields and waves.

			C2140909.4	Ability to evaluate use the techniques, and skills, which are necessary for engineering practice.
			C2140909.5	Acquire skills to create search for technical issues.
			C2140909.6	To developTransmission Line Equations and its solutions in Phasor form.
25		Signals and Systems	C2141005.1	Understand about various types of signals, classify them, analyze them, and perform various operations on them
			C2141005.2	Understand about various types of systems, classify them, analyze them and understand their response behavior.
			C2141005.3	Appreciate use of transforms in analysis of signals and system
			C2141005.4	Carry simulation on signals and systems for observing effects of applying various properties and operations.
			C2141005.5	Improve analyzing skills
			C2141005.6	Create strong foundation of communication and signal processing to be studied in the subsequent semester
26		Design Engineering - I B	C2140002.1	To Collect an idea for addressing the purpose.
			C2140002.2	To Classify the problem relevance in form of Activities, Environment, Interactions, Objects & user Charts.
			C2140002.3	To Select Research Papers to enhance the understanding on the theme they are working on.
			C2140002.4	To Analyze the learning requirements at an early stage along with prioritization of specific learning.
			C2140002.5	To Attach fast prototypes (non-working/ partially working) / conceptual layout.
			C2140002.6	To Arrange Progress Report including all the phases.
27	5	Power Electronics – I	C2150903.1	To Describe the construction and characteristics of Power semiconductor devices and fundamental of thyristors and family.
			C2150903.2	To Classify ac-to-dc and dc-to-ac converters.
			C2150903.3	To Apply the knowledge of power electronic converter for speed control of DC motors.

			C2150903.4	To Analyze the design, operation, characterization, and application of electronic circuits for conversion and control of electrical energy.
			C2150903.5	To Assess the performance of power electronic converter and its control scheme to target different applications.
			C2150903.6	To Develop power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work.
28		Microprocessor and Microcontroller Architecture & Interfacing	C2150907.1	Remember 8 bit microcontroller (MCS 51 Family) & Microprocessor architecture.
			C2150907.2	Understand the concept of bus system and interrupts.
			C2150907.3	Assess the assembly language programming / C programming to 8051 family.
			C2150907.4	Analyse different types of I/O interfaces with 8 bit microprocessor/microcontroller.
			C2150907.5	Appraise the role of Microcontroller in recent technology in different areas.
			C2150907.6	Develop microcontroller & microprocessor based small system as an open ended project.
29		Electrical Power System – I	C2150908.1	Understand Supply Systems
			C2150908.2	Explain mechanical design of transmission line
			C2150908.3	Calculation of line parameters (Resistance, inductance and capacitance)
			C2150908.4	Compare DC and AC distribution
			C2150908.5	Explain the representation of different power system components and loading capability of a generator
			C2150908.6	Describe underground cables
30		Control System Engineering	C2150909.1	Understand about various types of signals & systems, classify them, analyze them, and perform various operations on them
			C2150909.2	Carry simulation on signals and systems for observing effects of applying various properties and operations.
			C2150909.3	Create strong foundation of communication and signal processing to be studied in the subsequent semester
			C2150909.4	Improve concepts regarding continuous system and discrete system should be

				clear.
			C2150909.5	Understand Time response of a Physical System.
			C2150909.6	Acquire knowledge of Laplace Transform will be enhanced.
31		Elements of Electrical Design	C2150904.1	To understand the basic concepts related to design of electrical equipments.
			C2150904.2	To apply concepts of Designing the starters, field regulators, small transformers and choke coils.
			C2150904.3	To design winding diagrams for AC and DC machines.
			C2150904.4	To Analyze Estimate & cost of Electrical wirings.
			C2150904.5	To Analyze & Evaluate schematic diagrams and estimation of cost of wiring for Tenements, Row houses, Bungalows, Flats, Multi – Storied Buildings, Commercial Complexes like Offices, Hospitals, Hotels, and Theatres.
			C2150904.6	To design Consideration Of Electrical Installations.
32		Design Engineering - II A	C2150001.1	To Describe a problem starts with planned constructions for achieving goal/s.
			C2150001.2	To Construct goal oriented processes.
			C2150001.3	To Develop the model for performance, safety, reliability, ergonomics and aesthetics.
			C2150001.4	To Test for manufacturability.
			C2150001.5	To Evaluate marketing strategies for cost and Environment Project
			C2150001.6	To Design with a functional prototype
33		Institute Elective - Cyber Security	C2150002.1	To know the nature of different kinds of threats to data in Internet Era and ways to prevent from these attacks.
			C2150002.2	To understand information security governance, and related legal and regulatory issues.
			C2150002.3	To solve complex network security threats and complex network security designs using available secure solutions (such as PGP, SSL, IPSec, etc)
			C2150002.4	To analyze corrupted systems, protecting personal data, securing simple computer networks, and safe Internet usage
			C2150002.5	To describes key terms and concepts in cyber law, intellectual property and cyber

				crimes, trademarks and domain theft.
			C2150002.6	To explain computer technologies, digital evidence collection, and evidentiary reporting in forensic acquisition.
34	5(OLD)	Switchgear	C150905.1	Explain the purposes of protection, in relation to major types of apparatus, protection principle, dangers and criteria.
			C150905.2	Identify and justify a suitable protection system for a specified application.
			C150905.3	Analyse and compare specified protection systems
			C150905.4	Compare merits of various principles, relay hardware and interrupting devices
			C150905.5	Compare the different type of circuit breakers performance based on which selection of circuit breaker can be made for a given application
			C150905.6	Define importance of protection scheme in power system
35		Electrical Power Utilization and Traction	C150906.1	To rememberpower electronics technology in efficient utilization of electrical power
			C150906.2	To understand lighting system using LED Technologies
			C150906.3	To assess the use of Power Electronic Technologies in various process control
			C150906.4	To analyze electric welding and electrolytic process
			C150906.5	To develop effective utilization of Power Electronic Technologies in Electrical Traction
			C150906.6	Appraise the use of different heating methods in different areas
36		Management - II	C150001.1	To remember different aspects of banking.
			C150001.2	To understand the concept of management.
			C150001.3	To understand the fundamentals of engineering economics.
			C150001.4	To describe the concept of national income.
			C150001.5	To explain the basic components of marketing mix.

			C150001.6	To Analyse basic economics problems of India.
37		Electrical Machine - II	C150901.1	Describe Constructional details, principle of operation, Performance of polyphase transformers
			C150901.2	Describe Constructional details, principle of operation, Performance and application of polyphase induction motor
			C150901.3	Analyze the performance of single phase AC motor for various load conditions.
			C150901.4	Demonstrate Commutator motors
			C150901.5	Explain application and principal of operation of Induction generator
			C150901.6	Perform tests on induction motor
38		Power System Analysis and Simulation	C150902.1	Describe phenomenon of corona and its adverse effect in transmission system
			C150902.2	Analyze symmetrical and unsymmetrical faults
			C150902.3	Explain current and voltage relation in transmission system
			C150902.4	Calculate symmetrical components
			C150902.5	Demonstrate transients in power system using simulation software
			C150902.6	Define neutral grounding and its importance in power system
39		Power Electronics - I	C150903.1	To Describe the construction, principle and characteristics of Power semiconductor devices and fundamental of thyristors.
			C150903.2	To Explain the operation of Phase controlled converters.
			C150903.3	To Apply the knowledge of DC to DC converters in Power Electronics applications.
			C150903.4	To Analyze the operation of DC drives with phase controlled converters.
			C150903.5	To Compare different types of firing circuits used to trigger power Electronics Devices.
			C150903.6	To Explain the concept of DC drives with DC to DC converters.
40		Elements of Electrical Design	C150904.1	To understand the basic concepts related to design of electrical equipments.
			C150904.2	To apply concepts of Designing the starters, field regulators, small transformers and choke coils.
			C150904.3	To design winding diagrams for AC and DC machines.
			C150904.4	To Analyze Estimate & cost of

				Electrical wirings.
			C150904.5	To Analyze & Evaluate schematic diagrams and estimation of cost of wiring for Tenaments, Row houses, Bungalows, Flats, Multi – Storied Buildings, Commercial Complexes like Offices, Hospitals, Hotels, Theatres.
			C150904.6	To design Consideration Of Electrical Installations.
41	6	Power Electronics – II	C2160902.1	To Describe the operation of dc-to-ac inverters.
			C2160902.2	To Explain the principle and operation of ac-to-ac converters.
			C2160902.3	To Apply the knowledge of power electronic converter for speed control of AC motors.
			C2160902.4	To Compare power electronic converters and their control scheme.
			C2160902.5	To Assess the performance of power electronic converter and its control scheme to target different applications.
			C2160902.6	To Develop power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work.
42		Design of DC Machines and Transformer	C2160912.1	Remember the Rules and standards to design of electrical machines
			C2160912.2	Exemplifying the basic working principle of Electrical Machines.
			C2160912.3	Design the DC Machine and Transformer of given specifications
			C2160912.4	Attributing the results and data
			C2160912.5	Prepare the detailed sketches of the designed machine.
			C2160912.6	Develop a model in Computer Software and FEA analysis.
43		High Voltage Engineering	C2160904.1	To have basic knowledge of generation and measurement of High voltage and High current for testing purposes.
			C2160904.2	To understand Breakdown phenomenon in air, solid and liquid insulation, high voltage electrical Equipment with various testing devices and Over voltages, testing procedures and insulation coordination, Non-destructive insulation test techniques.
			C2160904.3	To Applyabove techniques and assemble HV generation and measurement system.

			C2160904.4	To Analyze abnormal phenomenon of electric system, insulators and bushings, isolators and circuit breakers. In testing of cables, testing of transformers - testing of surge diverters - radio interference measurements - design, planning and layout of high voltage laboratory.
			C2160904.5	To Evaluate calculations for the design of simple high voltage insulation systems, for the design of simple high voltage insulation systems, for the design of simple high voltage insulation systems.
			C2160904.6	To create solutions to high voltage plant design and testing methods.
44		Utilization of Electrical Energy and Traction	C2160907.1	To rememberpower electronics technology in efficient utilization of electrical power
			C2160907.2	To understand lighting system using LED Technologies
			C2160907.3	To assess the use of Power Electronic Technologies in various process control
			C2160907.4	To analyze electric welding and electrolytic process
			C2160907.5	To develop effective utilization of Power Electronic Technologies in Electrical Traction
			C2160907.6	Appraise the use of different heating methods in different areas
45		Electrical Power System – II	C2160908.1	Examine the performance of short and medium transmission line.
			C2160908.2	Describe the symmetrical components and its applications.
			C2160908.3	Demonstrate symmetrical and unsymmetrical faults in power systems.
			C2160908.4	Analyse transients in power systems.
			C2160908.5	Explain the corona effect in electrical power system.
			C2160908.6	Relate and resolve the problems of power

				system with software.
46		Design Engineering - II B	C2160001.1	To List specific software used for modeling the system.
			C2160001.2	To Estimate the cost of the prototype.
			C2160001.3	To Choose the standards and materials for the product.
			C2160001.4	To Analyze the design parameters of the product.
			C2160001.5	To Justify the design parameters for reuse of the product.
			C2160001.6	To Develop the prototype for practical application.
47		Institute Elective - Electrical Drives	C2160909.1	To Memorise mechanical characteristics of different drive application.
			C2160909.2	Understand the modelling of DC machine and AC machine
			C2160909.3	Choose different types of Converters or inverters which is used in Electric Drive.
			C2160909.4	Classify the solid state drives which is used for speed control of DC and AC machines.
			C2160909.5	To decide particular solid state drives for speed control of various special electrical machines like BLDC, PMSM etc…
			C2160909.6	To Design a drive for a particular application based on power rating.
48	6(OLD)	Electrical Machines - III	C160901.1	Develop knowledge of Constructional details, principle of operation, Performance of synchronous machines
			C160901.2	Describe special machines and its applications
			C160901.3	Identify methods for starting synchronous motor.
			C160901.4	Demonstrate V, inverse V and O curves.
			C160901.5	Define hunting in Synchronous machines and methodology of its prevention
			C160901.6	Identify Sudden short circuit of Synchronous machine
49		Power Electronics - II	C160902.1	To Describe the operation of dc-to-ac inverters.
			C160902.2	To Explain the principle and operation of AC Voltage Controllers.
			C160902.3	To Apply the knowledge of power electronic converters in Cycloconverters.
			C160902.4	To Analyze the operation of induction motor drives for power electronic application.
			C160902.5	To Summaries the concept of

				Synchronous Motor drives.
			C160902.6	To integrate the concept of Power electronics in industrial applications.
50		Microcontroller	C160903.1	To remember of pin diagram of microcontroller 8051
			C160903.2	To understand the basics of microprocessor and microcontroller
			C160903.3	To assess assembly language programming and C language programming
			C160903.4	To analyze data transfer instructions, logical instructions and arithmetic instructions
			C160903.5	Identify area of interest in project work for respective discipline
			C160903.6	To develop skill of software with the help of interfacing and programming with ADC and sensors
51		High Voltage Engineering	C160904.1	To have basic knowledge of generation and measurement of High voltage and High current for testing purposes.
			C160904.2	To understand Breakdown phenomenon in air, solid and liquid insulation, high voltage electrical Equipment with various testing devices and Over voltages, testing procedures and insulation coordination, Non-destructive insulation test techniques.
			C160904.3	To Apply above techniques and assemble HV generation and measurement system.
			C160904.4	To Analyze abnormal phenomenon of electric system, insulators and bushings, isolators and circuit breakers. In testing of cables, testing of transformers - testing of surge diverters - radio interference measurements - design, planning and layout of high voltage laboratory.
			C160904.5	To Evaluate calculations for the design of simple high voltage insulation systems, for the design of simple high voltage insulation systems, for the design of simple high voltage insulation systems.
			C160904.6	To create solutions to high voltage plant

				design and testing methods.
52		Electrical and Electronic Measurement	C160905.1	Define and classify the errors in measurements.
			C160905.2	Describe the AC bridges to measure the unknown parameters of the bridge.
			C160905.3	Find the unknown value of resistance
			C160905.4	Analyse the performance of Instrument transformers.
			C160905.5	Explain the magnetic measurements.
			C160905.6	Identify location of cable faults.
53		Theory of Electromagnetics	C160906.1	Afterthecompletion ofthis course the studentwillhave the knowledge ofelectrostatic and magneto static fields whichin future willhelp tounderstandits applications in Electrostatic generators, Electric powertransmission, Lightingprotection, Electro deposition, Magnetic separators, Developmentof motors,Transformers, Electromagnetic pump and so on.
			C160906.2	Ability to apply knowledge of mathematics, science, and engineering to the analysis and design of systems involving electric and magnetic fields as well as electromagnetic waves.
			C160906.3	Ability to understand, formulate, and solve engineering problems in the area of electric and magnetic fields and waves.
			C160906.4	Ability to evaluate use the techniques, and skills, which are necessary for engineering practice.
			C160906.5	Acquire skills to create search for technical issues.
			C160906.6	To develop Transmission Line Equations and its solutions in Phasor form.
54	7	Design of AC Machine	C2170909.1	Remember and recall all basic laws and equations of electrical machines
			C2170909.2	Estimate various parameters for Induction and Synchronous machines design.

			C2170909.3	Prepare the detailed sketches of the designed machine.
			C2170909.4	Analysis the calculated parameters and actual parameters electrical machine design.
			C2170909.5	Summarized all design data of electrical machine design.
			C2170909.6	Develop the design of Electrical machine on the calculated parameters by using Software.
55		Interconnected Power System	C2170901.1	Describe the basics of interconnected power system.
			C2170901.2	Discuss the characteristics of power systems matrices.
			C2170901.3	Solve the load flow problems of interconnected power system.
			C2170901.4	Analyse the economic operation of power system.
			C2170901.5	Explain different methods for controlling the frequency and voltage
			C2170901.6	Interpret the stability of power system.
56		Advanced Power Electronics	C2170906.1	To Describe different DC-DC voltage Regulators.
			C2170906.2	To Discuss and analyze Resonant Converters.
			C2170906.3	To Apply phase shifting technique for a multipulse converter.
			C2170906.4	To Analyze various configurations of multilevel Inverter.
			C2170906.5	To Compare various FACTs devices for VAR compensation.
			C2170906.6	To Develop power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work.
57		Industrial Instrumentation	C2170913.1	Identify the transducer based on its operating characteristics for the required application.
			C2170913.2	Explain the construction, working principle, performance and applications of transducers and sensors.
			C2170913.3	Carry out test and conduct performance experiments on various testing and measuring devices.
			C2170913.4	Identify the advantages and limitations of selected techniques.
			C2170913.5	Check various available techniques available and select appropriate to obtain satisfactory task for the parameter to be

				measured.
			C2170913.6	Evaluate the performance of the students by providing them Design based problems/ Open ended Problems that they can enhance the real application of instrumentation.
58		Switchgear and Protection	C2170908.1	Explain the purposes of protection, in relation to major types of apparatus, protection principle, dangers and criteria.
			C2170908.2	Identify and justify a suitable protection system for a specified application.
			C2170908.3	Analyse and compare specified protection systems
			C2170908.4	Compare merits of various principles, relay hardware and interrupting devices
			C2170908.5	Compare the different type of circuit breakers performance based on which selection of circuit breaker can be made for a given application
			C2170908.6	Define importance of protection scheme in power system
59		Project-1	C2170001.1	To Describe& identified problem from literature survey
			C2170001.2	To represent the problem relevance in current scenario.
			C2170001.3	Understand the possible solutions & the relevant field work carried out.
			C2170001.4	To develop software model in technical software.
			C2170001.5	To Test for manufacturability
			C2170001.6	To draft a project report and presentation.
60	7(OLD)	Inter Connected Power System	C170901.1	Describe the basics of interconnected power system.
			C170901.2	Discuss the characteristics of power systems matrices.
			C170901.3	Solve the load flow problems of interconnected power system.
			C170901.4	Analyse the economic operation of power system.
			C170901.5	Explain different methods for controlling the frequency and voltage
			C170901.6	Interpret the stability of power system.
61		Electrical Machine Design-I	C170902.1	Remember the Rules and standards to design of electrical machines
			C170902.2	Exemplifying the basic working principle of Electrical Machines.
			C170902.3	Design the DC Machine and Transformer of given specifications

			C170902.4	Attributing the results and data
			C170902.5	Prepare the detailed sketches of the designed machine.
			C170902.6	Develop a model in Computer Software and FEA analysis.
62		Power System Protection	C170903.1	To understand the purposes of protection, in relation to major types of apparatus, protection principle.
			C170903.2	Able to Choose and justify a suitable protection system for a specified application
			C170903.3	Able to Analyze and compare specified protection systems
			C170903.4	To understand and able to Compare merits of various principles, relay hardware and interrupting devices
			C170903.5	Able to Compare the different type of circuit breakers performance based on which selection of circuit breaker can be made for a given application
			C170903.6	Able to identify Faults in Electrical Power System.
63		Industrial Instrumentation	C170904.1	Identify the transducer based on its operating characteristics for the required application.
			C170904.2	Explain the construction, working principle, performance and applications of transducers and sensors.
			C170904.3	Carry out test and conduct performance experiments on various testing and measuring devices.
			C170904.4	Identify the advantages and limitations of selected techniques.
			C170904.5	Check various available techniques available and select appropriate to obtain satisfactory task for the parameter to be measured.
			C170904.6	Evaluate the performance of the students by providing them Design based problems/ Open ended Problems that they can enhance the real application of instrumentation.
64		Project-I	C170001.1	To Describe& identified problem from literature survey
			C170001.2	To represent the problem relevance in current scenario.
			C170001.3	Understand the possible solutions & the relevant field work carried out.
			C170001.4	To develop software model in technical software.

			C170001.5	To Test for manufacturability
			C170001.6	To draft a project report and presentation.
65		Advanced Power System-I	C170905.1	State conventional control mechanisms in power system.
			C170905.2	Emphasize the need for FACTS controllers in existing system
			C170905.3	Analyze the characteristics, applications and modeling of series and shunt FACTS controllers
			C170905.4	State conventional control mechanisms in power system.
			C170905.5	Describe control of HVDC converter and system.
			C170905.6	Recognize harmonics in HVDC systems
66		Advanced Power Electronics-I	C170906.1	To Describe the operation of resonant pulse Inverters.
			C170906.2	To Explain the concept of multilevel inverters.
			C170906.3	To Apply the concept of multilevel inverters in power electronics application.
			C170906.4	To Differentiate the different types of transformer connection used for multi pulseconverters.
			C170906.5	To Summaries the contribution of Power supplies in power electronic application.
			C170906.6	To Explain the concept of motor drives in power electronics application.
67	8(OLD)	Commissioning of Electrical Equipments	C180901.1	To rememberthe methods to find earth resistance
			C180901.2	To understand the importance of maintenance and testing
			C180901.3	To perform testing of various electrical equipment as per standard procedure and analyse results
			C180901.4	To suggest the remedial action to improve life of electrical equipment
			C180901.5	Apply corrective, preventive and preventive maintenance for electric power distribution system
			C180901.6	Compile commissioning of transmission line and cables
68		Electrical Power Utilization	C180902.1	To remember Basics of Motor Operation
			C180902.2	To understand the applications of all electrical Motors
			C180902.3	To assess the Electrical Power in various process control

			C180902.4	To analyze electric welding and electrolytic process
			C180902.5	To develop effective utilization of Electric Power in Electrical Traction
			C180902.6	To understand the basics of Illumination
69		Power System Practice and Design	C180903.1	To understand the electrical and mechanical aspects of Designing transmission line
			C180903.2	To Design primary and secondary distribution
			C180903.3	Able to Select the sizes and location of generating stations, substations
			C180903.4	To understand the basic concepts of power system earthing and measurement of earthing resistance
			C180903.5	Able to understand the basic concepts of insulation co-ordination
			C180903.6	Able to understand the basic concepts of generation planning, transmission planning and distribution Planning.
70		Electrical Machine Design II	C180904.1	Remember the Rules and standards to design of electrical machines
			C180904.2	Exemplifying the basic working principle of Electrical Machines.
			C180904.3	Design the Induction and Synchronous machines of given specifications
			C180904.4	Attributing the results and data
			C180904.5	Prepare the detailed sketches of the designed machine.
			C180904.6	Develop a model in Computer Software and FEA analysis.
71		Project II	C180905.1	To Describe& identified problem in software model.
			C180905.2	To represent the problem relevance in simulation.
			C180905.3	Understand the possible solutions & the relevant field work carried out.
			C180905.4	To develop Hardware model.
			C180905.5	To Test for manufacturability
			C180905.6	To draft a project report and presentation.
72		Advanced Power System II	C180906.1	Describe the state estimation of power systems.
			C180906.2	Discuss power system security.
			C180906.3	Demonstrate the control of reactive power and examine voltage stability of power systems
			C180906.4	Analyse the load forecasting techniques

				of power systems
			C180906.5	Summaries preventive, emergency and restorative control of power system
			C180906.6	Explain different structures of power systems.
73		Advanced Power Electronics II	C180907.1	To Describe different FACTs Devices.
			C180907.2	To Discuss and analyze Reactive Power Compensators.
			C180907.3	To Apply Six pulse converter Technique for HVDC Link.
			C180907.4	To Analyze various configurations of HVDC Converters.
			C180907.5	To Compare various FACTs devices for VAR compensation.
			C180907.6	To Explain the concept of HVDC transmission system.

Note: First numeric digit indicates Course code and second digit indicate course outcome nos. in the respective all Semesters.