



Department of Electrical and Electronics Engineering

List of Course Outcomes for 2019 Regulation

S.No	Year & Semester	Course Code	Course Name	Course Outcome
1	1 st Year 1 st Semester	U19HS101	Technical English	1. (Understand) Express their ideas effectively using appropriate vocabulary
				2. (Apply) Develop reading skills with the help of relevant reading strategies
				3. (Apply) Apply various interactive techniques for effective communication
				4. (Apply) Write letters, Contents and articles with proper structure
				5. (Apply) Make use of writing skills to communicate effectively
2	1 st Year 1 st Semester	U19MA101	Matrix Algebra and Calculus	1. (Apply) Determine inverse, higher integral powers by Cayley Hamilton theorem and convert quadratic form to canonical form by orthogonal transformation.
				2. (Analyze) Analyze the convergence or divergence of series of positive terms and alternating series by various techniques.
				3. (Analyze) Classify the extreme values of functions of two variables and functional dependence.
				4. (Apply) Apply integration concepts to compute area of the given surfaces, integrals in cartesian and polar coordinates.
				5. (Apply) Apply triple integration concepts to compute volume of the given surfaces and solid structure and area, volume of the surface using Gamma and Beta functions.
3	1 st Year 1 st Semester	U19PH101	Engineering Physics	1. (Apply) Learn the basic of properties of matter and its applications
				2. (Apply) Acquire knowledge on the concepts of optical devices and their applications in fiber optics.
				3. (Apply) Have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers.
				4. (Apply) Get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes.

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				5. (Understand) Understand the basics of quantum structures and their applications in spintronics and carbon electronics.
4	1 st Year 1 st Semester	U19CS101	Problem Solving using C	1. (Apply) Apply appropriate looping and conditional constructs for given problems
				2. (Apply) Use pointers, arrays and strings to solve complex problems
				3. (Apply) Use Structures, unions and files for problem solving
				4. (Apply) Apply problem solving techniques to real world problems
				5. (Apply) Make use of functions to build modular programming
5	1 st Year 1 st Semester	U19ME101	Engineering Graphics	1. (Apply) Draw orthographic projection to represent three dimensional objects in two dimensional views
				2. (Apply) Communicate industry standards through engineering drawings.
				3. (Apply) Draw the projection of simple solids using graphic principles.
				4. (Apply) Draw the sectional views of simple solids and develop the surfaces of sheet metal components.
				5. (Apply) Draw isometric projection and perspective projection of simple objects
6	1 st Year 1 st Semester	U19PH111	Physics Laboratory	1. (Understand) Understand the various experiments in the areas of optics, mechanics and thermal physics will nurture the students in all branches of Engineering.
				2. (Apply) Interpret and formulate experiments in engineering physics.
7	1 st Year 1 st Semester	U19GE111	Engineering Practices Laboratory	1. (Apply) Fabricate and experiment with Mechanical and Carpentry components and pipe connections.
				2. (Apply) Use fabrication tools to join and assembling the structures.
				3. (Apply) Identify and illustrate the various parts of pumps, plumbing works, welding and machine tools.
				4. (Apply) Apply electrical fundamentals to understand basic circuit elements.
				5. (Apply) Use electrical fundamentals to solve domestic / industrial wiring faults.
8	1 st Year 1 st Semester	U19CS111	Problem Solving using C Laboratory	1. (Apply) Solve problems using data types and operators
				2. (Apply) Apply appropriate looping and conditional constructs for given C programs

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				3. (Apply) Use functions to build modular programs 4. (Apply) Use appropriate IDE and tools to write, compile, debug and execute a C Program. 5. (Apply) Implement structures, unions and File Operations.
9	1 st Year 1 st Semester	U19ME101	Soft skills	1. (Apply) Apply the basic personality traits in social activity for future working environment 2. (Apply) Apply receptiveness and get customized to today's corporate world. 3. (Analyze) Analyze and mingle with different types of people to overcome and eradicate fear. 4. (Apply) Create a team environment in the classroom to measure their individual team player skills. 5. (Apply) Create a vivid vision about their behavior and discipline in future and through which they can measure themselves in socializing.
10	1 st Year 2 nd Semester	U19HS111	Language Elective - Business English	1. (Apply) Apply different conversation techniques in day to day communication 2. (Apply) Practice effective listening techniques during conversations. 3. (Apply) Develop good reading practice. 4. (Apply) Report ideas and concepts in an effective manner. 5. (Apply) Articulate effectively during discussions and presentations.
11	1 st Year 2 nd Semester	U19HS112	Language Elective - Basic Japanese	1. (Understand) Recognize and write Japanese alphabet 2. (Remember and Understand) Speak using basic sounds of the Japanese language 3. (Apply) Apply appropriate vocabulary needed for simple conversation in Japanese language 4. (Apply) Apply appropriate grammar to write and speak in Japanese language. 5. (Apply) Comprehend the conversation and give correct meaning.
12	1 st Year 2 nd Semester	U19HS113	Language Elective - Basic German	1. (Understand) Recognize and write German alphabet 2. (Remember and Understand) Speak using basic sounds of the German language 3. (Apply) Apply appropriate vocabulary needed for simple conversation in German language

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				4. (Apply) Apply appropriate grammar to write and speak in German language 5. (Apply) Comprehend the conversation and give correct meaning.
13	1 st Year 2 nd Semester	U19MA102	Advanced Calculus and Complex Variables	1. (Analyze) Compare the ideas of vector integral theorems for solving given problems and exhibit the relation between them. 2. (Apply) Make use of Milne Thomson method to construct analytic functions related to complex variable. 3. (Apply) Apply the concepts of integration for complex functions in certain regions to determine real integrals. 4. (Apply) Apply Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients. 5. (Apply) Apply various techniques in solving differential equations.
14	1 st Year 2 nd Semester	U19CY101	Engineering Chemistry	1. (Apply) Apply the principles of electrochemistry and corrosion in engineering. 2. (Understand) Understand the quality of water, and its treatment methods. 3. (Apply) Apply the concepts relevant to thermodynamics. 4. (Understand) Understand the Engineering materials. 5. (Understand) Understand the science of polymer and polymer reactions.
15	1 st Year 2 nd Semester	U19PH102	Semiconductor Physics	1. (Understand) Understand the basics of crystals, their structures and different crystal growth techniques. 2. (Apply) Map the operation of semiconductor devices with generalized switch and voltage rectifier. 3. (Apply) Apply the knowledge on VI characteristics of semiconductor device and specific application with Zener diode. 4. (Analyze) Analyze the biasing in BJT semiconductor to study the operation as voltage divider and a switch. 5. (Analyze) Analyze the biasing in FET semiconductor devices to study the flow of current and stability of operation.
16	1 st Year 2 nd Semester	U19EE103	Circuit Theory	1. (Apply) Apply the basic concepts to solve simple electric circuit problems. 2. (Apply) Select various circuit theorems to

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				<p>solve all types of electrical circuits.</p> <p>3. (Understand) Understand the phenomenon of resonance and its applications.</p> <p>4. (Apply) Derive the transient response of circuits with AC and DC supply.</p> <p>5. (Analyze) Analyze different types of three phase circuits and draw the phasor diagrams.</p>
17	1 st Year 2 nd Semester	U19CS103	Data Structures and Algorithms	<p>1. (Analyze) Analyze the representation and manipulation of data structures in memory.</p> <p>2. (Apply) Use appropriate linear data structure to solve various applications.</p> <p>3. (Apply) Apply the tree concepts for efficient storage and retrieval of data.</p> <p>4. (Apply) Apply the graph algorithms to solve real-world challenges.</p> <p>5. (Evaluate) Choose the optimal searching, sorting and hashing techniques to solve real-time applications.</p>
18	1 st Year 2 nd Semester	U19CY111	Chemistry Laboratory	<p>1. (Analyse) Analyse the role of water quality related parameters.</p> <p>2. (Create) Design the engineering materials against corrosion.</p>
19	1 st Year 2 nd Semester	U19CS113	Data Structures and Algorithms Laboratory	<p>1. (Apply) Apply linear data structures to solve problems.</p> <p>2. (Apply) Implement the concept of trees and graphs using non-linear data structures.</p> <p>3. (Evaluate) Select suitable sorting and searching algorithms</p> <p>4. (Analyze) Examine the various searching and sorting algorithms for the given problem.</p> <p>5. (Create) Apply linear and nonlinear data structure and develop a real time software application.</p>
20	1 st Year 2 nd Semester	U19EE111	Electric Circuits and Electronic Devices Laboratory	<p>1. (Apply) Make use of basic semiconductor device and construct amplifier and rectifier circuits.</p> <p>2. (Apply) Solve the basic circuit Problems using Circuit laws.</p> <p>3. (Apply) Develop the frequency response of series and parallel resonance circuit.</p> <p>4. (Analyze) Analyse the characteristics of basic semiconductor device.</p> <p>5. (Analyze) Simulate and verify various circuit theorems.</p>
21	2 nd Year 3 rd Semester	U19MA201	Transforms and Partial	<p>1. (Apply) Apply the mathematical principles to solve partial differential equations.</p>

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			Differential Equations	<p>2. (Apply) Solve engineering problems using Fourier series.</p> <p>3. (Apply) Utilize the concepts of Fourier series for solving wave and heat flow equations in various situations.</p> <p>4. (Apply) Make use of Fourier transform to convert the time function into sum of sine waves of different frequencies.</p> <p>5. (Apply) Apply Z- transform to convert a discrete time signal into a complex domain.</p>
22	2 nd Year 3 rd Semester	U19EE201	Field Theory	<p>1. (Remember) Recall the basic laws and theorems applicable to Electrostatics and Magneto static fields</p> <p>2. (Understand) Explain the applications of laws and theorems applicable to Electrostatic and Magneto static fields</p> <p>3. (Apply) Apply various laws, theorems and concepts to find the parameters in Electrostatic and Magneto static fields</p> <p>4. (Apply) Solve to find the parameters in Electrodynamic fields and in Electromagnetic waves</p> <p>5. (Apply) Apply the concepts of electromagnetic fields in various practical applications</p>
23	2 nd Year 3 rd Semester	U19EE202	DC Machines and Transformers	<p>1. (Understand) Outline the concept of Magnetic Circuit and Electromagnetic Energy Conversion applicable to DC machines and Transformers</p> <p>2. (Apply) Investigate the constructional details and Performance of DC Generators</p> <p>3. (Apply) Explore the principle of operation, speed control and braking techniques of DC motors</p> <p>4. (Analyse) Examine various testing methods adopted to verify the performance of DC machines and transformers</p> <p>5. (Apply) Study the constructional details, Performance and various three phase connections of Transformers</p>
24	2 nd Year 3 rd Semester	U19EE203	Linear and Digital Electronics	<p>1. (Understand) Explain IC fabrication and the various characteristics of Op amp</p> <p>2. (Understand) Demonstrate the basic applications of Op amp</p> <p>3. (Understand) Define the fundamental blocks and the working of various special and application ICs</p> <p>4. (Understand) Understand number</p>

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				<p>representation, conversion between different representation in digital electronic circuits and various logic families.</p> <p>5. (Analyse) Analyze logic processes and implement logical operations using combinational logic circuits and synchronous sequential systems.</p>
25	2 nd Year 3 rd Semester	U19EE204	Measurements and Instrumentation	<p>1. (Understand) Realize the standards and characteristics of measuring instruments.</p> <p>2. (Understand) Outline the construction and principle of operation of measuring instruments.</p> <p>3. (Apply) Apply the basic concepts for the measurement of various circuit parameters.</p> <p>4. (Understand) Understand the operation of various storage and display devices.</p> <p>5. (Understand) Classify transducers and study about data acquisition systems.</p>
26	2 nd Year 3 rd Semester	U19MC201	Environmental Science	<p>1. (Analyse) Analyse human interaction for the sustainability of a social eco-system.</p> <p>2. (Analyse) Examine the impact of pollution and hazardous chemical on environment and human health.</p> <p>3. (Analyse) Inspect the effect of different wastes and chemical on the environment and its mitigation methods.</p> <p>4. (Apply) Identify the application of natural resources for creating a good eco-system.</p> <p>5. (Analyse) Apply the basic concepts to understand various environmental issues.</p>
27	2 nd Year 3 rd Semester	U19EE211	DC Machines and Transformers Laboratory	<p>1. (Understand) Outline the concept of Electro Magnetic Energy Conversion applicable for DC machines and transformers.</p> <p>2. (Understand) Explain the constructional details and operation of DC machines and transformers.</p> <p>3. (Apply) Choose appropriate dc machine and transformer for specific applications.</p> <p>4. (Apply) Apply the concepts to determine the characteristics of DC machines and transformers.</p> <p>5. (Analyse) Analyze the performance of the DC Machines and transformers using test data.</p>
28	2 nd Year 3 rd Semester	U19EE212	Linear and Digital Electronics Circuits Laboratory	<p>1. (Apply) Examine the performance and operation of Logical gates, Adder and Subtractor circuits.</p> <p>2. (Apply) Determine the principle of operation of code converters, Parity generator, Parity</p>

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				Checking and Combinational Circuits.
				3. (Apply) Construct 3 bit modulo counter using Flip Flop ICs and Counter ICs.
				4. (Apply) Develop various application circuits using Operational Amplifier.
				5. (Understand) Explain the principle of operation of Multi-vibrator and Phase Lock Loop.
29	2 nd Year 3 rd Semester	Industry Oriented Course-U19IC501	Electrical Estimation, Cost And Auditing	1. (Apply) Make use of the concepts for planning, estimating and costing for wiring a residential building.
				2. (Apply) Apply the concepts for planning, estimating and costing for wiring an industrial building.
				3. (Apply) Utilize the tools for conducting electrical energy audit for a load center.
30	2 nd Year 3 rd Semester	Industry Oriented Course-U19IC502	Solar Pv Systems: Design, Simulation, Monitoring And Control	1. (Understand) Explain the fundamentals of solar PV Systems.
				2. (Apply) Apply the concepts to model a stand-alone PV System.
				3. (Apply) Utilize the concepts to design a grid connected PV System.
31	2 nd Year 3 rd Semester	Industry Oriented Course-U19IC503	Automotive Electrical Systems	1. (Understand) Outline the basics of automotive electrical systems and demonstrate the testing and maintenance of batteries.
				2. (Understand) Explain the operations of starting, ignition and lighting systems.
				3. (Understand) Describe the operation of various electrical equipment and accessories used in automotive systems.
32	2 nd Year 3 rd Semester	Industry Oriented Course-U19IC504	Electronic Design and Automation	1. (Understand) Understand the concepts of PCB Designing and the importance of an Arduino Shield.
				2. (Understand) Summarize the applications of Raspberry Pi Extension Boards and develop the commands scripts and user language programs.
				3. (Analyse) Construct the library functions for Design and Automation.
33	2 nd Year 3 rd Semester	Industry Oriented Course-U19IC505	Industrial Automation using PLC	1. (Apply) Utilize concepts to develop ladder logic for Industrial applications.
				2. (Apply) Develop HMI screens and interface with PLC.
				3. (Apply) Apply the concepts to control the speed of Induction motor using PLC.
34	2 nd Year 3 rd Semester	Industry Oriented	Industrial Robotics	1. (Understand) Explain the functional elements of robotics and principles of direct

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		Course-U19IC506		and inverse kinematics.
				2. (Understand) Summarize the operation of control modules and manipulators.
				3. (Apply) Make use of the concepts for the controls of manipulators.
35	2 nd Year 4 th Semester	U19MA205	Statistics and Numerical Methods	1. (Apply) Apply the concept of testing of hypothesis for small and large samples in real life problems.
				2. (Analyze) Analyze an experiment for an appropriate situation using analysis of variance techniques.
				3. (Analyze) Analyze the numerical techniques to obtain approximate solutions for algebraic, transcendental and system of linear equations.
				4. (Apply) Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
				5. (Apply) Execute the numerical techniques for solving initial value problems.
36	2 nd Year 4 th Semester	U19EE205	AC Machines	1. (Analyze) Predetermine voltage regulation and load sharing of Synchronous generator
				2. (Understand) Illustrate construction and working of Synchronous motor.
				3. (Analyze) Analyze and determine the performance of induction motor.
				4. (Understand) Study the various starting and speed control techniques of Induction motor.
				5. (Understand) Study performance of single phase induction motors and Special machines
37	2 nd Year 4 th Semester	U19EE206	Control Systems	1. (Apply) Make use of various analysis techniques for physical systems.
				2. (Apply) Apply time domain analysis to determine the parameters and characteristics of controllers.
				3. (Apply) Solve physical systems using frequency domain to verify its stability.
				4. (Analyze) Analyze the parameters of compensators using stability and state variable approach.
				5. (Analyze) Analyze various representations of system models using engineering fundamentals.
38	2 nd Year 4 th Semester	U19EE207	Generation, Transmission	1. (Understand) Summarize the types of power generating station.

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			and Distribution	2. (Understand) Explain the concept of transmission line parameters. 3. (Analyse) Analyse the performance of different transmission line models. 4. (Apply) Make use of insulators and supports for constructing transmissions line. 5. (Understand) Explain the types of underground cables and distribution system.
39	2 nd Year 4 th Semester	U19CS604 Open Elective I	Introduction to Artificial Intelligence	1. (Apply) Make use of appropriate strategy to solve a given problem. 2. (Apply)Identify suitable search algorithm to solve problems where artificial intelligence techniques are applicable. 3. (Understand) Infer the way to represent knowledge and plan it accordingly. 4. (Apply) Utilize the learning model to model machines. 5. (Apply) Design applications that use Artificial Intelligence.
40	2 nd Year 4 th Semester	U19MC202	Indian Constitution and Tradition	1. (Understand) Understand the characteristics of the Constitution of India. 2. (Understand) Understand the fundamental rights and duties. 3. (Understand) Understand the federal structure and distribution of legislative and financial powers. 4. (Understand) Understand the constitutional amendments and emergency provisions. 5. (Understand) Understand the fundamental right to equality, freedom, life and personal freedom.
41	2 nd Year 4 th Semester	U19EE213	AC Machines Laboratory	1. (Understand) Demonstrate the performance characteristics of synchronous machines and Induction machines 2. (Understand) Illustrate various methods for starting and speed control of synchronous and induction motors 3. (Apply) Apply the concepts to determine the various parameters of Synchronous machines and Induction machines. 4. (Apply) Develop equivalent circuit models for induction motors 5. (Analyse) Analyse and predetermine the performance of synchronous and induction machines
42	2 nd Year 4 th Semester	U19EE214	Control and Instrumentation Laboratory	1. (Understand) Understand control theory and apply them to electrical engineering problems. 2. (Understand) Understand the basic concepts

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				of bridge networks
				3. (Understand) Illustrate the basics of signal conditioning circuits.
				4. (Apply) Utilize the simulation packages.
				5. (Analyze) Analyse the various types of controllers and compensators.
43	2 nd Year 4 th Semester	U19EE281	Mini Project	1. (Understand) Identify the problem statement
				2. (Understand) Explain the process the solve the problem statement
				3. (Understand) Identify the methodologies to be adopted to solve the problem statement
				4. (Apply) Employ the concepts to develop the solution for the problem statement.
				5. (Apply) Develop the prototype model for the problem statement.
44	2 nd Year 4 th Semester	U19EM201	Verbal and Soft Skills	1. (Apply) Inculcate rhetorical skills to build confidence level.
				2. (Apply) Creative employability attribution for campus interview.
				3. (Apply) Improve verbal skills through vocabularies.
				4. (Apply) Develop comprehending ability in various contexts.
				5. (Apply) Improve sentence formation by collaborative learning methods.
45	2 nd Year 4 th Semester	U19EM202	Summer Internship	1. (Apply) Explore career alternatives prior to graduation.
				2. (Evaluate) Assess interests and abilities in their field of study.
				3. (Evaluate) Build a record of work experience.
				4. (Evaluate) Acquire employment contacts leading directly to a full-time job following graduation from college.
				5. (Apply) Develop communication, interpersonal and other critical skills in the job interview process.
46	3 rd Year 5 th Semester	U19EE301	Power System Analysis	1. (Apply) Model electrical network parameters illustrate the power system network under healthy and faulty conditions.
				2. (Understand) Demonstrate the power flow parameters and their network operations.
				3. (Understand) Explain the fault and model the fault conditions using symmetrical and unsymmetrical components.
				4. (Understand) Illustrate the transient behaviour of power system network under

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				open circuit and short circuit conditions
				5. (Analyse) Analyse the stability of the power system and maintaining a reliable electric power systems.
47	3rd Year 5 th Semester	U19EE302	Power Electronics	1. (Understand) Realize the different types of power semi-conductor devices and plot their switching characteristics.
				2. (Understand) Explain the operation, characteristics and performance parameters of phase controlled converters
				3. (Understand) Illustrate the operation, switching techniques and basic topologies of DC to DC converters
				4. (Apply) Apply the different PWM modulation techniques to inverters and to realize the harmonic reduction methods
				5. (Understand) Illustrate the operation of AC to AC Converters
48	3rd Year 5 th Semester	U19EE303	Microprocessors And Microcontrollers	1. (Understand) Illustrate the functionalities of 8085 & 8086 architectures and Assembly language programming.
				2. (Understand) Explain the architecture and functional block of 8051 microcontroller.
				3. (Apply) Program the functional units of 8051 microcontroller for the given specifications using C/Assembly language.
				4. (Understand) Outline the function of various peripheral devices such as 8255, 8279, 8251, 8253, 8259 and 8237.
				5. (Apply) Experiment the various applications using 8051 microcontroller and basic architectures of PIC, ARM and ATMEGA microprocessors and microcontrollers.
49	3rd Year 5 th Semester	U19EE311	Power Electronics Laboratory	1. (Understand) Illustrate power electronic converter design and testing
				2. (Analyse) Design linear and digital electronic circuits
				3. (Apply) Examine the characteristics of MOSFET, IGBT and analyze its switching behaviours
				4. (Analyse) Analyze the working of Switched mode power converter and Step down and step up MOSFET based choppers
				5. (Understand) Simulate PE circuits and create the driver circuits for different converters in MATLAB
50	3rd Year 5 th Semester	U19EE312	Microprocessor And Microcontroller	1. (Understand) Distinguish the fundamentals of assembly language programming for microprocessors and microcontrollers.

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			Laboratory	<p>2. (Apply) Apply the programming concepts to understand functions like arithmetic and logical functions in 8085 & 8051.</p> <p>3. (Apply) Examine the different communication standards in 8085 & 8051.</p> <p>4. (Apply) Contrast how different I/O devices can be interfaced to processors and will explore several techniques of interfacing.</p> <p>5. (Apply) Utilize assembly language programs of 8085 and 8051 for various applications.</p>
51	3rd Year 5 th Semester	U19EM301	Aptitude I	<p>1. (Understand) Students will be able to solve problems based on application of aptitude concepts in real life</p> <p>2. (Understand) Will understand the importance and impact created by aptitude concepts in real life</p> <p>3. (Apply) Will be able to create shortcut formulas by self.</p> <p>4. (Apply) Will be able to analyze, evaluate and compare different scenarios given in a problem and find the strategically best solutions.</p> <p>5. (Apply) Will be capable of creating their own questions based on parameters and constraints given.</p>
52	3rd Year 5 th Semester	U19EE501	PE: 1 Power System Operation And Control	<p>1. (Understand) Understand the day-to-day operation of electric power system.</p> <p>2. (Analyse) Analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.</p> <p>3. (Apply) Acquire knowledge on real power-frequency interaction and the significance of power system operation and control.</p> <p>4. (Understand) Understand the reactive power-voltage interaction.</p> <p>5. (Apply) Design SCADA and its application for real time operation.</p>
53	3rd Year 5 th Semester	U19EE502	PE:1 Power System Transients	<p>1. (Understand) Realize the generation of switching transients and analyze its effects.</p> <p>2. (Analyse) Analyze the switching transients origins and design proper protective techniques</p> <p>3. (Understand) Explain the mechanism of lightning strokes and design protection system for transmission line and tower.</p> <p>4. (Apply) Identify the propagation, reflection and refraction of travelling waves and design to suitable filters to suppress the surge</p>

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				waves.
				5. (Analyse) Analyze the impact of transient in integrated power system.
54	3rd Year 5 th Semester	U19EE511	PE:1 Design Of Electrical Machines	1. (Understand) Classify and select proper materials for different parts and study the mmf calculation of various electrical machines
				2. (Apply) Illustrate the design concept of Armature and field system of DC machine
				3. (Apply) Creatively apply knowledge to design core, yoke, windings and cooling systems of transformers.
				4. (Apply) Construct the design of stator and rotor of induction machines
				5. (Apply) Demonstrate the design concept of Armature and field system of Synchronous machine
55	3rd Year 5 th Semester	U19EE512	PE1: Electrical Machine Analysis	1. (Understand) Explain the principles and concepts of electromagnetic energy conversion methods
				2. (Understand) Outline the analysis of DC Machines and its dynamic characteristics
				3. (Understand) Summarize the concepts of Reference Frame Theory and transformation relationships
				4. (Understand) Illustrate the equivalent circuit and analysis of Induction Machines
				5. (Understand) Determine the steady state analysis and voltage and torque equation of synchronous machines
56	3rd Year 5 th Semester	U19EE521	PE1: Non- Conventional Energy Sources	1. (Understand) Explain the importance of renewable energy sources
				2. (Understand) Describe the process of wind energy conversion system
				3. (Understand) Outline the techniques of Solar PV and Solar Thermal conversion system
				4. (Understand) Illustrate the process of energy conversion from Bio-Mass and Hydro Systems
				5. (Understand) Summarize the concepts of energy conversion from tide, OTEC, Hydrogen Production, Fuel Cells and Energy storage systems
57	3rd Year 5 th Semester	U19EE522	PE1: Solar And Wind Energy Conversion	1. (Understand) Describe the functions of Solar Cells
				2. (Understand) Outline the characteristics and performance of Photo Voltaic (PV) Modules

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			Systems	3. (Understand) Explain the manufacturing and design process of PV system 4. (Understand) Illustrate the concepts of Wind Energy Conversion Systems (WECS) and its design 5. (Understand) Discuss the different applications of Wind Energy
58	3rd Year 5 th Semester	U19EE531	PE1: Advanced Control Systems	1. (Understand) Explain the concepts of state variable analysis and design in control systems. 2. (Understand) Identify the non-linear system analysis in control systems. 3. (Understand) Review phase plane and describing function analysis in control systems. 4. (Apply) Examine the different Liapunov stability analysis techniques. 5. (Apply) Determine the Optimal control techniques used in control systems.
59	3rd Year 5 th Semester	U19EE532	PE1: Advanced Microprocessors And Microcontrollers	1. (Understand) Explain the ARM Registers, Instruction pipeline, Interrupts and Architectures 2. (Understand) Outline the Instructions, Addressing modes and conditional instructions. 3. (Understand) Describe the Thumb Instructions and software interrupt instructions. 4. (Apply) Experiment with C programming to control ARM processors 5. (Analyse) Discuss Cache architecture, Polices, Flushing, MMU, page tables, translational, and access permissions.
60	3rd Year 6 th Semester	U19EE304	Solid State Drives	1. (Understand) Explain the Steady State Operation of a motor load system. 2. (Understand) Describe the operation of the converter/chopper fed dc drive. 3. (Understand) Describe the operation of the Induction motor drive. 4. (Understand) Explain the operation of the Synchronous motor drive. 5. (Apply) Illustrate the current and speed controllers for a closed loop solid state DC motor drive.
61	3rd Year 6 th Semester	U19EE305	Power System Protection And Switchgear	1. (Understand) Realize the various protection schemes for power system protection 2. (Analyse) Analyze the characteristics and functions of relays and protection schemes. 3. (Understand) Identify the different

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				<p>protection techniques for electrical apparatus</p> <p>4. (Apply) Design protection system using static relays and numerical protection</p> <p>5. (Understand) Realize the different types of circuit breakers and select them for suitable application</p>
62	3rd Year 6 th Semester	U19EE306	Special Electrical Machines	<p>1. (Understand) Explain the Construction, Principle of Operation of Stepper Motors and its applications</p> <p>2. (Understand) Illustrate the Construction, Principle of Operation of Switched Reluctance Motor</p> <p>3. (Understand) Describe the concept behind the construction, principle of operation of PMBLDC Motor</p> <p>4. (Understand) Outline the construction, principle of operation and control techniques of Permanent Magnet Synchronous Motor</p> <p>5. (Understand) Summarize the construction, principle of operation and applications of Synchronous Reluctance, AC Series, Repulsion, Hysteresis, Universal, Servo and Linear Induction Motors</p>
63	3rd Year 6 th Semester	U19EE313	Power Systems Laboratory	<p>1. (Understand) Illustrate the power system planning and operational studies</p> <p>2. (Understand) Explain the Formation of Bus Admittance and Impedance Matrices and Solution of Networks.</p> <p>3. (Analyze) Analyze the Power flow solution of small systems using simple method, Gauss-Seidel P.F. method.</p> <p>4. (Apply) Examine the Symmetric and Unsymmetrical fault in Power System</p> <p>5. (Understand) Explain the concepts of Economic Dispatch and Electromagnetic Transients</p>
64	3rd Year 6 th Semester	U19EE381	Innovative/ Multi-Disciplinary Project	<p>1. (Analyze) Analyze and identify the problem and technology to be adopted</p> <p>2. (Apply) Function as a team in planning and execution of the project work</p> <p>3. (Apply) Apply appropriate knowledge of engineering to achieve identified objectives of the project.</p> <p>4. (Create) Create a demonstrable output.</p>
65	3rd Year 6 th Semester	U19EM302	Aptitude II	<p>1. (Understand) Students will be able to solve problems based on application of aptitude concepts in real life</p> <p>2. (Understand) Will understand the</p>

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				<p>importance and impact created by aptitude concepts in real life</p> <p>3. (Apply) Will be able to create shortcut formulas by self.</p> <p>4. (Apply) Will be able to analyze, evaluate and compare different scenarios given in a problem and find the strategically best solutions.</p> <p>5. (Apply) Will be capable of creating their own questions based on parameters and constraints given.</p> <p>6. (Apply) Will understand lot of learning methods and will be able to apply them in real life problems.</p>
66	3rd Year 6 th Semester	U19EE503	PE2: Energy Auditing And Management	<p>1. (Understand) Explain the basic of industrial energy audits, objectives, methodology and outcomes.</p> <p>2. (Apply) Identify energy consumption pattern of various electrical utilities.</p> <p>3. (Apply) Explain possible auditing methods in electric fans, motors and blower along with energy conservation measures.</p> <p>4. (Apply) Identify energy consumption pattern of various thermal utility system.</p> <p>5. (Analyse) Analyse practice calculation methods to prepare viable energy conservation proposals using project and financial management.</p>
67	3rd Year 6 th Semester	U19EE504	PE2: High Voltage Engineering	<p>1. (Understand) Realize the causes of over voltage and its protection methods used in Power System</p> <p>2. (Understand) Illustrate the Breakdown mechanism in solid, liquid and gaseous dielectrics.</p> <p>3. (Apply) Identify the suitable methods for generating High Voltage in Laboratory.</p> <p>4. (Apply) Classify the high voltage measurement techniques.</p> <p>5. (Analyse) Summarize the different High Voltage testing methods applied on Electrical apparatus</p>
68	3rd Year 6 th Semester	U19EE513	PE2: Advanced Power Semiconductor Devices	<p>1. (Apply) Select power semiconductor device structures for adjustable speed motor control applications.</p> <p>2. (Understand) Illustrate the static and dynamic characteristics of current controlled power semiconductor devices.</p> <p>3. (Understand) Illustrate the the static and dynamic characteristics of voltage controlled</p>

S.No	Year & Semester	Course Code	Course Name	Course Outcome
				power semiconductor devices.
				4. (Apply) Select devices for different power electronics applications.
				5. (Understand) Explain the control and firing circuit for different devices.
69	3rd Year 6 th Semester	U19EE514	PE2: Modern Power Converters	1. (Understand) Realize the working of Switched Mode Power Supplies
				2. (Understand) Illustrate the perform and working of DC-AC Converters
				3. (Analyze) Identify the suitable methods for choosing the inverter
				4. (Apply) Classify the different types and application of AC-AC converters
				5. (Analyse) Summarize the different soft switching techniques used in Modern Power converters
70	3rd Year 6 th Semester	U19EE523	PE2: Design Of Solar Photovoltaic Systems	1. (Understand) Explain the fundamentals of Solar PV Systems
				2. (Understand) Outline the Components of Solar PV systems
				3. (Apply) Apply the concepts to model a Stand Alone PV System
				4. (Apply) Utilize the concepts to design a Grid connected PV System
				5. (Understand) Explain the Installation and Maintenance techniques of a Solar PV System
71	3rd Year 6 th Semester	U19EE524	PE2: Distributed Generation And Microgrid	1. (Understand) Explain the various schemes of conventional and nonconventional power generation.
				2. (Understand) Illustrate the topologies and energy sources of distributed generation.
				3. (Understand) Outline the requirements for grid interconnection and its impact with NCE sources.
				4. (Understand) Explain the concepts of power quality management in Smart Grids.
				5. (Understand) Summarize the fundamental concepts of Microgrid.
72	3rd Year 6 th Semester	U19EE533	PE2: Microcontroller Based System Design	1. (Understand) Outline the architecture of PIC microcontroller
				2. (Understand) Explain the use of interrupts and timers of PIC microcontroller
				3. (Understand) Identify the peripheral devices for data communication and transfer
				4. (Understand) Demonstrate the functional blocks of the ARM processor
				5. (Understand) Illustrate the architecture of

S.No	Year & Semester	Course Code	Course Name	Course Outcome
				ARM processors
73	3rd Year 6 th Semester	U19EE534	PE2: PLC and SCADA	<ol style="list-style-type: none"> 1. (Understand) Realize the architecture of PLC and different types of I/O devices 2. (Apply) Design the HMI screens and I/O functions for the project development 3. (Apply) Configure the Variable Frequency Drives for the speed control of Induction Motor 4. (Apply) Develop the program for different Pick and Place Applications using Industrial Robot 5. (Analyse) Control the PLC, HMI from remote station using SCADA