



**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 <sup>st</sup> Year 1 <sup>st</sup> Semester	U19HS101	Technical English	1. <b>(Understand)</b> Express their ideas effectively using appropriate vocabulary
				2. <b>(Apply)</b> Develop reading skills with the help of relevant reading strategies
				3. <b>(Apply)</b> Apply various interactive techniques for effective communication
				4. <b>(Apply)</b> Write letters, Contents and articles with proper structure
				5. <b>(Apply)</b> Make use of writing skills to communicate effectively
2	1 <sup>st</sup> Year 1 <sup>st</sup> Semester	U19MA101	Matrix Algebra and Calculus	1. <b>(Apply)</b> Determine inverse, higher integral powers by Cayley Hamilton theorem and convert quadratic form to canonical form by orthogonal transformation.
				2. <b>(Analyze)</b> Analyze the convergence or divergence of series of positive terms and alternating series by various techniques.
				3. <b>(Analyze)</b> Classify the extreme values of functions of two variables and functional dependence.
				4. <b>(Apply)</b> Apply integration concepts to compute area of the given surfaces, integrals in cartesian and polar coordinates.
				5. <b>(Apply)</b> 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 <sup>st</sup> Year 1 <sup>st</sup> Semester	U19PH101	Engineering Physics	1. <b>(Apply)</b> Learn the basic of properties of matter and its applications
				2. <b>(Apply)</b> Acquire knowledge on the concepts of optical devices and their applications in fiber optics.
				3. <b>(Apply)</b> Have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers.
				4. <b>(Apply)</b> Get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes.

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

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

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

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

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

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

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

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

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

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

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

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

S.No	Year & Semester	Course Code	Course Name	Course Outcome
				waves.
				5. <b>(Analyse)</b> Analyze the impact of transient in integrated power system.
54	3rd Year 5 <sup>th</sup> Semester	U19EE511	PE:1 Design Of Electrical Machines	<p>1. <b>(Understand)</b> Classify and select proper materials for different parts and study the mmf calculation of various electrical machines</p> <p>2. <b>(Apply)</b> Illustrate the design concept of Armature and field system of DC machine</p> <p>3. <b>(Apply)</b> Creatively apply knowledge to design core, yoke, windings and cooling systems of transformers.</p> <p>4. <b>(Apply)</b> Construct the design of stator and rotor of induction machines</p> <p>5. <b>(Apply)</b> Demonstrate the design concept of Armature and field system of Synchronous machine</p>
55	3rd Year 5 <sup>th</sup> Semester	U19EE512	PE1: Electrical Machine Analysis	<p>1. <b>(Understand)</b> Explain the principles and concepts of electromagnetic energy conversion methods</p> <p>2. <b>(Understand)</b> Outline the analysis of DC Machines and its dynamic characteristics</p> <p>3. <b>(Understand)</b> Summarize the concepts of Reference Frame Theory and transformation relationships</p> <p>4. <b>(Understand)</b> Illustrate the equivalent circuit and analysis of Induction Machines</p> <p>5. <b>(Understand)</b> Determine the steady state analysis and voltage and torque equation of synchronous machines</p>
56	3rd Year 5 <sup>th</sup> Semester	U19EE521	PE1: Non- Conventional Energy Sources	<p>1. <b>(Understand)</b> Explain the importance of renewable energy sources</p> <p>2. <b>(Understand)</b> Describe the process of wind energy conversion system</p> <p>3. <b>(Understand)</b> Outline the techniques of Solar PV and Solar Thermal conversion system</p> <p>4. <b>(Understand)</b> Illustrate the process of energy conversion from Bio-Mass and Hydro Systems</p> <p>5. <b>(Understand)</b> Summarize the concepts of energy conversion from tide, OTEC, Hydrogen Production, Fuel Cells and Energy storage systems</p>
57	3rd Year 5 <sup>th</sup> Semester	U19EE522	PE1: Solar And Wind Energy Conversion	<p>1. <b>(Understand)</b> Describe the functions of Solar Cells</p> <p>2. <b>(Understand)</b> Outline the characteristics and performance of Photo Voltaic (PV) Modules</p>

S.No	Year & Semester	Course Code	Course Name	Course Outcome
			Systems	3. <b>(Understand)</b> Explain the manufacturing and design process of PV system 4. <b>(Understand)</b> Illustrate the concepts of Wind Energy Conversion Systems (WECS) and its design 5. <b>(Understand)</b> Discuss the different applications of Wind Energy
58	3rd Year 5 <sup>th</sup> Semester	U19EE531	PE1: Advanced Control Systems	1. <b>(Understand)</b> Explain the concepts of state variable analysis and design in control systems. 2. <b>(Understand)</b> Identify the non-linear system analysis in control systems. 3. <b>(Understand)</b> Review phase plane and describing function analysis in control systems. 4. <b>(Apply)</b> Examine the different Liapunov stability analysis techniques. 5. <b>(Apply)</b> Determine the Optimal control techniques used in control systems.
59	3rd Year 5 <sup>th</sup> Semester	U19EE532	PE1: Advanced Microprocessors And Microcontrollers	1. <b>(Understand)</b> Explain the ARM Registers, Instruction pipeline, Interrupts and Architectures 2. <b>(Understand)</b> Outline the Instructions, Addressing modes and conditional instructions. 3. <b>(Understand)</b> Describe the Thumb Instructions and software interrupt instructions. 4. <b>(Apply)</b> Experiment with C programming to control ARM processors 5. <b>(Analyse)</b> Discuss Cache architecture, Polices, Flushing, MMU, page tables, translational, and access permissions.
60	3rd Year 6 <sup>th</sup> Semester	U19EE304	Solid State Drives	1. <b>(Understand)</b> Explain the Steady State Operation of a motor load system. 2. <b>(Understand)</b> Describe the operation of the converter/chopper fed dc drive. 3. <b>(Understand)</b> Describe the operation of the Induction motor drive. 4. <b>(Understand)</b> Explain the operation of the Synchronous motor drive. 5. <b>(Apply)</b> Illustrate the current and speed controllers for a closed loop solid state DC motor drive.
61	3rd Year 6 <sup>th</sup> Semester	U19EE305	Power System Protection And Switchgear	1. <b>(Understand)</b> Realize the various protection schemes for power system protection 2. <b>(Analyse)</b> Analyze the characteristics and functions of relays and protection schemes. 3. <b>(Understand)</b> Identify the different

S.No	Year & Semester	Course Code	Course Name	Course Outcome
				<p>protection techniques for electrical apparatus</p> <p>4. <b>(Apply)</b> Design protection system using static relays and numerical protection</p> <p>5. <b>(Understand)</b> Realize the different types of circuit breakers and select them for suitable application</p>
62	3rd Year 6 <sup>th</sup> Semester	U19EE306	Special Electrical Machines	<p>1. <b>(Understand)</b> Explain the Construction, Principle of Operation of Stepper Motors and its applications</p> <p>2. <b>(Understand)</b> Illustrate the Construction, Principle of Operation of Switched Reluctance Motor</p> <p>3. <b>(Understand)</b> Describe the concept behind the construction, principle of operation of PMBLDC Motor</p> <p>4. <b>(Understand)</b> Outline the construction, principle of operation and control techniques of Permanent Magnet Synchronous Motor</p> <p>5. <b>(Understand)</b> 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 <sup>th</sup> Semester	U19EE313	Power Systems Laboratory	<p>1. <b>(Understand)</b> Illustrate the power system planning and operational studies</p> <p>2. <b>(Understand)</b> Explain the Formation of Bus Admittance and Impedance Matrices and Solution of Networks.</p> <p>3. <b>(Analyze)</b> Analyze the Power flow solution of small systems using simple method, Gauss-Seidel P.F. method.</p> <p>4. <b>(Apply)</b> Examine the Symmetric and Unsymmetrical fault in Power System</p> <p>5. <b>(Understand)</b> Explain the concepts of Economic Dispatch and Electromagnetic Transients</p>
64	3rd Year 6 <sup>th</sup> Semester	U19EE381	Innovative/ Multi-Disciplinary Project	<p>1. <b>(Analyze)</b> Analyze and identify the problem and technology to be adopted</p> <p>2. <b>(Apply)</b> Function as a team in planning and execution of the project work</p> <p>3. <b>(Apply)</b> Apply appropriate knowledge of engineering to achieve identified objectives of the project.</p> <p>4. <b>(Create)</b> Create a demonstrable output.</p>
65	3rd Year 6 <sup>th</sup> Semester	U19EM302	Aptitude II	<p>1. <b>(Understand)</b> Students will be able to solve problems based on application of aptitude concepts in real life</p> <p>2. <b>(Understand)</b> Will understand the</p>

S.No	Year & Semester	Course Code	Course Name	Course Outcome
				<p>importance and impact created by aptitude concepts in real life</p> <p>3. <b>(Apply)</b> Will be able to create shortcut formulas by self.</p> <p>4. <b>(Apply)</b> Will be able to analyze, evaluate and compare different scenarios given in a problem and find the strategically best solutions.</p> <p>5. <b>(Apply)</b> Will be capable of creating their own questions based on parameters and constraints given.</p> <p>6. <b>(Apply)</b> Will understand lot of learning methods and will be able to apply them in real life problems.</p>
66	3rd Year 6 <sup>th</sup> Semester	U19EE503	PE2: Energy Auditing And Management	<p>1. <b>(Understand)</b> Explain the basic of industrial energy audits, objectives, methodology and outcomes.</p> <p>2. <b>(Apply)</b> Identify energy consumption pattern of various electrical utilities.</p> <p>3. <b>(Apply)</b> Explain possible auditing methods in electric fans, motors and blower along with energy conservation measures.</p> <p>4. <b>(Apply)</b> Identify energy consumption pattern of various thermal utility system.</p> <p>5. <b>(Analyse)</b> Analyse practice calculation methods to prepare viable energy conservation proposals using project and financial management.</p>
67	3rd Year 6 <sup>th</sup> Semester	U19EE504	PE2: High Voltage Engineering	<p>1. <b>(Understand)</b> Realize the causes of over voltage and its protection methods used in Power System</p> <p>2. <b>(Understand)</b> Illustrate the Breakdown mechanism in solid, liquid and gaseous dielectrics.</p> <p>3. <b>(Apply)</b> Identify the suitable methods for generating High Voltage in Laboratory.</p> <p>4. <b>(Apply)</b> Classify the high voltage measurement techniques.</p> <p>5. <b>(Analyse)</b> Summarize the different High Voltage testing methods applied on Electrical apparatus</p>
68	3rd Year 6 <sup>th</sup> Semester	U19EE513	PE2: Advanced Power Semiconductor Devices	<p>1. <b>(Apply)</b> Select power semiconductor device structures for adjustable speed motor control applications.</p> <p>2. <b>(Understand)</b> Illustrate the static and dynamic characteristics of current controlled power semiconductor devices.</p> <p>3. <b>(Understand)</b> 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. <b>(Apply)</b> Select devices for different power electronics applications.
				5. <b>(Understand)</b> Explain the control and firing circuit for different devices.
69	3rd Year 6 <sup>th</sup> Semester	U19EE514	PE2: Modern Power Converters	1. <b>(Understand)</b> Realize the working of Switched Mode Power Supplies
				2. <b>(Understand)</b> Illustrate the perform and working of DC-AC Converters
				3. <b>(Analyze)</b> Identify the suitable methods for choosing the inverter
				4. <b>(Apply)</b> Classify the different types and application of AC-AC converters
				5. <b>(Analyse)</b> Summarize the different soft switching techniques used in Modern Power converters
70	3rd Year 6 <sup>th</sup> Semester	U19EE523	PE2: Design Of Solar Photovoltaic Systems	1. <b>(Understand)</b> Explain the fundamentals of Solar PV Systems
				2. <b>(Understand)</b> Outline the Components of Solar PV systems
				3. <b>(Apply)</b> Apply the concepts to model a Stand Alone PV System
				4. <b>(Apply)</b> Utilize the concepts to design a Grid connected PV System
				5. <b>(Understand)</b> Explain the Installation and Maintenance techniques of a Solar PV System
71	3rd Year 6 <sup>th</sup> Semester	U19EE524	PE2: Distributed Generation And Microgrid	1. <b>(Understand)</b> Explain the various schemes of conventional and nonconventional power generation.
				2. <b>(Understand)</b> Illustrate the topologies and energy sources of distributed generation.
				3. <b>(Understand)</b> Outline the requirements for grid interconnection and its impact with NCE sources.
				4. <b>(Understand)</b> Explain the concepts of power quality management in Smart Grids.
				5. <b>(Understand)</b> Summarize the fundamental concepts of Microgrid.
72	3rd Year 6 <sup>th</sup> Semester	U19EE533	PE2: Microcontroller Based System Design	1. <b>(Understand)</b> Outline the architecture of PIC microcontroller
				2. <b>(Understand)</b> Explain the use of interrupts and timers of PIC microcontroller
				3. <b>(Understand)</b> Identify the peripheral devices for data communication and transfer
				4. <b>(Understand)</b> Demonstrate the functional blocks of the ARM processor
				5. <b>(Understand)</b> Illustrate the architecture of

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