



RVS

COLLEGE OF ENGINEERING AND TECHNOLOGY



Kumaran Kottam Campus, Kannampalayam (PO), Coimbatore – 641 402

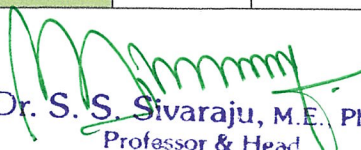
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)

NAAC Accredited and ISO 21001:2018 Certified Institution

B.E – ELECTRICAL ANDELECTRONICS ENGINEERING

Regulation – 2017

Course ID	Semester	Course Code	Course Name	Course Outcome
C101	I	HS8151	Communicative English	CO1 Listen and recognize main ideas from different discourses in different accents.
				CO2 Speak clearly, confidently, comprehensively, and communicate with one or many listeners using appropriate communicative strategies
				CO3 Read different genres of text adopting various reading strategies
				CO4 Write cohesively and coherently by using a wide range of vocabulary and organize ideas logically on a topic without grammatical errors
				CO5 Determine the main and subordinate ideas, draw conclusions and summarize information from written material
C102	I	MA8151	Engineering Mathematics - I	CO1 Use both the limit definition and rules of differentiation to differentiate functions


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				CO2 Apply differentiation to solve maxima and minima problems
				CO3 Evaluate integrals both by using Reimann sums and by using the fundamental theorem of convergent improper integrals. Evaluate integrals using techniques of integration, such as substitution, partial Fractions, integration by parts and improper integrals.
				CO4 Apply integration to compute multiple integrals, area, volume, integrals in polar Coordinates, in addition to change of order and change of variables.
				CO5 Apply various techniques in solving differential equations.
C103	I	PH8151	Engineering Physics	CO1 Demonstrate the properties of elasticity and measure the different moduli of elasticity.
				CO2 Examine the characteristics of waves, Laser and optical fiber
				CO3 Illustrate different modes of heat transfer through objects.
				CO4 Explain the block body radiation, properties of matter waves and schrodinger equations
				CO5 Classify the bravais lattices, crystal structures, crystal imperfections and crystal growth techniques
C104	I	CY8151	Engineering Chemistry	CO1 Explain the hardness of water, its types and estimation, boiler troubles and treatment of boiler feed water.
				CO2 Explain adsorption, types and theories of adsorption isotherm and its application in pollution abatement, theories of catalysis and applications
				CO3 Understand the basic concepts of phase rule and its application to one and two component systems, properties, significance and applications of alloys.


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				CO4 Relate the significance of solid, liquid and gaseous fuels and to calculate the calorific value of fuels.
				CO5 Illustrate the methods of harvesting energy from non-conventional energy sources
C105	I	GE8151	Problem Solving and Python Programming	CO1 Develop algorithmic solutions to simple computational problems.
				CO2 Demonstrate programs using simple Python statements and expressions.
				CO3 Explain control flow and functions concept in Python for solving problems.
				CO4 Use Python data structures- lists, tuples & dictionaries for representing compound data.
				CO5 Explain files, exception, modules and packages in Python for solving problems.
C106	I	GE8152	Engineering Graphics	CO1 Familiarize with the fundamentals and standards of engineering graphics.
				CO2 Perform freehand sketching of basic geometrical constructions and multiple views of objects.
				CO3 Project orthographic projections of lines and plane surfaces.
				CO4 Draw projections, solids and development of surfaces.
				CO5 Visualize and to project isometric and perspective sections of simple solids.
C107	I	GE8161	Problem Solving and Python Programming Laboratory	CO1 Develop solutions to simple computational problems using Python programs.
				CO2 Solve problems using conditionals and loops in Python.
				CO3 Develop Python programs by defining functions and calling them.


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				CO4 Use Python lists, tuples & dictionaries for representing compound data.
				CO5 Develop Python programs using files.
C108	I	BS8161	Physics and Chemistry Laboratory	CO1 Determine and estimate the types of alkalinity & hardness of a given water sample.
				CO2 Estimate the amount of copper content present in a given sample.
				CO3 Determine the strength of an acid by using pH meter.
				CO4 Evaluate moment of inertia of disc and rigidity modulus for thin wire using Torsion pendulum.
				CO5 Appraise Young's modulus of the beam by Non-Uniform bending method.
C109	II	HS8251	Technical English	CO1 Read technical texts and write area- specific texts effortlessly
				CO2 Listen and comprehend lectures and talks in their area of specialization successfully
				CO3 Speak appropriately and effectively in varied formal and informal contexts
				CO4 Write reports and winning job applications.
				CO5 Use appropriate technologies to organize, present, and communicate information to address a range of audiences, purposes, genres
C110	II	MA8251	Engineering Mathematics - II	CO1 Calculate the eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices
				CO2 Evaluate the line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.


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				CO3 Determine Analytic functions, conformal mapping and Bilinear transformation.
				CO4 Evaluate the Cauchy's integrals, Taylor's and Laurent's and residue theorem for evaluation for real integrals using circular and semicircular, contour
				CO5 Evaluate Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
C111	II	PH8253	Physics for Electronics Engineering	CO1 Gain knowledge on classical and quantum electron theories and energy band structures.
				CO2 Acquire knowledge on basis of semiconductor physics and its applications in various devices.
				CO3 Get knowledge on magnetic and dielectric properties of materials.
				CO4 Have the necessary understanding on the functioning of optical materials for opto electronics.
				CO5 Understand the basics of quantum structures and their applications in spintronics and carbon nanotubes.
C112	II	BE8252	Basic Civil and Mechanical Engineering	CO1 State the scope of civil Engineering and Overview of Civil Engineering and Explain the scope of Mechanical Engineering and Overview of Mechanical Engineering.
				CO2 State the functions of IC engine and differentiate the working principle of 2stroke, 4 stroke petrol and diesel engine, Types of power plant and classify the various types of boilers and conclude the use of boiler in power plant.


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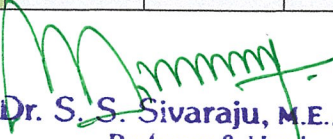
				CO3 Apply the principles of vapour absorption and compression systems and Explain the Operation and type of air conditioner.
				CO4 Apply the principles of surveying and use various measurements for surveying and Explain about various engineering materials and leveling instruments.
				CO5 Classify the types of bridges, foundation, floorings, roofs, plasters and R.C.C structural members and state the purpose of dam.
C113	II	EE8251	Circuit Theory	CO1 Apply Kirchoff's current and voltage laws to simple circuits and Solve complex circuits using Mesh & Nodal Methods.
				CO2 Apply Network theorems to linear circuits and to solve simple and complex problems.
				CO3 Analyze the Transient response of RLC circuits under DC and AC excitation using Laplace Transform
				CO4 Analyze three phase balanced and unbalanced star, delta network
				CO5 Compute the frequency response of Series and Parallel resonance and analyze tuned circuits.
C114	II	GE8291	Environmental Science and Engineering	CO1 Explain the values, threats and conservation of biodiversity and classify various ecosystems.
				CO2 Identify and implement technological and economical solution to environmental pollution.
				CO3 Develop the knowledge on various natural resources, their causes and their effects.

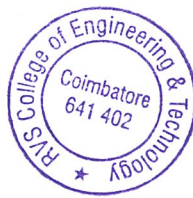

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				CO4 Explain various environmental acts and to explain various disaster management.
				CO5 Relate population growth and environment and the role of IT in environment and human health.
C115	II	GE8261	Engineering Practices Laboratory	CO1 Demonstrate wiring for a simple residential house; identify the ratings of various appliances like fluorescent tube
				CO2 Calculate the different electrical quantities
				CO3 Measure the resistance to earth of electrical equipment
				CO4 Verify the truth tables of logic gates AND
				CO5 Develop soldering in a PCB
C116	II	EE8261	Electric Circuits Laboratory	CO1 Apply Kirchoff's voltage and current laws to solve simple and complex circuits.
				CO2 Apply network theorems to solve simple and complex circuits.
				CO3 Demonstrate the working of Analog and digital storage oscilloscopes.
				CO4 Determine frequency response of RLC circuits and Use MATLAB to simulate series, parallel resonant circuit.
				CO5 Apply MATLAB tool to simulate three phase balanced and unbalanced star, delta network circuit.
C201	III	MA8353	Transforms and Partial	CO1 Solve First, Second order homogeneous and non-homogeneous partial differential equations
				CO2 Find the Fourier series of a given function satisfying Dirchlet's condition.


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			Differential Equations	CO3 Apply Fourier series to solve one dimensional wave, one- and two-dimensional heat equations.
				CO4 Determine Fourier transform for a given function and use them to evaluate certain definite Integrals
				CO5 Determine z transforms of standard functions and use them to solve difference equations
C202	III	EE8351	Digital Logic Circuits	CO1 Analyze the various types of number system and compare the digital logic families.
				CO2 Apply K –Map for simplification and implementation of combinational logic circuit.
				CO3 Design the synchronous Sequential logic circuits, draw the block diagram of Shift Registers.
				CO4 Design of asynchronous sequential circuits and describe the operation of Programmable Logic Devices.
				CO5 Design the VHDL coding for combinational logic and Sequential circuits.
C203	III	EE8391	Electromagnetic Theory	CO1 Apply the vector calculus to static electric-magnetic fields.
				CO2 Apply the principles of electrostatics related to electric field and electric potential, boundary conditions, energy density and capacitance of different configurations.
				CO3 Apply the principles of magnetostatics related to magnetic field and magnetic potential, boundary conditions, energy density and inductance of different configurations.


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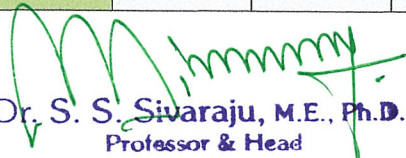
				CO4 Apply Maxwell 's equations in differential and integral forms.
				CO5 Apply Maxwell 's equations to solutions of problems relating to uniform plane wave propagation in different media and its interfaces
C204	III	EE8301	Electrical Machines - I	CO1 Analyze the magnetic-circuits and Magnetic materials.
				CO2 Acquire the knowledge in constructional details of transformers.
				CO3 Understand the concepts of electromechanical energy conversion and concept of rotating machines.
				CO4 Acquire the knowledge in working principles of DC Generator.
				CO5 Acquire the knowledge in working principles of DC Motor
C205	III	EC8353	Electron Devices and Circuits	CO1 Understand the basic structure of electronic devices such as diodes, Rectifiers and display devices
				CO2 Understand the operation of various types of transistors and thyristor families
				CO3 Analysis various amplifiers hybrid parameters and study their frequency and gain response
				CO4 Explain knowledge on multistage amplifiers and differential amplifiers
				CO5 Understand the advantages of feedback amplifiers, various oscillators and their applications
C206	III	ME8792	Power Plant Engineering	CO1 Explain the layout, construction and working of the components inside a thermal power plant


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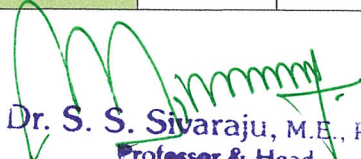
				CO2 Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
				CO3 Explain the layout, construction and working of the components inside nuclear power plants.
				CO4 Explain the layout, construction and working of the components inside Renewable energy power plants
				CO5 Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.
C207	III	EC8311	Electronics Laboratory	CO1 Analyze the PN junction diode acts as a perfect switch and Zener diode act as a voltage regulator. Design an experimental setup of a voltage buffer, current buffer and amplifier circuit using NPN transistor.
				CO2 Analyze the characteristics of a voltage-controlled device. Design an experimental setup of the relaxation oscillator using UJT.
				CO3 Design a experiment and determine the frequency response of common emitter amplifier. Analyze the characteristics of photo sensitive semiconductor device and Light activated relay circuit.
				CO4 Design an experimental setup of a Audio frequency oscillator and Radio frequency oscillator. Design and implement a circuit that converts AC voltage to DC voltage for the given input and calculate its ripple factor and percentage of regulation with and without capacitive and inductive filter.
				CO5 Design an experimental setup of a differential amplifier using field effect transistor and determine its gain and CMRR. Analyze the sine, square and triangular waveforms Using Cathode ray oscilloscope and then measure its corresponding amplitude, frequency and phase respectively. Design the low pass


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				filter and High pass filter using passive components with cutoff frequency of 1khz and determine its gain
C208	III	EE8311	Electrical Machines Laboratory - I	CO1 Investigate the voltage drop due to armature reaction effect in DC shunt and DC compound generators and Design Ampere turns for Inter poles and compensating winding. Examine critical resistance and critical speed.
				CO2 Analyze load characteristics DC shunt, series and compound motor. Examine its maximum output and maximum efficiency
				CO3 Investigate the constant losses of the DC shunt motor predict the efficiency in different methods at different load condition
				CO4 Analyze load characteristics of single and three phase transformers. Examine the different losses and efficiency
				CO5 Investigate the the equivalent circuit parameters of single-phase transformer to predetermine its voltage regulation and efficiency.
C209	IV	MA8491	Numerical Methods	CO1 Determine the solution of algebraic and transcendental system of linear equations
				CO2 To interpolate the values of unknown functions using Newton's Formula
				CO3 Estimate the numerical values of the derivatives and integrals of unknown function.
				CO4 Solve first and second order initial value problem
				CO5 Solve Numerically boundary value problem
C210	IV	EE8401	Electrical Machines - II	CO1 To understand the construction and working principle of Synchronous Generator


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				CO2 To acquire knowledge on Synchronous motor.
				CO3 To understand the construction and working principle of Three phase Induction Motor
				CO4 To understand Starting and Speed Control of Three Phase Induction Motor
				CO5 To understand the construction and working principle of single-Phase Induction Motor and Special Machines
C211	IV	EE8402	Transmission and Distribution	CO1 Illustrate the importance and the functioning of transmission line parameters.
				CO2 Investigate the performance of Transmission lines.
				CO3 Explain the concepts of Lines and Insulators
				CO4 Explain the concepts of Underground cables
				CO5 Discuss the function of different components used in Transmission and Distribution levels of power system and modelling of these components.
C212	IV	EE8403	Measurements and Instrumentation	CO1 To acquire knowledge on Basic functional elements of instrumentation
				CO2 To understand the concepts of Fundamentals of electrical and electronic instruments
				CO3 Ability to compare between various measurement techniques
				CO4 To acquire knowledge on Various storage and display devices
				CO5 To understand the concepts Various transducers and the data acquisition systems


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C213	IV	EE8451	Linear Integrated Circuits and Applications	CO1 Understand the various Classification of IC's & Packaging
				CO2 Discuss the Op-Amp AC&DC characteristics
				CO3 Construct the first and second order active filter with opamp and derive the equation for the same.
				CO4 Explain the various application with 555 timer IC like Monostable, Astable& Schmitt trigger operation.
				CO5 List out the characteristics and application of IC 555 timer
C214	IV	IC8451	Control Systems	CO1 Develop mathematical models for physical system and simplify it using reduction techniques.
				CO2 Determine the time domain responses of first and second-order systems to test inputs.
				CO3 Analyze system's stability using different frequency domain methods.
				CO4 Design compensators and their selection to meet desired response.
				CO5 Develop and analyze state space models
C215	IV	EE8411	Electrical Machines Laboratory - II	CO1 Analyze the voltage regulation of three phase alternator for different loading condition in different methods and compare the results.
				CO2 Analyze the voltage regulation three phase salient pole synchronous machine in different loading condition and estimate its negative and zero sequence components
				CO3 Analyze the characteristic of three phase synchronous machine at different load condition for different excitation


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				CO4 Analyze performance characteristics of three phase induction motor at different load condition and estimate its equivalent circuit parameters
				CO5 Analyze performance characteristics of single-phase induction motor at different load condition and estimate its equivalent circuit parameters.
C216	IV	EE8461	Linear and Digital Integrated Circuits Laboratory	CO1 Design and implement the experimental setup of combinational circuits like Boolean functions, code converters, parity generator, parity checker, encoders, decoders, multiplexer and demultiplexer.
				CO2 Design and implement the experimental setup of Counters and Shift registers using specific IC's.
				CO3 Design a experimental setup of Timer IC applications.
				CO4 Design an experimental setup of a Op-Amp applications like inverting and Non inverting amplifier, adder, comparator, integrator and differentiator.
				CO5 Analyze the voltage to frequency characteristics of voltage-controlled oscillator using NE/SE 566 IC and Design the variability voltage regulator using LM317 IC
C217	IV	EE8412	Technical Seminar	CO1 Function effectively as an individual and Make effective presentation on Engineering/ technology
				CO2 Review, prepare and present technological developments in the field of electrical and electronics engineering.
				CO3 Design documentation and write effective reports on seminar topics
				CO4 Ability to review, prepare and present technological developments
				CO5 Ability to face the placement interviews


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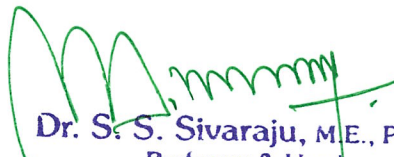
C301	V	EE8501	Power System Analysis	CO1 Understand the system planning, operation and representation of components in power system
				CO2 Solve the power flow problem using Newton Raphson method and Gauss seidal methods.
				CO3 Use of Thevenin's theorem and bus building algorithm to solve Symmetrical short circuit fault
				CO4 Solve the unsymmetrical fault occurring at any point in a power system.
				CO5 Investigate the power system stability by swing equation and Modified Euler method.
C302	V	EE8551	Microprocessors and Microcontrollers	CO1 Understand the basic concepts of Microprocessor and Microcontroller
				CO2 Explain about the 8085 Instruction -format.
				CO3 Describe the internal architecture of 8051 and the basic concept of special function register
				CO4 Compare the features and the operating modes of IC 8255
				CO5 Understand the concept of controlling the operation of Stepper Motor
C303	V	EE8552	Power Electronics	CO1 Understand basic concepts of power semiconductor devices
				CO2 Examine the construction, operation and switching waveforms of 3 pulse converters using various loads
				CO3 Describe the need and functionality of chopper
				CO4 Understand the types and functional operations of inverters.

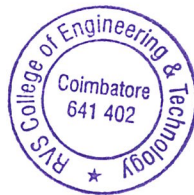

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				CO5 Identify the types and functional operation of voltage regulators
C304	V	EE8591	Digital Signal Processing	CO1 Apply the Mathematical knowledge to evaluate the different types of signals and systems and analyze the sampling process of continuous time signal.
				CO2 Analyze the discrete time systems using z-transform and inverse Z transform
				CO3 Apply the Radix-2 Decimation in Time (DIT) and Decimation in Frequency (DIF) FFT Algorithm to Compute the Discrete Fourier Transform.
				CO4 Design of different types of Infinite Impulse Response (IIR) filters and Finite Impulse Response (FIR) filters.
				CO5 Analyze the various architectures of Digital Signal Processors and addressing formats
C305	V	CS8392	Object Oriented Programming	CO1 Outline OOP principles such as objects, classes, encapsulation, inheritance and polymorphism and associate those principles in java language.
				CO2 Design algorithms and develop programs using the concept of Inheritance and Interfaces.
				CO3 Examine the exception handling concepts and develop I/O streams for reading and writing files.
				CO4 Develop programs that run in the same instant using multithreading and multitasking concepts and utilize the power of generic programming in java for robust programming.
				CO5 Design and develop applications in java using forms, AWT, and swing.
C306 OE	V			CO1 Demonstrate the different bio potential and its propagation


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		OMD55 1	Basics of Biomedical Instrumentation (BBI)	CO2 Demonstrate the different electrode placement for various physiological Recording.
				CO3 Explain bio amplifier for various physiological recording
				CO4 Illustrate the various technique non electrical physiological measurements.
				CO5 Illustrate the different biochemical measurements.
C307	V	EE8511	Control and Instrumentation Laboratory	CO1 Analyze the characteristics of P, PI and PID controllers experimentally and analyze the stability of the control system using MATLAB
				CO2 Compute the transfer function of a Field controlled DC motor experimentally and analyze the response of Lag, Lead and Lag-Lead Compensators
				CO3 Analyze the transient response of Position Control system experimentally and analyze the Characteristics of Synchro-Transmitter- Receiver and to Use MATLAB for the Simulation of Control Systems.
				CO4 Ability to analyze the basic concepts of bridge networks and to analyze the Dynamics of Sensors/Transducers
				CO5 Measure the Power and Energy experimentally and analyze signal conditioning circuits and to Use MATLAB for Process Simulation
C308	V	HS8581	Professional Communication	CO1 Summarize various skills such as Soft Skills, Hard skills, employability and career Skills and demonstrate values such as Time Management and general awareness of current affairs.
				CO2 Demonstrate oneself before the audience by making effective presentations on introducing oneself, answering questions and visual presenting.


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				CO3 Demonstrate oneself by participating in group discussions, brainstorming sessions and question sessions. Develop activities to improve GD Skills.
				CO4 Develop interview skills so as to be successful in them.
				CO5 Develop adequate Soft Skills required for the workplace and long-term career.
C309	V	CS8383	Object Oriented Programming Laboratory	CO1 Design C++ programs using functions, classes with objects, member functions and constructors.
				CO2 Develop operator and function overloading and run time polymorphism using C++.
				CO3 Develop file handling techniques in C++ for sequential and random access also use Java code for strings.
				CO4 Construct packages and interfaces in Java.
				CO5 Create threads in Java and handle predefined and user defined exceptions
C310	VI	EE8601	Solid State Drives	CO1 To understand and suggest a converter for solid state drive
				CO2 To analyze the operation of the converter/chopper fed dc drive
				CO3 To analyze the operation and performance of induction motor drives
				CO4 To analyze the operation and performance of synchronous motor drives
				CO5 To analyze and design the current and speed controllers for a closed loop solid state DC motor drives.
C311	VI	EE8602		CO1 Understand the basic concept of protection scheme


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			Protection and Switchgear	CO2 Explain the principle and operation of various protective relay
				CO3 List out the various apparatus protection schemes
				CO4 Explain about the static relays and numerical protection
				CO5 Compare the various circuit breakers used in various power system circuit levels.
C312	VI	EE8691	Embedded Systems	CO1 Discuss the differences between general computing and embedded systems, and the methodologies used in developing embedded systems
				CO2 Describe the various communication protocols used in embedded systems
				CO3 Describe the basic concepts of real-time operating systems
				CO4 Compare the performance of RMA, EDF, DMA, SJF, FCFS, LCFS algorithms for the given task set
				CO5 Explain development of embedded systems, using washing machine and smart card reader as examples
C313 E11	VI	IC8651	Advanced Control System	CO1 Able to design state feedback controller and state observer.
				CO2 Able to understand and analyse linear and nonlinear systems using phase plane method.
				CO3 Able to understand and analyse nonlinear systems using describing function method.
				CO4 Able to understand and design optimal controller.
				CO5 Able to understand optimal estimator including Kalman Filter


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C313 E12	VI	EE8001	Visual Languages and Applications	CO1 Ability to understand and apply computing platform and software for engineering problems
				CO2 Ability to study about the concepts of windows programming models.
				CO3 Ability to study the concepts of Menu basics, menu magic and classic controls.
				CO4 Ability to study the concept of Document/View Architecture with single & multiple document interface.
				CO5 Ability to study about the integrated development programming event driven programming.
C313 E13	VI	EE8002	Design of Electrical Apparatus (DEA)	CO1 Apply the Knowledge of Engineering fundamentals to the solutions of magnetic circuits
				CO2 Apply the Knowledge of Engineering fundamentals to the design solutions of transformers
				CO3 Apply the Knowledge of Engineering fundamentals to the design solutions of DC machines
				CO4 Apply the Knowledge of Engineering fundamentals to the design solutions of induction motors
				CO5 Apply the Knowledge of Engineering fundamentals to the design solutions of synchronous machines
C313 E14	VI	EE8003	Power Systems Stability	CO1 Apply the Engineering knowledge for modelling of power system components in stability studies.
				CO2 Analyze small signal stability of SMIB and multi machine system.


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				CO3 Analyze the stability of the power system using Modified Euler's and Runge-Kutta methods.
				CO4 Apply Engineering techniques for voltage collapse and voltage stability assessment of Power system.
				CO5 Analyze various methods of Enhancing the stability of power system
C313 E15	VI	EE8004	Modern Power Converters	CO1 Understand the Switched Mode Power Supplies
				CO2 Analyze the Ac-Dc Converters
				CO3 Analyze the Dc-Ac Converters
				CO4 Analyze Ac-Ac Converters with And Without Dc Link
				CO5 Understand the Soft Switching Power Converters
C313 E16	VI	GE8075	Intellectual Property Rights	CO1 Know about the intellectual property
				CO2 Know how to register the IPRs
				CO3 Know the agreement and legislations
				CO4 Know the digital property and law
				CO5 Know the enforcement of IPRs
C314 E21	VI	RO8591	Principles of Robotics	CO1 Ability to understand basic concept of robotics.
				CO2 Analyze Instrumentation systems and their applications to various
				CO3 Know about the differential motion add statics in robotics
				CO4 Know about the various path planning techniques.


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				CO5 Know about the dynamics and control in robotics industries.
C314 E22	VI	EE8005	Special Electrical Machines (SEM)	CO1 Illustrate the construction, working principle and characteristics of stepper motors and its drive circuits
				CO2 Explain the construction, working principle and characteristics of switched reluctance motors and its power converter circuits
				CO3 Describe the construction, working principle and characteristics of permanent magnet brushless D.C. motors and its power converter circuits
				CO4 Explain the construction, working principle and characteristics of permanent magnet synchronous motors
				CO5 Describe the construction, working principle and characteristics of synchronous reluctance motors
C314 E23	VI	EE8006	Power Quality	CO1 Apply the engineering knowledge on defining and classifying the various power quality issues in power system
				CO2 Estimate the voltage sag performance and severity, then apply the engineering knowledge in the mitigation of voltage sag and voltage swell
				CO3 Analyze the causes and mitigation of harmonics with the characteristics of power system with harmonics.
				CO4 Analysis and Design of Passive Shunt Compensators Simulation and Performance of Passive Power Filters.
				CO5 Apply the expert system in the monitoring of power quality and analyze the different types of power quality analyzers and custom power devices
C314 E24	VI	EE8007		CO1 Ability to understand the principles and types of EHVAC system.


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			EHVAC Transmission	CO2 Ability to analyze the electrostatic field of AC lines
				CO3 Ability to study about the compensation.
				CO4 Ability to study about the corona in E.H.V. lines
				CO5 Ability to understand the EHV capabilities.
C314 E25	VI	EC8395	Communication Engineering	CO1 Ability to comprehend and appreciate the significance and role of this course in the present contemporary world
				CO2 Ability to comprehend and appreciate the significance and role of this course in the present contemporary world
				CO3 Apply analog and digital communication techniques.
				CO4 Use data and pulse communication techniques.
				CO5 Analyze Source and Error control coding.
C315	VI	EE8661	Power Electronics and Drives Laboratory	CO1 Analyze the VI characteristics of SCR, TRIAC and Generation of Gate Pulse using R, RC and UJT.
				CO2 Analyze the characteristics of MOSFET, IGBT, GTO and IGCT
				CO3 Design a single-phase AC to DC half-controlled converter, AC to DC fully controlled converter, step down chopper and step up MOSFET, Switched Mode Power Converter and analyze the output response.
				CO4 Analyze the output waveforms of single phase and three phase IGBT based PWM inverter, AC Voltage controller and the characteristic of PMBLDC motor.
				CO5 Analyze the Simulation of output waveform PE circuits (1 Φ & 3 Φ semi converters, 1 Φ & 3 Φ full converters, DC-DC converters, AC voltage controllers).


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C316	VI	EE8681	Microprocessors and Microcontrollers Laboratory	CO1 Design a program for arithmetic operation, Ascending/ Descending order, finding Maximum/Minimum numbers, rotate instruction and code conversions and execute using 8085 processor
				CO2 Identify and convert Analog to Digital, Digital to Analog numbers and implement the traffic light controller with 8085
				CO3 Design a code to display the given words using keyboard display controller for serial communication and programming practices with simulator/Emulator /open source
				CO4 Analyze a program using read key to interface with display units and demonstrate conditional jumps, loops and calling subroutines with 8051 Microcontroller.
				CO5 Create program using I/O port ,8051 timer, A/D & D/A interface with DC & AC motors and develop a program for hardware application using embedded processors
C317	VI	EE8611	Mini Project	CO1 Apply practical knowledge within the chosen area of expertise for project development
				CO2 Identify, analyze, design and handle prototype projects with a complete and organized approach
				CO3 Contribute as an individual or in a team in development of technical projects
				CO4 Develop effective communication skills for presentation of project related activities and prepare mini project reports and examination
				CO5 Apply modern engineering tools for solution
C401	VII	EE8701		CO1 Ability to understand Generation and measurement of high voltage.


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			High Voltage Engineering	CO2 Ability to understand High voltage testing.
				CO3 Ability to understand various types of over voltages in power system.
				CO4 Ability to measure over voltages.
				CO5 Ability to test power apparatus and insulation coordination
C402	VII	EE8702	Power System Operation and Control	CO1 Understand the day-to-day operation of electric power system and analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand
				CO2 Understand the significance of power system operation and control
				CO3 Understand the knowledge on real power-frequency interaction.
				CO4 Understand the reactive power-voltage interaction.
				CO5 Design SCADA and its application for real time operation
C403	VII	EE8703	Renewable Energy Systems	CO1 Analyze the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the environment.
				CO2 Formulate the power in wind energy, classify the types of WPPs, select the site for WPPs and analyze the grid integration issues of WPPs.
				CO3 Apply the knowledge of engineering for harnessing thermal and electrical energy from solar energy.
				CO4 Apply the knowledge of engineering for harnessing electrical energy from biomass, geothermal and hydro power energy.


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				CO5 Apply the knowledge of engineering for harnessing electrical energy from ocean energy, fuel cell, hybrid energy systems and production with storage of the hydrogen.
C404 OE2	VII	OEC753	Signals and Systems	CO1 To be able to determine if a given system is linear/causal/stable
				CO2 Capable of determining the frequency components present in a deterministic signal
				CO3 Capable of characterizing LTI systems in the time domain and frequency domain
				CO4 To be able to compute the output of an LTI system in the time and frequency domains
				CO5 To analyze continuous time signals and system in the Fourier and Laplace domain
C405 E31	VII	GE8071	Disaster Management (DM)	CO1 Differentiate the types of disasters, causes and their impact on environment and society
				CO2 Assess vulnerability and various methods of risk reduction measures as well as mitigation.
				CO3 Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.
				CO4 Enhance awareness of institutional processes in the country
				CO5 Develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity
C405 E32	VII	GE8074	Human Rights	CO1 Know the Natural, Moral and Legal Rights.


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				CO2 Know the Evolution of the concept of Human Rights
				CO3 Know the Theories and perspectives of UN Laws
				CO4 Know the Constitutional Provisions / Guarantees
				CO5 Know the Human Rights of Disadvantaged People
C405 E33	VII	MG8491	Operations Research	CO1 Know the The phase of an operation research study
				CO2 Know the Transportation Models and Network Models
				CO3 Know the Inventory Models of operation research
				CO4 Know the Queueing Models of operation research
				CO5 Know the Decision Models of operation research
C405 E34	VII	MA8391	Probability and Statistics	CO1 Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
				CO2 Understand the basic concepts of one- and two-dimensional random variables and apply in engineering applications.
				CO3 Apply the concept of testing of hypothesis for small and large samples in real life problems.
				CO4 Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
				CO5 Have the notion of sampling distributions and statistical techniques used in engineering and management problems.


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C405 E35	VII	EI8075	Fibre Optics and Laser Instrumentation	CO1 Analyze the characteristics of optical fibres and working the light through the fibre
				CO2 Apply the gained knowledge of optical fibres and application of the fibre in industries for measurement system and units
				CO3 Analyze the fundamentals concepts of laser operation and its characteristics of various types of lasers
				CO4 Analyze the application of lasers in industrials for various units and working methods
				CO5 Apply the level of laser in hologram and medical application
C406 E41	VII	EE8008	System Identification and Adaptive Control	CO1 Ability to understand various system identification techniques and features of adaptive control like STR and MRAC.
				CO2 Ability to understand the concept of system identification and adaptive control
				CO3 Ability to understand about Black-box approach-based system identification
				CO4 Ability to get knowledge about batch and recursive identification
				CO5 Ability to study about computer-controlled systems
C406 E42	VII	CS8491	Computer Architecture	CO1 Understand the basics structure of computers, operations and instructions.
				CO2 Design arithmetic and logic unit.
				CO3 Understand pipelined execution and design control unit.
				CO4 Understand parallel processing architectures.


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				CO5 Understand the various memory systems and I/O communication.
C406 E43	VII	EE8009	Control of Electrical Drives	CO1 Understand the DC drive control.
				CO2 Study and analyze the Induction motor drive control.
				CO3 Study and understand the Synchronous motor drive control.
				CO4 Study and analyze the SRM and BLDC motor drive control.
				CO5 Analyze and design the Digital control for drives
C406 E44	VII	EC8095	VLSI Design	CO1 Demonstrate the concepts of digital building blocks using MOS transistor.
				CO2 Design combinational MOS circuits and power strategies
				CO3 Design and construct Sequential Circuits and Timing systems.
				CO4 Design arithmetic building blocks and memory subsystems.
				CO5 Apply and implement FPGA design flow and testing.
C406 E45	VII	EE8010	Power Systems Transients (PST)	CO1 To understand and analyze switching and lightning transients.
				CO2 To acquire knowledge on generation of switching transients and their control.
				CO3 To analyze the mechanism of lightning strokes.
				CO4 Ability to understand the importance of propagation, reflection and refraction of travelling waves.
				CO5 Ability to understand the concept of circuit breaker action, load rejection on integrated power system.


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C406 E46	VII	GE8077	Total Quality Management	CO1 Infer the need for quality, evolution of quality, definitions of quality and dimensions of a quality via. the contributions of Juran, Deming and Crosby; Show the barriers to TQM, Customer focus, Customer orientation, Customer satisfaction, Customer complaints and Customer retention.
				CO2 Summarize the quality principles like quality statements, strategic quality planning, quality council, employee empowerment, team, recognition, rewards, performance appraisal and motivation. Develop a continuous process improvement using PDCA Cycle, 5S, kaizen etc
				CO3 Summarize, compare and contrast the 7 traditional tools of quality and new management tools such as Six Sigma, benchmarking and FMEA charts.
				CO4 Summarize, compare and contrast the modern management tools such as Quality circles, Quality cost, Quality function deployment and Taguchi's loss function.
				CO5 Infer various quality management systems such as ISO9000 series and ISO14000 series. Prescribe the same to any management based on its requirements and expected benefits.
C407	VII	EE8711	Power System Simulation Laboratory	CO1 Develop the coding to analyze the performance of transmission line in electrical power system and to formulate bus impedance, admittance matrix for the given power network.
				CO2 Develop the coding to Analyse the load flow problems using Newton Raphson and Gauss seidal methods for the power system and interpret the results.
				CO3 Design the simulation model to Analyse the power system under symmetrical and unsymmetrical fault conditions and analyse the transient stability of the power system


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				CO4 Develop the coding to Analyse the economic dispatch and load frequency dynamic problems for the given power system and interpret the results
				CO5 Design the simulation model to Analyse the occurrence of electromagnetic transients in power system and interpret the results
C408	VII	EE8712	Renewable Energy Systems Laboratory	CO1 Analyze the V-I characteristics and efficiency of 1 KW solar PV system with stand alone and grid connected by conducting experiment and simulation using MATLAB Simulink.
				CO2 Analyze the performance and assessment of micro wind energy generator by conducting experiment and simulation using MATLAB Simulink.
				CO3 Analyze the performance and assessment of solar-wind hybrid system by conducting experiment and simulation using MATLAB Simulink.
				CO4 Analyze the Hydel power using MATLAB Simulink and analyze the performance and assessment of Fuel cell by conducting experiment and simulation using MATLAB Simulink.
				CO5 Analyze the various types of intelligent controller for hybrid system using MATLAB Simulink.
C409 E51	VIII	EE8011	Flexible AC Transmission Systems	CO1 Ability to understand, analyze and develop analytical model of FACTS controller for power system application.
				CO2 Ability to understand the concepts about load compensation techniques.
				CO3 Ability to acquire knowledge on facts devices.
				CO4 Ability to analyze the performance of steady state and transients of facts controllers.


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				CO5 Ability to study about advanced FACTS controllers.
C409 E52	VIII	EE8012	Soft Computing Techniques	CO1 Ability to understand the concepts of ANN, different features of fuzzy logic and their modelling, control aspects and different hybrid control schemes.
				CO2 Ability to understand the basics of artificial neural network.
				CO3 Ability to get knowledge on modelling and control of neural.
				CO4 Ability to get knowledge on modelling and control of fuzzy control schemes.
				CO5 Ability to acquire knowledge on hybrid control schemes.
C409 E53	VIII	EE8013	Power Systems Dynamics	CO1 Ability to understand and analyze power system operation, stability, control and protection.
				CO2 Ability to get knowledge on the basics of dynamics and stability problems
				CO3 Ability to design and modelling of synchronous machines
				CO4 Ability to study about excitation system and speed-governing controllers.
				CO5 Ability to understand the concept of small signal stability of a single-machine infinite bus system with excitation system.
C409 E54	VIII	EE8014	SMPS and UPS	CO1 Ability to analyze the state space model for DC – DC converters
				CO2 Ability to acquire knowledge on switched mode power converters.
				CO3 Ability to understand the importance of Resonant Converters.
				CO4 Ability to analyze the PWM techniques for DC-AC converters
				CO5 Ability to acquire knowledge on filters and UPS


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C409 E55	VIII	EE8015	Electric Energy Generation, Utilization and Conservation	CO1 Ability to understand Generation and measurement of high voltage.
				CO2 Ability to understand High voltage testing.
				CO3 Ability to understand various types of over voltages in power system.
				CO4 Ability to measure over voltages.
				CO5 Ability to test power apparatus and insulation coordination
C409 E56	VIII	GE8076	Professional Ethics in Engineering	CO1 Describe an awareness of human values to appreciate the rights of others and stress management.
				CO2 Illustrate the moral issues and models of professional roles.
				CO3 Discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.
				CO4 Describe the responsibilities, rights and assesses of the safety and risk.
				CO5 Apply the social responsibility on multinational corporations related to engineering.
C409 E57	VIII	MG8591	Principles of Management	CO1 Demonstrate the basics of management and its types, skills, management roles; Differentiate types of business organizations and to examine organization culture and current trends in business.
				CO2 Outline the nature and purpose of planning, Classify the types of planning, develop objectives, policies, planning premises and decision-making process.


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				CO3 Compare the different organization structures – formal vs informal organization, line vs staff authority, centralization vs decentralization; design job attributes such as HR management, HR planning, Recruitment, selection, training, career planning etc.
				CO4 Criticize individual and group behavior, compare and explain the types and theories of leadership and motivation; Explain the communication process, examine the barriers in communication and propose an effective communication method.
				CO5 Analyze and design various control process like budgetary control, non-budgetary control, use of IT in management control, direct control and preventive control
C410 E61	VIII	EE8016	Energy Management and Auditing	CO1 Ability to understand the basics of Energy audit process.
				CO2 Ability to understand the basics of energy management by cogeneration
				CO3 Ability to acquire knowledge on Energy management in lighting systems
				CO4 Ability to impact concepts behind economic analysis and Load management.
				CO5 Ability to acquire knowledge on HVAC.
C410 E62	VIII	CS8391	Data Structures	CO1 Understand the concepts of ADTs
				CO2 Learn linear data structures – lists, stacks, and queues
				CO3 Understand sorting, searching and hashing algorithms
				CO4 Apply Tree and Graph structures


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				CO5 Critically analyze the various sorting algorithms.
C410 E63	VIII	EE8017	High Voltage Direct Current Transmission	CO1 Ability to understand the principles and types of HVDC system.
				CO2 Ability to analyze and understand the concepts of HVDC converters.
				CO3 Ability to acquire knowledge on DC link control.
				CO4 Ability to understand the concepts of reactive power management, harmonics and power flow analysis.
				CO5 Ability to get knowledge about Planning of DC power transmission and comparison with AC power transmission
C410 E64	VIII	EE8018	Microcontroller Based System Design	CO1 Analyze the functional building block of PIC16cxx and formulate the instruction set for simple operations.
				CO2 Analyze the concept of interrupts in PIC micro controllers and write the interrupt programs
				CO3 Apply the knowledge of PIC programming to interface I/O devices like LCD, Keyboard, and Sensors etc.,
				CO4 Apply the knowledge of programming concepts in ARM processor
				CO5 Design an embedded ARM application and select an ARM Coprocessor
C410 E65	VIII	EE8019	Smart Grid	CO1 Learners will develop more understanding on the concepts of Smart Grid and its present developments.
				CO2 Learners will study about different Smart Grid technologies.
				CO3 Learners will acquire knowledge about different smart meters and advanced metering infrastructure.


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				CO4 Learners will have knowledge on power quality management in Smart Grids
				CO5 Learners will develop more understanding on LAN, WAN and Cloud Computing for Smart Grid applications.
C410 E66	VIII	EI8073	Biomedical Instrumentation	CO1 Identify the functions of human nervous system, Basic Components of a biomedical system and able to analyze the functions of different transducers used in biomedical system.
				CO2 Apply the knowledge of medical science to analyse the different non-electrical parameter measurements.
				CO3 Analyse the different electrodes and amplifiers used in physiological measurements like EEG, ECG, EMG etc.,
				CO4 Analyse the different imaging techniques and biotelemetry system.
				CO5 Analyse the different life assisting, Therapeutic and robotic devices used in Biomedical field.
C410 E67	VIII	GE8073	Fundamentals of Nano Science	CO1 Will study the Nanoscale Science and Technology
				CO2 Will demonstrate the preparation of Nanomaterials
				CO3 Will familiarize about the science of Nanomaterials
				CO4 Will develop knowledge in characteristic Nanomaterials
				CO5 Will study the application of Nanomaterials
C411	VIII	EE8811	Project Work	CO1 Identify and apply the real world and societal importance problems in the Electrical and its allied area.


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				CO2 Identify, analyze, design, implement and handle prototype projects with a complete and organized solution methodologies
				CO3 Apply modern engineering tools for solution
				CO4 Contribute as an individual or in a team in development of technical projects
				CO5 Develop effective communication skills for presentation of project related activities and prepare reports and examination following professional ethics


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