



**ELECTRICAL AND
ELECTRONICS
ENGINEERING**



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B. TECH – ELECTRICAL AND ELECTRONICS ENGINEERING

Department Vision

Transforming the individuals into globally competent Electrical Engineers to accomplish the technological needs of the society.

Department Mission:

- Establishing world class infrastructure in Electrical Engineering.
- Adopting continuous improvement methods in content delivery and assessment.
- Facilitating industry institution interaction in teaching & learning, consultancy and research activities to fulfill the technological needs of the society.
- Encouraging the faculty and students to carry out innovative research and practicing ethical standards.
- Motivating the students for active participation in co-curricular and extracurricular activities.

Program Educational Objectives (PEOs) :

PEO1	Graduates will be technically sound to have vibrant careers in core & IT sector.
PEO2	Graduates will compete, sustain, lead and enhance in competitive world.
PEO3	Graduates will serve the nation by solving technical problems with professional ethics and social responsibility

Program Specific Outcomes (PSO's):

PSO1	The ability to analyse, design and implement power systems, power electronics, control systems using software systems.
PSO2	The ability to apply project management techniques to electrical & Electronics systems & to utilize applied differential equations, matrices, different transform methods, discrete mathematics in support to the program.



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Program Outcomes (POs):

Engineering Graduates will be able to:

1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



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Course outcomes (Cos) of all courses of all programs offered by the institution

Course Outcomes for First Year First Semester Course	
Course Code: B19 HS 1101	
Course Title: English	
CO-1	Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English.
CO-2	Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information.
CO-3	Build confidence and adapt themselves to the social and public discourses, discussions and presentations.
CO-4	Understand and apply the principles of writing to paragraphs, arguments, essays and formal/informal communication.
CO-5	Construct sentences using proper grammatical structures and correct word forms.
Course Code: B19 BS 1101	
Course Title: Mathematics-I	
CO-1	Solve a given system of linear algebraic equations
CO-2	Determine Eigen values and Eigen vectors of a system represented by a matrix
CO-3	Solve linear ordinary differential equations of first order and first degree.
CO-4	Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-5	Solve linear ordinary differential equations of second order and higher order.
CO-6	Determine Laplace transform and inverse Laplace transform and solve linear ODE.
Course Code: B19BS1104	
Course Title: APPLIED PHYSICS	
CO-1	Interpret the behavior of light radiation in interference and diffraction Phenomena and their applications.
CO-2	Explain the properties of dielectric and magnetic materials suitable for engineering applications.
CO-3	Explain the important aspects of semiconductors and electrical conductivity in them.
CO-4	Understand the basics of modern technologies lasers, optical fibers and ultrasonics and their utility in various fields.
CO-5	Demonstrate the synthesis methods and applications of nano materials.
Course Code: B19CS1103	
Course Title: FUNDAMENTALS OF COMPUTERS	
CO-1	The student will be understood functioning of computers
CO-2	The student will convert numbers from one type to other type of system.
CO-3	The student will distinguish between different types of memories and learn the mapping of I/O device
CO-4	The student will demonstrate the internal organization of digital
CO-5	Apply digital computer for storing electrical engineering problems
Course Code: B19ME1101	
Course Title: ENGINEERING DRAWING	
CO-1	Apply principles of drawing to Construct polygons and engineering curves.
CO-2	Apply principles of drawing to draw the projections of points and lines.
CO-3	Apply principles of drawing to draw the projections of planes
CO-4	Apply principles of drawing to draw the projections of solids.
CO-5	Apply principles of drawing to represent the object in 3D view through isometric views.
Course Code: B19BS1107	
Course Title: APPLIED PHYSICS LAB	
CO-1	Students get hands on experience in setting up experiments and using the instruments / equipment individually.
CO-2	Get introduced to using new / advanced technologies and understand their significance.
Course Code: B19HS1102	
Course Title: ENGLISH LAB	



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CO-1	Remember and understand the different aspects of English language proficiency with emphasis on LSRW skills.
CO-2	Apply communication skills through various language learning activities.
CO-3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening comprehension.
CO-4	Exhibit an acceptable etiquette essential in social settings.
CO-5	Get awareness on mother tongue influence and neutralize it in order to improve fluency and clarity in spoken English.
Course Code: B19EE1102	
Course Title: ELECTRICAL ENGINEERING WORKSHOP	
CO-1	Explain the limitations, tolerances, safety aspects of electrical systems and wiring.
CO-2	Select wires/cables and other accessories used in different types of wiring.
CO-3	Make simple lighting and power circuits.
Course Code: B19MC1102	
Course Title: CONSTITUTION OF INDIA	
CO-1	Understand historical background of the constitution making and its importance for building a democratic India.
CO-2	Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.
CO-3	Understand the value of the fundamental rights and duties for becoming good citizen of India.
CO-4	Analyze the decentralization of power between central, state and local self-government.
CO-5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
CO-6	1. Know the sources, features and principles of Indian Constitution.
	2. Learn about Union Government, State government and its administration.
	3. Get acquainted with Local administration and Pachayati Raj.
	4. Be aware of basic concepts and developments of Human Rights.
	5. Gain knowledge on roles and functioning of Election Commission

Course Outcomes for First Year second Semester Course	
Course Code: B19BS1201	
Course Title: MATHEMATICS – II	
CO-1	Fit an interpolation formula and perform interpolation for an equally spaced data as well as unequally spaced data.
CO-2	Find a real root of algebraic and transcendental equations, evaluate numerically certain definite integrals & solve a first order ordinary differential equation by Euler and RK methods.
CO-3	Compute partial derivatives, total derivative and Jacobian
CO-4	Find maxima/minima of functions of two variables and evaluate some real definite integrals.
CO-5	Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs.
Course Code: B19BS1202	
Course Title: MATHEMATICS – III	
CO-1	Determine Fourier series and half range series of functions.
CO-2	Find different Fourier transforms of non-periodic functions and also use them to evaluate integrals.
CO-3	Use the knowledge of Beta and Gamma functions in evaluating improper integrals.
CO-4	Evaluate double integrals, simple triple integrals & find areas and volume.
CO-5	Find the gradient of a scalar function, divergence and curl of a vector function. Determine scalar potential.
Course Code: B19BS1205	



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Course Title: APPLIED CHEMISTRY	
CO-1	At the end of the course the students learn the advantages and limitations of plastics materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly students understand liquid crystals and semi conductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.
Course Code: B19CS1201	
Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C	
CO-1	Students will learn about computer systems, computing environments, developing of a computer program and Structure of a C Program
CO-2	Students will learn to use different operators, data types and loops for developing C Programs.
CO-3	Students will able to write programs using Arrays ,Strings, enumerated types, Structure and Union
CO-4	Students will able to design and implement programs to analyze the different pointer applications
CO-5	Students will able to decompose a problem into functions and to develop modular reusable code
Course Code: B19EE1201	
Course Title: CIRCUIT THEORY	
CO-1	Able to analyze various electrical networks in presence of active and passive elements.
CO-2	Able to understand the principles of Magnetic circuits and dot convention.
CO-3	Able to Solve R, L and C networks with sinusoidal excitation.
CO-4	Able to evaluate the frequency response of RLC networks.
CO-5	Able to apply various network theorems to Electrical networks.
Course Code: B19BS1208	
Course Title: APPLIED CHEMISTRY LAB	
CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipments.
CO-3	Acquire ability to apply real time knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
Course Code: B19HS1202	
Course Title: COMMUNICATION SKILLS LAB	
CO-1	Learn different aspects of English language proficiency in LSRW skills.
CO-2	Apply communication skills through various language learning activities.
CO-3	Draft job application letters.
CO-4	Adopt a professional etiquette in formal settings.
CO-5	Improve fluency and clarity in both spoken and written English.
Course Code: B19CS1204	
Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB	
CO-1	Gains Knowledge on various concepts of a C language.
CO-2	Able to draw flowcharts and write algorithms.
CO-3	Able design and development of C problem solving skills.
CO-4	Able to design and develop modular programming skills.
CO-5	Able to trace and debug a program
Course Code: B19EE1205	



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Course Title: ENGINEERING EXPLORATION PROJECT	
CO-1	The first part will be learning-based-making students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
CO-2	The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human- centered design.
CO-3	The class will then divide into teams and they will be working with one another for about 2 – 3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
CO-4	The teams start with Design Challenge and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
CO-5	Outside of class, students will also be gathering the requirements, identifying the challenges, usability, importance etc
CO-6	At the end, Students are required to submit the final reports, and will be evaluated by the faculty.
Course Code: B19MC1101	
Course Title: ENVIRONMENTAL SCIENCE	

Course Outcomes for Second Year First Semester Course	
Course Code: B19EC2101	
Course Title: ELECTRONIC DEVICES AND CIRCUITS	
CO-1	Analyze the characteristics and operation of Diode, BJT, JFET and MOSFET.
CO-2	Analyze the biasing circuits of BJT and JFET.
CO-3	Analyze the performance of small signal BJT and FET single stage amplifiers.
CO-4	Apply the gained knowledge in the design of simple Electronic circuits.
Course Code: B19BS2102	
Course Title: MATHEMATICS IV	
CO-1	Comprehend the concept of Analytic function and apply in Electrostatics and Fluid dynamics
CO-2	Determine Laurent series of functions about isolated singularities, and determine residues. Use the residue theorem to evaluate certain real definite integrals.
CO-3	Formulate and solve linear difference equations.
CO-4	Use Z-transforms to solve linear difference equations with constant coefficients.
CO-5	Identify a random variable as discrete/continuous, find its expected value and also fit a probability distribution for a given frequency distribution.
CO-6	Decide the test applicable and apply it for giving inference about Population Parameter based on sample statistic for some large samples and small samples.
Course Code: B19EE2101	
Course Title: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	
CO-1	Examine the operation of different meters for measuring electrical quantities with their applications.
CO-2	Apply the knowledge of instrument transformers to use them for accurate measurements.
CO-3	Analyse the usage of different bridges for the measurement of Resistance, Capacitance, Inductance and Frequency.
CO-4	Examine the operation of different transducers for measuring non-electrical quantities with their applications.
CO-5	Interpret the usage of CRO, ADC, DAC & Digital Voltmeters.
Course Code: B19EE2102	
Course Title: NETWORK ANALYSIS AND SYNTHESIS	
CO-1	Explain three-phase balanced and unbalanced electric circuits.
CO-2	Analyze the transient behavior of circuits by applying first and second order differential equations.
CO-3	Apply Laplace transform techniques to electrical circuits.
CO-4	Analyze and model two port network based on its parameters.



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CO-5	Synthesize an electrical network from a given impedance/admittance function.
Course Code: B19EE2103	
Course Title: ELECTRO MAGNETIC FIELD THEORY	
CO-1	Apply vector calculus to find the electrostatic and magneto static fields for given charge/ current configurations.
CO-2	Apply basic principles/ theorems/ laws to estimate the effect of electric and magnetic fields.
CO-3	Analyze the boundary conditions, calculate parameters like energy, Inductance, Capacitance, forces
CO-4	Analyze the Maxwell's equations for both static and time varying fields.
CO-5	Analyze the EM wave in different domains and compute average power density
Course Code:B19 CS 2108	
Course Title: DATA STRUCTURES	
CO-1	Apply advanced data structure strategies for exploring complex data structures and implement data structures like stacks, queues
CO-2	Implement & perform operations on dynamic linear data structures like linked lists.
CO-3	Apply different operations on trees and graphs.
CO-4	Implement & analyze various searching & sorting algorithms
Course Code: B19EE2104	
Course Title: NETWORKS LAB	
CO-1	Inspect Maximum power transfer, superposition, Thevinins & Norton's Theorems
CO-2	Analyze resonance condition in R-L-C series circuit and draw locus diagrams for RL,RC series circuits.
CO-3	Examine power in 3- phase circuits in 3-phase balanced load.
CO-4	Verify the Ohm's law, Kirchhoff's current's law, Kirchhoff's voltage's law.
CO-5	Evaluate Two port network parameters and parameters of choke coil
Course Code: B19EC2105	
Course Title: ELECTRONIC DEVICES & CIRCUITS - LAB (WITH SIMULATION)	
CO-1	Apply the concepts of different electronic devices to verify their characteristics and measure the important parameters.
CO-2	Analyze the performance of rectifier circuits with and without filters.
CO-3	Analyze the performance of BJT and FET amplifier circuits.
CO-4	Simulation and Design of small electronic circuits using BJT and FET.
Course Code: B19MC2102	
Course Title: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	
CO-1	Understand the concept of Traditional knowledge and its importance.
CO-2	Know the need and importance of protecting traditional knowledge.
CO-3	Know the various enactments related to the protection of traditional knowledge.
CO-4	Understand the concepts of Intellectual property to protect the traditional knowledge.

Course Outcomes for Second Year Second Semester Course	
Course Code:B19EE2201	
Course Title: ELECTRICAL MACHINES-I	
CO-1	Identify the concepts of electromechanical energy conversion. Describe the concepts of construction, operating principle of DC machines.
CO-2	Discriminate different types of DC machines and transformers, efficiency on DC machine and parallel operation of DC generators and transformers.
CO-3	Interpret the characteristics of DC machines
CO-4	Discriminate different types of speed control methods of DC motors and different types of transformer connections
CO-5	Examine the performance of DC machines and transformers by different testing methods.



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Course Code:B19EE2202	
Course Title: DIGITAL ELECTRONICS AND LOGIC DESGIN	
CO-1	Apply the concepts of Boolean Algebra for the analysis and minimization of Boolean expressions and apply the knowledge of number systems to perform arithmetic operations and error corrections.
CO-2	Deduce the Boolean expressions by K-maps and implement logic circuits using logic gates.
CO-3	Design and analyze the combinational logic circuits.
CO-4	Design and analyze the sequential logic circuits.
CO-5	Design and analyze the logic gates using diodes and transistors.
Course Code: B19EE2203	
Course Title: SIGNALS AND SYSTEMS	
CO-1	Apply the properties of continuous time and discrete time signals and systems to classify them.
CO-2	Apply convolution to analyze CT and DT systems in the Time domain.
CO-3	Analyze the spectral characteristics of periodic and a periodic signal using Fourier analysis.
CO-4	Apply sampling theorem for signal conversion.
CO-5	Analyze DT signals and systems using Z Transform.
Course Code: B19ME2207	
Course Title: PRIME MOVERS AND PUMPS	
CO-1	Compute the performance parameters of Internal combustion engines
CO-2	Compute the efficiencies of steam & gas power plants to improve their performance.
CO-3	Apply the concepts of mechanics to solve the hydrodynamic force of jets.
CO-4	Apply the concepts of fluid mechanics to solve the performance parameters of turbines and pumps
Course Code: B19CS2209	
Course Title: OOPS THROUGH JAVA	
CO-1	Apply object-oriented programming principles and various java programming constructs and develop java programs.
CO-2	Apply the concepts of Inheritance, Polymorphism and String handling methods in developing java programs
CO-3	Apply the concepts like interfaces, packages, exception handling and multithreading in programming to develop error free programs.
CO-4	Develop the GUI applications for the end users using applets with event handling.
Course Code: B19HS2201	
Course Title: MANAGEMENT AND ORGANIZATIONAL BEHAVIOR	
CO-1	Explain management functions and principles
CO-2	Will be able to describe the concepts of functional management that is HRM and Marketing functions
CO-3	Will be able to get discuss about vision, mission, goal, objective and a strategy based on which the corporate planning depends
CO-4	The learner is able to recognize strategically contemporary management practices and describe corporate planning process
CO-5	The learner can discuss about individual behaviour and motivational theories
CO-6	The student can explain about ways in managing conflicts and stress
Course Code: B19 EE 2204	
Course Title: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB	
CO-1	Calibrate Wattmeter and Energy Meter.
CO-2	Select the suitable method for measurement of active, reactive powers and energy.
CO-3	Apply various transducers used for the measurement of various physical quantities.



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CO-4	Apply the suitable method for measurement of resistance, inductance, and capacitance.
CO-5	Test the dielectric strength of oil
Course Code: B19ME2208	
Course Title: THERMAL PRIME MOVERS LAB	
CO-1	Assess the environmental, societal safety and health issue through determining the flash & fire point of various lubricating oils as well as fuels, engine performance characteristics, along with computing the viscosity of lubricating oils.
CO-2	Functioning and communicating as an individual in a team to write and prepare effective reports on experiments conducted in the laboratory.
Course Code: B19MC2202	
Course Title: PROFESSIONAL ETHICS AND HUMAN VALUES	
CO-1	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships and field work.
CO-2	Identify the multiple ethical interests at stake in a real-world situation or practice and Articulate what makes a particular course of action ethically defensible.
CO-3	Assess their own ethical values and the social context of problems.
CO-4	Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects.
CO-5	Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.

Course Outcomes for Third Year First Semester Course	
Course Code: B19EE3101	
Course Title: ELECTRICAL MACHINES-II	
CO-1	Illustrate the constructional features of AC rotating machines, MMF distribution in air-gap, Rotating Magnetic field and calculate generated voltage
CO-2	Compute voltage regulation and analyze the power angle characteristics and explain parallel operation of salient pole synchronous generator.
CO-3	Analyze characteristics of salient pole synchronous motor and explain the starting methods of synchronous motor.
CO-4	Illustrate the operation of three phase induction motor and apply the slip-torque equations in Analyzing the performance of 3 Φ Induction Motor.
CO-5	Demonstrate the starting and speed control of 3- Φ induction motor, operation of single-phase induction motor and its starting methods.
Course Code: B19EE3102	
Course Title: CONTROL SYSTEMS	
CO-1	Derive transfer functions for electrical and mechanical physical systems by applying laws of physics.
CO-2	Prepare block diagrams & Signal Flow Graphs for systems and find their transfer functions.
CO-3	Analyze systems in time domain for transient and steady-state behavior
CO-4	Ascertain the stability of systems using RH criterion and Root locus.
CO-5	Illustrate the frequency response plots of systems and use them for system analysis and stability assessment.
Course Code: B19EE3103	
Course Title: POWER ELECTRONICS	



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CO-1	Illustrate different Power Semi-conductor devices and Analyze Series and Parallel connections of SCR's.
CO-2	Analyze the phase-controlled rectifiers with different loads.
CO-3	Explain DC-DC converters for power electronic applications.
CO-4	Acquire knowledge on single phase AC voltage controllers.
CO-5	Analyze the operation of inverters.
Course Code: B19EE3104	
Course Title: ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION	
CO-1	Describe the power generation from different energy sources, tariffs and Economic aspects.
CO-2	Apply Kelvin's law and analyze different type's transmission and distribution networks.
CO-3	Calculate Inductance & Capacitance of transmission lines
CO-4	Determine the performance of short, medium and long transmission lines.
CO-5	Explain the mechanical and electrical design aspects of transmission system
Course Code: B19EE3105	
Course Title: MICRO PROCESSORS AND MICRO CONTROLLERS	
CO-1	Illustrate the Architecture, Addressing modes, and Memory organization of 8085 Microprocessor.
CO-2	Illustrate the Architecture, Addressing modes, and Memory organization of 8086 Microprocessor.
CO-3	Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.
CO-4	Illustrate the Architecture, Memory organization, Timers/Counters, Serial Communication and Interrupts of 8051 Microprocessor.
CO-5	List out the 8051 instructions and develop programming to interface 8051 microcontrollers for simple real time applications.
Course Code: B19EE3106	
Course Title: ANALOG ELECTRONICS	
CO-1	Outline the concepts of feedback amplifiers
CO-2	Analyze and design practical electronic circuits using amplifiers, oscillators
CO-3	Design fundamental circuits using op-amps
CO-4	Design and analyze of Active filters and oscillators
CO-5	Design and analyze of various applications using 555 Timer and IC 565
Course Code: B19EE3107	
Course Title: LINEAR AND DIGITAL IC APPLICATIONS	
CO-1	Design/analyze fundamental circuits based on op-amps
CO-2	Design and analyze of various active filters, oscillators.
CO-3	Design and Analyze of various applications using IC 555 timer and IC 565 PLL
CO-4	Analyze the designing of Analog to digital and Digital to Analog converters
CO-5	Analyze the various Digital IC Logic Families and to implement the logic function
Course Code: R19EE3108	
Course Title: PULSE AND DIGITAL CIRCUITS	
CO-1	Analyze passive RC circuits and understand the applications of Integrator, differentiator circuits.
CO-2	Design of different clipping circuits and understand the applications of clamper circuits.
CO-3	Design different multivibrators for various applications.
CO-4	Understand different Time Base Generators.
CO-5	Analyze synchronization techniques for sweep circuits and understand different logic families; realize logic gates using diodes and transistors.
Course Code: B19EE3110	
Course Title: ELECTRICAL MACHINES- I LAB	
CO-1	Conduct Load tests on DC motors and Hopkinson's test to Analyze the efficiency performance of DC Shunt and DC series motors.
CO-2	Conduct OC and SC tests and Load test on transformer to Analyze the regulation and efficiency performance of the transformer.



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CO-3	Conduct Swinburn's test and Sumpner's test to Predict the Efficiency performance of Dc shunt machine and Transformer.
CO-4	Conduct OCC test on DC Shunt generator and Load test on DC compound generator to Determine the open circuit characteristics and over compound and under compound characteristics.
CO-5	Conduct a test on Speed control of a DC shunt motor to Analyze the Speed characteristics of DC shunt motor.
Course Code: B19EE3111	
Course Title: MICROPROCESSOR & MICROCONTROLLER LAB	
CO-1	Demonstrate the architecture, instruction set, configuration of 8085 ,8086 processors and 8051 controllers
CO-2	Develop simple arithmetic and logical programs on 8085 and 8086 processors using the instruction set.
CO-3	Evaluate programs on sorting, counting, Binary to BCD conversion on 8085 & 8086 processors using the instruction set.
CO-4	Develop arithmetic and logical programs on 8051controller using the instruction set.
CO-5	Design programs for interfacing circuits like traffic controller, LED display board, Motor controllers etc.
Course Code: B19MC3101	
Course Title: EMPLOYABILITY SKILLS - I	
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.
PART-B	
CO-1	The students will be able to perform well in calculating on number problems and various units of ratio concepts
CO-2	Accurate solving problems on time and distance and units related solutions
CO-3	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability
CO-4	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any person to be placed in the industry
CO-5	The students will learn to apply Logical thinking to the problems of syllogisms and be able to effectively attempt competitive examinations like CAT, GRE, GATE for further studies
Course Code: B19MC3102	
Course Title: BASIC CODING	
CO-1	Know about Control Structures, Loop Structures and branching in programming
CO-2	Know about various searching and sorting methods
CO-3	Know about Functions, Recursions and Storage Classes
CO-4	Know about Structures and Unions
CO-5	Know different Operating System concepts
CO-6	Differentiate OSI Model Vs. TCP/IP suite.

Course Outcomes for Third Year Second Semester Course

Course Code: B19EE3201	
Course Title: POWER SYSTEM ANALYSIS AND STABILITY	
CO-1	Compute pu reactance and pu impedance and draw per unit reactance diagram.
CO-2	Apply load flow techniques to analyze load flow problems in the power system.



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CO-3	Compute short circuit MVA and analyze symmetrical fault currents and voltages in a power system.
CO-4	Determine symmetrical components and draw sequence networks of power system components and calculate un-symmetrical fault currents in a power system.
CO-5	Apply swing equation and equal area criterion to analyze steady state and transient stability problems of a power system.
Course Code: B19EE3202	
Course Title: INTERNET OF THINGS AND ITS APPLICATIONS IN ELECTRICAL ENGINEERING	
CO-1	Identity different components of IoT Networks
CO-2	Interface various sensors to Processor boards
CO-3	Design Power management circuit for IoT application
CO-4	Apply various IoT network protocols to communicate between sensors and machines wirelessly
CO-5	Develop automation of a system using IoT devices
Course Code: B19EE3203	
Course Title: ADVANCED CONTROL SYSTEMS	
CO-1	Employ various components in the implementation of control systems.
CO-2	Apply root locus and Bode plot techniques for designing basic compensators.
CO-3	Construct state space models for control systems and analyze them
CO-4	Analyze control systems with state feedback.
CO-5	Apply digital computers for control system applications
Course Code: B19EE3204	
Course Title: DIGITAL CONTROL SYSTEMS	
CO-1	Apply the concepts of Signal conversion to examine the characteristics of ZOH
CO-2	Apply Z- transform in Engineering application related to digital control systems
CO-3	Determine the pulse transfer function in digital systems which is useful to relate input and output of a given system.
CO-4	Apply the concept of State variables to analyze multi- input- multi- output systems of linear time invariant systems.
CO-5	Apply the concept of Controllability and Observability to analyze the behavior of state variables and test the stability of linear digital system by Bi-Linear Transformation Method- Jury's test.
Course Code: B19EE3205	
Course Title: SPECIAL ELETRICAL MACHINES	
CO-1	Illustrate the principle of operation and control for stepper motor.
CO-2	Acquire the knowledge on principle of operation, and control of Permanent Magnet Brushless DC Motor
CO-3	Illustrate the operation and control of Permanent Magnet Synchronous motor.
CO-4	Acquire the knowledge on principle of operation and control of Switched reluctance Motor.
CO-5	Illustrate the operation and control of Synchronous reluctance Motor.
Course Code: B19EE3207	
Course Title: POWER ELECTRONIC DRIVES	
CO-1	Select drive for particular application & demonstrate the operation of drive to satisfy four-quadrant operation to meet load requirements
CO-2	Analyze the dynamics of electric drive & also Explain starting and braking methods.
CO-3	Apply and analyze rectifier fed DC drives for continuous and discontinuous modes.
CO-4	Apply and analyze chopper fed DC drives for continuous and discontinuous modes with closed



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	loop control.
CO-5	Apply control strategies for Induction motor Drives and also distinguish slip power recovery schemes.
Course Code: B19EE3208	
Course Title: ADVANCED POWER ELECTRONIC CIRCUITS	
CO-1	Analyze the RMS output voltage of three phase AC-AC Converters for R and RL loads.
CO-2	Identify the necessity of power factor correction converters.
CO-3	Compare the operation of flyback, push pull and bridge type isolated DC-DC converters.
CO-4	Examine the voltage control of inverters using various PWM methods
CO-5	Distinguish between flying capacitor, diode clamped and cascaded type multilevel inverters.
Course Code: B19EE3209	
Course Title: SWITCHED MODE POWER SUPPLIES	
CO-1	Assign suitable power semiconductor devices for particular converter topology.
CO-2	Investigate the suitable filters for DC – DC converters.
CO-3	Analyze various Isolated DC-DC converters
CO-4	Apply the resonance concept for DC-DC converters.
CO-5	Examine various switching mode DC-AC converters.
Course Code: B19EE3211	
Course Title: ELECTRICAL MACHINES - II LAB	
CO-1	Conduct OC and SC tests on an alternator to Analyze the regulation of an alternator by using EMF, MMF and ZPF methods.
CO-2	Conduct a test on a Line excited induction generator and synchronous motor by using induction start method and synchronizing method to Analyze its performance characteristics
CO-3	Conduct No – Load and Blocked Rotor tests on a 3- Φ and 1- Φ induction motor and to Draw equivalent circuit and analyze the performance characteristics of a 3- Φ and 1- Φ induction motor.
CO-4	Conduct a test on a synchronous machine to determine X_d & X_q and sequence reactance's.
CO-5	Conduct load test on a 3- Φ induction motor to Draw and Analyzes its performance characteristics and Conduct speed control by pole changing method
Course Code: B19EE3212	
Course Title: CONTROL SYSTEMS LAB	
CO-1	Formulate transfer function for given control system problems.
CO-2	Find time response of given control system model.
CO-3	Apply Root Locus and Bode plots for given control system model
CO-4	Design Lead, Lag, Lead-Lag and PID controllers for given control system model
Course Code: B19EE3213	
Course Title: POWER ELECTRONICS LAB	
CO-1	Conduct the experiment for the operation and characteristics of power semiconductor devices, Triggering circuits and powerconverters
CO-2	Conduct the experiment for the effect of Freewheeling diode on single-phase semi converter with RL-load & single-phase full converter with DC motor.
CO-3	Conduct the experiment for the AC output voltage of AC voltage controller & Cycloconverter with changing frequency modes
CO-4	Conduct the experiment for the performance of various Inverters.
CO-5	Conduct the experiment for the performance of DC Choppers.
Course Code: B19MC3201	
Course Title: EMPLOYABILITY SKILLS II	
CO-1	Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	Analyze the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign universities), letters of recommendation(for professional and educational purposes).
CO-4	Converse with ease during interactive sessions/seminars in their classrooms, compete in



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	literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process
PART-B	
CO-1	The students will be able to perform well in calculating different types of data interpretation problems.
CO-2	The students will perform efficaciously on analytical and logical problems using various methods.
CO-3	Students will find the angle measurements of clock problems with the knowledge of calendars and clock
CO-4	The students will skillfully solve the puzzle problems like arrangement of different positions
CO-5	The students will become good at solving the problems of lines, triangulars, volume of cone, cylinder and so on.
Course Code : B19MC3203	
Course Title: ADVANCED CODING	
CO-1	Able to solve problems using java collection framework and I/o classes
CO-2	Able to develop multithreaded applications with synchronization.
CO-3	Able to develop applets for web applications
CO-4	Able to design GUI based applications

Course Outcomes for Fourth Year First Semester Course	
Course Code: B19EE4101	
Course Title: SWITCHGEAR AND PROTECTION	
CO-1	Illustrate the need for protection, rating of circuit breakers and analyse different voltages due to arc interruption
CO-2	Apply the arc quenching methods and testing on various types of circuit breakers.
CO-3	Illustrate the behaviour of different types of electromagnetic relays and compute the operating times by using time-current characteristics
CO-4	Apply electromagnetic relays to alternator, transformer, feeder and busbar protection and illustrate the operation of various protection devices against over voltages
CO-5	Illustrate the principles of comparators, static and numerical relaying.
Course Code: B19EE4102	
Course Title: SOLAR AND WIND ENERGY SYSTEMS	
CO-1	Apply the fundamental principles to understand the solar geometry, operation of solar cell and analyze its Characteristics, equivalent circuit parameters
CO-2	Design a PV Module and analyze series and parallel interconnection schemes
CO-3	Apply the MPPT techniques and analyze the Operating range of Buck, Boost and Buck-Boost converters.
CO-4	Apply the fundamental of wind energy systems to illustrate the wind turbine operation and control.
CO-5	Illustrate various configurations of wind energy conversion systems.
Course Code: B19EE4103	
Course Title: DIGITAL SIGNAL PROCESSING	
CO-1	Apply Sampling theorem to analyze the Discrete time signals, systems and realize digital filters.
CO-2	Analyze discrete signals in the frequency domain and compute the linear and circular convolutions of discrete sequences
CO-3	Apply FFT algorithms to find the DFT of Discrete sequence
CO-4	Design the IIR filter by considering the given specifications.
CO-5	Design the FIR filter by using window techniques and know the finite word length effects in FIR filter.
Course Code: B19EE4104	



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Course Title: ELECTRIC VEHICLES	
CO-1	Analyze and understand dynamic modelling and design considerations of electrical vehicles.
CO-2	Illustrate the architecture of electric vehicles and power train components
CO-3	Evaluate battery performance parameters for EVs and understand other energy storage methods for EVs.
CO-4	Analyze and understand the electric drives using power electronic converters for EVs.
CO-5	Illustrate the EV charger infrastructure.
Course Code: B19EE4105	
Course Title: COMPUTER ARCHITECTURE AND ORGANIZATION	
CO-1	Acquire the knowledge of register transfer language and micro-operations useful for the design of ALU.
CO-2	Illustrate the instruction cycle, interrupt cycle, instruction formats, and the register and memory reference instructions.
CO-3	Illustrate the CPU organization and micro program control.
CO-4	Explore different memories and their organization.
CO-5	Illustrate I/O interfacing and different modes of transfer.
Course Code: B19EE4106	
Course Title: POWER QUALITY	
CO-1	Acquire the knowledge of power quality issues and power quality parameters.
CO-2	Illustrate the sources of transient over voltages and protection techniques
CO-3	Analyze filters for controlling harmonic distortion.
CO-4	Analyze long duration voltage variations and regulation of voltage variations.
CO-5	Explore power quality aspects and protection in distributed generation.
Course Code: B19EE4107	
Course Title: SOFT COMPUTING TECHNIQUES	
CO-1	Examine the Feasibility of Applying Soft Computing Techniques
CO-2	Apply Fuzzy Logic to Design Intelligent Controllers for Electrical Systems
CO-3	Apply Artificial Neural Networks to Identify Engineering Prediction Models
CO-4	Apply Genetic Algorithm to Identify Optimal Solutions of Engineering Problems
CO-5	Apply Particle Swarm Optimization to Identify Optimal Solutions of Engineering Problems
Course Code: B19EE4109	
Course Title: ELECTRICAL SYSTEM SIMULATION LABORATORY	
CO-1	Compute the Y-bus and solve GS load flow, Economic Load Dispatch using MATLAB Programming
CO-2	Compute the symmetrical components and LG, LLG fault currents using MATLAB Programming / SIMULINK
CO-3	Construct the model of swing equation for assessing transient stability, load frequency control of single area system using MATLAB/ SIMULINK software
CO-4	Construct the simulation models to illustrate the operation of Rectifier, Inverter, Chopper, AC Voltage controller and Cycloconverter using MATLAB/SIMULINK software
CO-5	Construct the EMTP models to illustrate the functioning of PF correction & Effect of shading in PV array using PSCAD and ETAP softwares.
Course Code: B19EE4110	
Course Title: SOLAR AND WIND ENERGY SYSTEMS LABORATORY	
CO-1	Plot and analyse the performance Characteristics of a PV Module
CO-2	Illustrate partial shading effect on PV Modules and its mitigation.
CO-3	Analyse the Standalone and Grid connected PV systems
CO-4	Estimate the required number of PV panels and configuration for a given load
CO-5	Illustrate the performance of wind turbine at various wind speed and load
Course Code: B19EE4111	
Course Title: SMART SYSTEMS LABORATORY	
CO-1	Demonstrate Arduino and Node MCU usage and applications.
CO-2	Interface display devices with Arduino / Node MCU
CO-3	Interface various sensors to Processor boards



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CO-4	Apply Bluetooth and Cloud technology for wireless communication.
CO-5	Develop automation of a system using IoT devices.
Course Code: B19EE4112	
Course Title: PROJECT WORK - I	
CO-1	Identify a problem through literature survey/area/case studies
CO-2	Analyze the existing methodologies to indentify the research gaps
CO-3	Identify the objectives from the gaps and propose solution for solving objective
CO-4	Identify the required tools & components to initiate the project/process at the laboratory level.
CO-5	Write a detailed report, and also present the merits & demerits between existing and proposed solution orally.

Course Outcomes for Fourth Year Second Semester Course	
Course Code: B19EE4201	
Course Title: POWER SYSTEM OPERATION AND CONTROL	
CO-1	Compute the economic load scheduling for Thermal power plants.
CO-2	Illustrate the concepts of hydro thermal systems and unit commitment.
CO-3	Analyze the frequency deviations of a single area power system.
CO-4	Analyze the Load frequency control of a Two area system with tie-line bias and illustrate the concepts of automatic voltage control, generator constraints and governor dead band.
CO-5	Apply the knowledge of engineering fundamentals to assess the stability enhancement methods and preventive & emergency control.
Course Code: B19EE4202	
Course Title: HIGH VOLTAGE ENGINEERING	
CO-1	Apply the knowledge of over voltages, electric stress and field configuration to compute electric fields
CO-2	Explore the breakdown behaviour of solid, liquid and gaseous dielectric materials
CO-3	Illustrate the generation of High AC, DC & Impulse voltages and currents.
CO-4	Apply different methods to measure High AC, DC & Impulse voltages and currents
CO-5	Analyse the different electrical apparatus used in HV engineering and industrial applications.
Course Code: B19EE4203	
Course Title: POWER ELECTRONICS FOR RENEWABLE ENERGY	
CO-1	Apply the fundamentals of physics to understand the principles of renewable power generation and their interconnections.
CO-2	Apply the Power Electronics to enhance the performance of the PV system.
CO-3	Illustrate different wind generations and their interconnection to grid
CO-4	Illustrate different topologies of small hydroelectric systems and their operation.
CO-5	Apply the concepts of Power electronics to fuel cell systems
Course Code: B19EE4204	
Course Title: HVDC TRANSMISSION	
CO-1	Compare the HVDC transmission and conventional AC transmission.
CO-2	Explore the VSC with respect to Graetz converter with and without overlap.
CO-3	Describe various methods of controlling HVDC systems
CO-4	Examine the generation of harmonic and necessity of filters in HVDC systems.
CO-5	Compare the existing HVDC systems with MTDC systems
Course Code: B19EE4206	
Course Title: PROJECT WORK - II	
CO-1	Demonstrate a sound technical knowledge of their selected project topic as individual and team in extension to phase-I project.
CO-2	Investigate the selected problem in depth and propose solution.
CO-3	Design solutions to complex electrical engineering problems utilizing software/hardware approach.
CO-4	Develop the project within the available resources, in stipulated time and with ethical values & social responsibility.



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CO-5	Write the documentation in standard format and communicate orally in a professional manner enhancing self-study and lifelong learning abilities.
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