DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PROGRAMME: B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

- ❖ To produce globally competent and socially responsible Electrical and Electronics Engineers to meet the Industry needs.

MISSION

- ❖ To establish quality learning facilities.
- ❖ To produce Quality Electrical Engineers to compete globally.
- ❖ To nurture innovative research on cutting edge technologies.
- ❖ To inculcate the positive attitude and spirit of ethical practices.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- ❖ Find employment in Core Electrical and Electronics Engineering and service sectors.
- ❖ Get elevated to technical lead position and lead the organization competitively.
- ❖ Enter into higher studies leading to post-graduate and research degrees. Become consultant and provide solutions to the practical problems of core organization.
- ❖ Become an entrepreneur and be part of electrical and electronics product and service industries.

PROGRAM OUTCOMES (POs)

- ❖ Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ❖ Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ❖ 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.
- ❖ 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.

❖ Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

❖ 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.

❖ 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.

❖ Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

❖ Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

❖ 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.

❖ 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 multidisciplinary environments.

❖ 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.

PROGRAM SPECIFIC OUTCOMES (PSOs)

❖ Ability to understand the principles and working of electrical components, circuits, systems and control that are forming a part of power generation, transmission, distribution, utilization, conservation and energy saving. Students can assess the power management, auditing, crisis and energy saving aspects.

❖ Ability to apply mathematical methodologies to solve problems related with electrical engineering using appropriate engineering tools and algorithms.

❖ Ability to use knowledge in various domains to identify research gaps and hence to provide solution which leads to new ideas and innovations.

COURSE OUTCOMES (COs)

Regulation	2021
Semester	01
Course Code	IP3151
Course Name	Induction Programme
Course Outcome	❖ To make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

Regulation	2021
Semester	01
Course Code	HS3151
Course Name	Professional English - I
Course Outcome	❖ To listen and comprehend complex academic texts. ❖ To read and infer the denotative and connotative meanings of technical texts. ❖ To write definitions, descriptions, narrations and essays on various topics. ❖ To speak fluently and accurately in formal and informal communicative contexts. ❖ To express their opinions effectively in both oral and written medium of communication.

Regulation	2021
Semester	01
Course Code	MA3151
Course Name	Matrices and Calculus
Course Outcome	❖ Use the matrix algebra methods for solving practical problems. ❖ Apply differential calculus tools in solving various application problems. ❖ Able to use differential calculus ideas on several variable functions.

	❖ Apply different methods of integration in solving practical problems.
	❖ Apply multiple integral ideas in solving areas, volumes and other practical problems.

Regulation	2021
Semester	01
Course Code	PH3151
Course Name	Engineering Physics
Course Outcome	❖ Understand the importance of mechanics. ❖ Express their knowledge in electromagnetic waves. ❖ Demonstrate a strong foundational knowledge in oscillations, optics and lasers. ❖ Understand the importance of quantum physics. ❖ Comprehend and apply quantum mechanical principles towards the formation of energy bands.

Regulation	2021
Semester	01
Course Code	CY3151
Course Name	Engineering Chemistry
Course Outcome	❖ To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water. ❖ To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications. ❖ To apply the knowledge of phase rule and composites for material selection requirements. ❖ To recommend suitable fuels for engineering processes and applications. ❖ To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

Regulation	2021
Semester	01
Course Code	GE3151
Course Name	Problem Solving and Python Programming
Course Outcome	❖ Develop algorithmic solutions to simple computational problems. ❖ Develop and execute simple Python programs. ❖ Write simple Python programs using conditionals and looping for solving problems. ❖ Decompose a Python program into functions. ❖ Represent compound data using Python lists, tuples, dictionaries etc. ❖ Read and write data from/to files in Python programs.

Regulation	2021
Semester	01
Course Code	GE3171
Course Name	Problem Solving and Python Programming Laboratory
Course Outcome	❖ Develop algorithmic solutions to simple computational problems. ❖ Develop and execute simple Python programs. ❖ Implement programs in Python using conditionals and loops for solving problems. ❖ Deploy functions to decompose a Python program. ❖ Process compound data using Python data structures. ❖ Utilize Python packages in developing software applications.

Regulation	2021
Semester	01
Course Code	BS3171
Course Name	Physics and Chemistry Laboratory
Course Outcome	❖ Understand the functioning of various physics laboratory equipment. ❖ Use graphical models to analyze laboratory data.

	❖ Use mathematical models as a medium for quantitative reasoning and describing physical reality.
	❖ Access, process and analyze scientific information.
	❖ Solve problems individually and collaboratively.
	❖ To analyze the quality of water samples with respect to their acidity, alkalinity, hardness.
	❖ To determine the amount of metal ions through volumetric and spectroscopic techniques.
	❖ To analyze and determine the composition of alloys.
	❖ To learn simple method of synthesis of nanoparticles.
	❖ To quantitatively analyse the impurities in solution by electro analytical techniques.

Regulation	2021
Semester	02
Course Code	HS3251
Course Name	Professional English - II
Course Outcome	❖ To compare and contrast products and ideas in technical texts.
	❖ To identify cause and effects in events, industrial processes through technical texts
	❖ To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.
	❖ To report events and the processes of technical and industrial nature.
	❖ To present their opinions in a planned and logical manner, and draft effective resumes in context of job search.

Regulation	2021
Semester	02
Course Code	MA3251
Course Name	Statistics and Numerical Methods
Course Outcome	❖ Apply the concept of testing of hypothesis for small and large samples in real

	life problems.
	❖ Apply the basic concepts of classifications of design of experiments in the field of agriculture.
	❖ Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
	❖ Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
	❖ Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

Regulation	2021
Semester	02
Course Code	PH3201
Course Name	Physics For Electrical Engineering
Course Outcome	❖ At the end of the course, the students should be able to ❖ know basics of dielectric materials and insulation. ❖ Gain knowledge on the electrical and magnetic properties of materials and their applications ❖ Understand clearly of semiconductor physics and functioning of semiconductor devices ❖ Understand the optical properties of materials and working principles of various optical devices ❖ Appreciate the importance of nanotechnology and nanodevices

Regulation	2021
Semester	02
Course Code	BE3255
Course Name	Basic Civil and Mechanical Engineering
Course Outcome	❖ Understanding profession of Civil and Mechanical engineering

	❖ Summarise the planning of building, infrastructure and working of Machineries.
	❖ Apply the knowledge gained in respective discipline
	❖ Illustrate the ideas of Civil and Mechanical Engineering applications.
	❖ Appraise the material, Structures, machines and energy

Regulation	2021
Semester	02
Course Code	EE3251
Course Name	Electric Circuit Analysis
Course Outcome	❖ After completing this course, the students will be able to: ❖ Explain circuit's behavior using circuit laws. ❖ Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit ❖ Compute the transient response of first order and second order systems to step and sinusoidal input ❖ Compute power, line/ phase voltage and currents of the given three phase circuit ❖ Explain the frequency response of series and parallel RLC circuits CO6: Explain the behavior of magnetically coupled circuits.
Regulation	2021
Semester	02
Course Code	GE3271
Course Name	Engineering Practices Laboratory
Course Outcome	❖ Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work. ❖ Wire various electrical joints in common household electrical wire work. ❖ Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple

	mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
	❖ Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

Regulation	2021
Semester	02
Course Code	EE3271
Course Name	Electric Circuits Laboratory
Course Outcome	• Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit (Ex 1) • Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin, Norton and maximum power transfer) for the given DC/AC circuit (Ex 2-5) • Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods (Ex 6) • Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods (Ex 7-8) • Analyze the performance of the given three-phase circuit using simulation and experimental methods (Ex 9)

Regulation	2021
Semester	02
Course Code	GE3251
Course Name	Engineering Graphics
Course Outcome	❖ On successful completion of this course, the student will be able to ❖ Use BIS conventions and specifications for engineering drawing. ❖ Construct the conic curves, involutes and cycloid. ❖ Solve practical problems involving projection of lines.

	❖ Draw the orthographic, isometric and perspective projections of simple solids.
	❖ Draw the development of simple solids.

Regulation	2021
Semester	03
Course Code	MA3303
Course Name	Probability And Complex Functions
Course Outcome	❖ Upon successful completion of the course, students will be able to:
	❖ Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
	❖ Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
	❖ To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.
	❖ To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.
	❖ To acquaint the students with Differential Equations which are significantly used in engineering problem

Regulation	2021
Semester	03
Course Code	EE3301
Course Name	Electromagnetic Fields
Course Outcome	❖ Upon the successful completion of the course, students will be able to:
	❖ Explain Gradient, Divergence, and Curl operations on electromagnetic vector fields.
	❖ Explain electrostatic fields, electric potential, energy density and their applications.
	❖ Calculate magneto static fields, magnetic flux density, vector potential

	❖ Explain different methods of emf generation and Maxwell's equations ❖ Explain the concept of electromagnetic waves and characterizing parameters
Regulation	2021
Semester	03
Course Code	EE3302
Course Name	Digital Logic Circuits
Course Outcome	❖ Upon the successful completion of the course, students will be able to: ❖ Explain various number systems and characteristics of digital logic families ❖ Apply K-maps and Quine McCluskey methods to simplify the given Boolean expressions ❖ Explain the implementation of combinational circuit such as multiplexers and de multiplexers - code converters, adders, subtractors, Encoders and Decoders ❖ Design various synchronous and asynchronous circuits using Flip Flops CO5: Explain asynchronous sequential circuits and programmable logic devices ❖ Use VHDL for simulating and testing RTL, combinatorial and sequential circuits

Regulation	2021
Semester	03
Course Code	EC3301
Course Name	Electron Devices And Circuits
Course Outcome	❖ Upon successful completion of the course, the students will be able to: ❖ Explain the structure and operation of PN junction devices (diode, Zener diode, LED and Laser diode) ❖ Design clipper, clamper, half wave and full wave rectifier, regulator circuits using PN junction diodes ❖ Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT ❖ Analyze the performance of various configurations of BJT and MOSFET based amplifier

	❖ Explain the characteristics of MOS based cascade and differential amplifier
	❖ Explain the operation of various feedback amplifiers and oscillators

Regulation	2021
Semester	03
Course Code	EE3303
Course Name	Electrical Machines - I
Course Outcome	❖ At the end of the course students will be able to: ❖ Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems. ❖ Explain the construction and working principle of DC machines ❖ Interpret various characteristics of DC machines. ❖ Compute various performance parameters of the machine, by conducting suitable tests. ❖ Draw the equivalent circuit of transformer and predetermine the efficiency and regulation. ❖ Describe the working principle of auto transformer, three phase transformer with different types of connections.

Regulation	2021
Semester	03
Course Code	CS3353
Course Name	C Programming And Data Structures
Course Outcome	❖ Develop C programs for any real world/technical application. ❖ Apply advanced features of C in solving problems. ❖ Write functions to implement linear and non–linear data structure operations. ❖ Suggest and use appropriate linear/non–linear data structure operations for solving a given problem. ❖ Appropriately use sort and search algorithms for a given application.

	❖ Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

Regulation	2021
Semester	03
Course Code	EC3311
Course Name	Electronic Devices And Circuits Laboratory
Course Outcome	❖ Upon successful completion of the course, the students will be able to: ❖ Analyze the characteristics of PN, Zener diode and BJT in CE,CC,CB configurations experimentally ❖ Analyze the characteristics of JFET and UJT experimentally ❖ Analyze frequency response characteristics of a Common Emitter amplifier experimentally ❖ Analyze the characteristics of RC phase shift and LC oscillators experimentally ❖ Analyze the characteristics of half-wave and full-wave rectifier with and without filters experimentally ❖ Analyze the characteristics of FET based differential amplifier experimentally ❖ Calculate the frequency and phase angle using CRO experimentally ❖ Analyze the frequency response characteristics of passive filters experimentally

Regulation	2021
Semester	03
Course Code	EE3311
Course Name	Electrical Machines Laboratory - I
Course Outcome	❖ At the end of the course students will be able to: ❖ Construct the circuit with appropriate connections for the given DC

	machine/transformer.
	❖ Experimentally determine the characteristics of different types of DC machines.
	❖ Demonstrate the speed control techniques for a DC motor for industrial applications.
	❖ Identify suitable methods for testing of transformer and DC machines.
	❖ Predetermine the performance parameters of transformers and DC motor.
	❖ Understand DC motor starters and 3-phase transformer connections

Regulation	2021
Semester	03
Course Code	CS3362
Course Name	C Programming And Data Structures Laboratory
Course Outcome	❖ At the end of the course, the students will be able to: ❖ Use different constructs of C and develop applications ❖ Write functions to implement linear and non-linear data structure operations ❖ Suggest and use the appropriate linear / non-linear data structure operations for a given problem ❖ Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval ❖ Implement Sorting and searching algorithms for a given application

Regulation	2021
Semester	04
Course Code	GE3451
Course Name	Environmental Sciences And Sustainability
Course Outcome	❖ Gain knowledge about environment and ecosystem. ❖ Students will learn about natural resource, its importance and environmental impacts of human activities on natural resource.

	❖ Gain knowledge about the conservation of biodiversity and its importance.
	❖ Aware students about problems of environmental pollution, its impact on human and ecosystem and control measures.
	❖ Students will learn about increase in population growth and its impact on environment.

Regulation	2021
Semester	04
Course Code	EE3401
Course Name	Transmission And Distribution
Course Outcome	❖ On the successful completion of the course, students will be able to: ❖ Understand the structure of power system, computation of transmission line parameter for different configurations and the impact of skin and proximity effects. ❖ Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance. ❖ Do Mechanical design of transmission lines, grounding and to understand about the insulators in transmission system. ❖ Design the underground cables and understand the performance analysis of underground cable. ❖ Understand the modelling, performance analysis and modern trends in distribution system

Regulation	2021
Semester	04
Course Code	EE3402
Course Name	Linear Integrated Circuits
Course Outcome	❖ Upon successful completion of the course, the students will be able to: Explain monolithic IC fabrication process ❖ Explain the fabrication of diodes, capacitance, resistance, FETs and PV Cell.

	❖ Analyze the characteristics and basic applications (inverting/non-inverting amplifier, summer, differentiator, integrator, V/I and I/V converter) of Op-Amp
	❖ Explain circuit and applications of op-amp based instrumentation amplifier, log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converters
	❖ Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs
	❖ Explain the applications of ICs in Instrumentation amplifier, fixed and variable voltage regulator,SMPS and function generator

Regulation	2021
Semester	04
Course Code	EE3403
Course Name	Measurements And Instrumentation
Course Outcome	❖ Upon successful completion of the course, the students should have the: ❖ Ability to understand the fundamental art of measurement in engineering. ❖ Ability to understand the structural elements of various instruments. ❖ Ability to understand the importance of bridge circuits. ❖ Ability to understand about various transducers and their characteristics by experiments. ❖ Ability to understand the concept of digital instrumentation and virtual instrumentation byexperiments.

Regulation	2021
Semester	04
Course Code	EE3404
Course Name	Microprocessor And Microcontroller
Course Outcome	❖ Upon successful completion of the course, the students should have the:

	❖ Ability to write assembly language program for microprocessor and microcontroller
	❖ Ability to design and implement interfacing of peripheral with microprocessor and
	❖ microcontroller
	❖ Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring.
	❖ Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.
	❖ Ability to understand and appreciate advanced architecture evolving microprocessor field

Regulation	2021
Semester	04
Course Code	EE3405
Course Name	Electrical Machines - II
Course Outcome	❖ Upon the successful completion of the course, students will have the: ❖ Ability to understand the construction and working principle of Synchronous generator ❖ Ability to understand the construction and working principle of Synchronous Motor ❖ Ability to understand the construction and working principle of Three Phase Induction Motor ❖ Acquire knowledge about the starting and speed control of induction motors. ❖ To gain knowledge about the basic principles and working of Single phase induction motors andSpecial Electrical Machines

Regulation	2021
Semester	04
Course Code	EE3411
Course Name	Electrical Machines Laboratory - Ii

Course Outcome	❖ At the end of the course, the student should have the:
	❖ Ability to understand and analyze EMF and MMF methods
	❖ Ability to analyze the characteristics of V and Inverted V curves
	❖ Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines
	❖ Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors
	❖ Ability to acquire knowledge on separation of losses

Regulation	2021
Semester	04
Course Code	EE3412
Course Name	Linear And Digital Circuits Laboratory
Course Outcome	❖ At the end of the course, the student should have the:
	❖ Ability to understand and implement Boolean Functions.
	❖ : Ability to understand the importance of code conversion
	❖ Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register.
	❖ Ability to acquire knowledge on Application of Op-Amp
	❖ Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters

Regulation	2021
Semester	04
Course Code	EE3413
Course Name	Microprocessor And Microcontroller Laboratory
Course Outcome	❖ After studying the above subject, students should have the:
	❖ Ability to design and implement combinational logic circuits and to analysis

	simple sequential logic circuits.
	❖ Ability to write assembly language program for microprocessor and microcontroller
	❖ Ability to design and implement interfacing of peripheral with microprocessor and
	❖ microcontroller
	❖ Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring..
	❖ Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring