Department of Electrical & Electronics Engineering

Bachelor of Technology in Electrical & Electronics Engineering

Program Outcomes

POs:

[PO.1]. Engineering knowledge: An ability to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to get the solution of the engineering problems.

[PO.2]. Problem analysis: Ability to Identify, formulates, review research literature, and analyze complex engineering problems.

[PO.3]. Design/Development of Solutions: Ability to design solutions for complex Engineering Problems by considering social, Economical and Environmental aspects.

[PO.4]. Conduct investigations of complex problems: Use research-based knowledge to design, conduct analyse experiments to get valid conclusion.

[PO.5]. Modern tool usage: ability to create, select, and apply appropriate techniques, and to model complex engineering activities with an understanding of the limitations.

[PO.6]. The engineer and society: Ability to apply knowledge by considering social health, safety, legal and cultural issues.

[PO.7]. Environment and sustainability: Understanding of the impact of the adopted engineering solutions in social and environmental contexts.

[PO.8]. Ethics: Understanding of the ethical issues of the civil engineering and applying ethical principles in engineering practices.

[PO.9]. Individual and teamwork: Ability to work effectively as an individual or in team, as a member or as a leader.

[PO.10]. Communication: An ability to communicate clearly and effectively through different modes of communication.

[PO.11]. Project management and finance: Ability to handle project and to manage finance related issue.

[PO.12]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning.

Department of Electrical & Electronics Engineering

Program Specific Outcomes

PSOs:

[PSO.1]. Specify & analyze: An ability to identify, specify and analyze systems that inefficiently deliver technological solution in electrical & electronics engineering

[PSO.2]. Design/development of solutions: Design solutions for complex electronics engineering problem & design system components or processes that meet the specified needs with appropriate consideration for the public health & safety, & the cultural, society & environmental considerations.

[PSO.3]. Modern tool usage: Create, select, & apply appropriate electrical techniques, resources & modern engineering including prediction & modeling to complex electrical systems with an understanding of the limitations & short comes.

[PSO.4]. Demonstrate & communicate: Ability to demonstrate the knowledge, skill to analyze the cause and effect on Electrical systems & processes & communicate effectively with society at large, such as, being able to comprehend & write effective reports & design documentation, make effective presentations & give & receive clear instructions.

Semester I

Department of Electrical & Electronics Engineering

Subject: Engineering Chemistry
Code: BTE22011
3 Credits | Semester 1

Course Outcomes: At the end of the course, students will be able to:

[CO1] Understand the skills required to succeed in graduate school, the chemical industry or professional school.
[CO2] Acquire a foundation of chemistry of sufficient breadth and depth to enable them to understand and critically interpret the primary chemical literature.
[CO3] Recognize the exigency and importance of engineering chemistry in the use of industrial and domestic determination.
[CO4] Design economically and new methods of synthesis of new materials and apply their knowledge for protection of environment and application in their field.
[CO5] Understand an insight into latest (R&D oriented) topics, to enable the engineering student upgrade the existing technologies and pursue further research.

Subject: Engineering Mathematics–I
Code: BTE21001
Credit - 4 | Semester 1

Course Outcomes: At the end of the course, students will be able to:

[CO1] Remember the differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications, they will have a basic Understand of Beta and Gamma functions.
[CO2] Understand the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
[CO3] Demonstrate the tool of power series and Fourier series for learning advanced Engineering Mathematics.
[CO4] Analyze functions of several variables that is essential in most branches of engineering
[CO5] Evaluate the essential tool of matrices and linear algebra in a comprehensive manner.

Department of Electrical & Electronics Engineering

Subject: Basic Electrical Engineering
Code: BTE21003
Credits- 4 | Semester 1

Course Outcomes: At the end of the course, students will be able to:

[CO1] Understand the basic knowledge of electrical quantities such as current, voltage, power, energy and frequency
[CO2] Predict the behavior of any electrical and magnetic circuits.
[CO3] Formulate and solve complex AC, DC circuits.
[CO4] Identify the type of electrical machine used for that particular application.
[CO5] Realize the requirement of transformers in transmission and distribution of electric power and other applications.

Subject: Engineering Mechanics
Code: BTE22009
Credits- 3 | Semester I

Course Outcomes: At the end of the course, students will be able to:

[CO1] Identify the force systems for given conditions by Apply the basics of mechanics.
[CO2] Determine unknown force(s) of different engineering systems.
[CO3] Apply the principles of friction in various conditions for useful purposes.
[CO4] Find the centroid and center of gravity of various components in engineering systems.
[CO5] Select the relevant simple lifting machine(s) for given purposes.

Department of Electrical & Electronics Engineering

Subject: Engineering Chemistry Lab
Code: BTE22015
Credits- 1 | Semester I

Course Outcomes: At the end of the course, students will be able to:

[CO1] Understand the principles of chemistry relevant to the study of science and engineering

[CO2] Estimate rate constants of reactions from concentration of reactants/products as a function of time

[CO3] Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.

[CO4] Differentiate hard and soft water, solve the related numerical problems on water purification and its significance in industry and daily life.

Subject: Basic Electrical Engineering Lab
Code: BTE21005
Credits- 1 | Semester I

Course Outcomes: At the end of the course, students will be able to:

[CO1] Understand different meters and instruments for measurement of electrical quantities

[CO2] Understand the linear and nonlinear characteristics of different types of loads experimentally

[CO3] Design and experiment potential divider circuits

[CO4] Experimentally verify the basic circuit theorems

[CO5] Measure power and power factor in ac circuits

Department of Electrical & Electronics Engineering

Subject: Engineering Mechanics Lab
Code: BTE22013
Credits- 1 | Semester I

Course Outcomes: At the end of the course, students will be able to:

[CO1] Identify the force systems for given conditions by Apply the basics of mechanics.

[CO2] Determine unknown force(s) of different engineering systems.

[CO3] Apply the principles of friction in various conditions for useful purposes.

[CO4] Find the centroid and centre of gravity of various components in engineering systems.

[CO5] Select the relevant simple lifting machine(s) for given purposes.

Subject: Engineering Graphics & Design
Code: BTE21004
Credits- 2 | Semester I

Course Outcomes: At the end of the course, students will be able to:

[CO1] Perform basic sketching techniques
[CO2] Understand of architectural and engineering scales will increase.
[CO3] Draw orthographic projections and sections.
[CO4] Draft the engineered drawings in practical application
[CO5] Become familiar with office practice and standards.

Semester II

Department of Electrical & Electronics Engineering

Subject: Engineering Physics
Code: BTE22010
4 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to:

[CO1] Identify and understand the kinds of experimental results, which are incompatible with classical Physics leading to the development of a quantum theory of matter and light.
[CO2] Use basic concepts to Analyze and design a wide range of semiconductor devices.
[CO3] Understand & solve different types of wave equations.
[CO4] Use the principles of optics to solve various complex engineering problems.
[CO5] Use fundamental laws and relations to solve problems in electricity, electromagnetism.

Subject: Engineering Mathematics –II
Code: BTE22008
4 Credits |Semester II

Course Outcomes: At the end of the course,

[CO1] Remember the mathematical tools needed in Evaluate the multiple integrals and their usage.
[CO2] Understand the effective mathematical tools for the solutions of differential equations that model physical processes.
[CO3] Demonstrate the tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems
[CO4] Calculate the analytic function.
[CO5] Evaluate complex integrals by using Cauchy-Goursat integral theorem.

Department of Electrical & Electronics Engineering

Subject: Programming for Problem Solving
Code: BTE21259
3 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to:

[CO1] Formulate simple algorithms for arithmetic and logical problems.

[CO2] Test and execute the programs and correct syntax and logical errors and to implement conditional branching, iteration and recursion

[CO3] Apply programming to solve matrix addition and multiplication problems and searching and sorting problems.

[CO4] Use arrays, pointers and structures to formulate algorithms and programs

[CO5] Decompose a problem into functions and synthesize a complete program using divide and conquer approach.

[CO6] Understand various types of files and operations on them

English for Communication
Code: BTE22370
3 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to:

[CO1] Understand the basic of the communication and represent communication process and to know the practical implementations in the work place.

[CO2] Understand verbal and non-verbal modes of communication effectively in practical situations

[CO3] Analyze vocalics and basic grammar.

[CO4] Create competence in reading and writing.

[CO5] Evaluate speaking process.

Department of Electrical & Electronics Engineering

Subject: Constitution of India
Code: BTE25095
0 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to

[CO1] Understand the emergence and evolution of Indian Constitution. Understand and analyse federalism in the Indian context

[CO1] Understand and explain the significance of Indian Constitution as the fundamental law of the land.

[CO2]. Exercise his fundamental rights in proper sense at the same time identifies his responsibilities in national building.

[CO3] Analyse the Indian political system, the powers and functions of the Union, State and Local Governments in detail

[CO4] Understand Electoral Process, Emergency provisions and Amendment procedure.

Subject: Engineering Physics Lab
Code: BTE21261
1 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to

[CO1] Understand calculation of specific resistance of wire by Carey Foster bridge
[CO2] Calculate thermal conductivity of poor conductors
[CO3] Measure resonance frequency and quality factor of LCR Circuit & RC circuit with AC current
[CO4] Understand the characteristics of transistors, photoelectric cells and determine operational parameters associated with their performance.
[CO5] Work with laboratory sodium light and lasers. Understand method to measure the wavelength of the light emitted from a laser and Sodium light.

Department of Electrical & Electronics Engineering

Subject: Programming for Problem Solving Lab
Code: BTE21262
Credits- 2 | Semester II

Course Outcomes: At the end of the course, students will be able to;

[CO1] Formulate simple algorithms for arithmetic and logical problems. To translate the algorithms to programs (in C language).To test and execute the programs and correct syntax and logical errors.

[CO2] Program for solving simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

[CO3] Decompose a problem into functions and synthesize a complete program using divide and conquer approach.

[CO4] Analyze the complexity of problems, modularize the problems into small modules and then convert them into programs.

Subject: Engineering Workshop Practice
Code: BTE22267
2   Credits | Semester II

Course Outcomes: At the end of the course, students will be able to;

[CO1] Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment's and machines

[CO2] Understand job drawing and complete jobs as per specifications in allotted time

[CO3] Inspect the job for the desired dimensions and shape

[CO4] Operate, control different machines and equipment's adopting safety practices

Semester III

Department of Electrical & Electronics Engineering

Subject: Electrical Circuit Analysis
Code: BTE23379
3 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify the characteristics of circuit elements.
[CO2] Demonstrate the resonance in R-L-C series circuit.
[CO3] Apply network theorems for the analysis of electrical circuits.
[CO4] Analyze two port circuit behavior.
[CO5] Evaluate circuit parameters in the sinusoidal steady state (single-phase and three-phase) condition.
[CO6] Generate the transient and steady state response of electrical circuits.

Subject: Electromagnetic Fields
Code: BTE24075
4 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

[CO1] Recall the basic laws of electromagnetism.
[CO2] Understand the propagation of EM waves
[CO3] Apply Maxwell's equation in different forms and different media.
[CO4] Analyze time varying electric and magnetic fields.
[CO5] Interpret the electric and magnetic fields for simple configurations under static conditions.
[CO6] Design various devices that can work based on the forces generated by electric and magnetic fields.

Department of Electrical & Electronics Engineering

Analog Electronics
Code: BTE23380
3 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

[CO1] Recall the characteristics of transistors.

[CO2] Understand the functioning of OP-AMP and design OP-AMP based circuits.

[CO3] Develop design competence in the area of discrete feedback amplifiers.

[CO4] Analyze various rectifier and amplifier circuits.

[CO5] Judge commonly used linear and non-linear applications of OP-AMP and Comparators.

[CO6] Design competence in linear and non-linear OP-AMP Circuits.

Engineering Mathematics – III
Code: BTE23046
4 Credits | Semester III

COURSE OUTCOMES: By the end of this course, students will be able to:

[CO 1] Recall about statistical parameter estimation.

[CO 2] Understand the difficulty of solving problems analytically and the need to use numerical approximations for their resolution.

[CO 3] Solve the problems choosing the most suitable method.

[CO 4] Analyze the fundamental concepts of Probability, and the basic numerical methods for their resolution.

[CO 5] Evaluate solution using computational tools and applications of basic and applied statistics.

[CO 6] Formulate about regression and correlation analysis.

Department of Electrical & Electronics Engineering

Electrical Machines-I
Code: BTE23041
4 Credits | Semester III

COURSE OUTCOMES: By the end of this course, students will be:

[CO.1] Recognize the concepts of magnetic circuits.
[CO.2] Understand the operation of dc machines.
[CO.3] Analyze single phase and three phase transformer circuits.
[CO.4] Compare the differences in operation of different dc machine configurations.
[CO.5] Evaluate performance parameters for transformer.
[CO.6] Formulate the equation to find efficiency of transformer.

Subject: Environmental Science
Code: BTE24085
0   Credits | Semester III

COURSE OUTCOMES: By the end of this course, students will be:

[CO1] Define the ecosystem and terminology related.
[CO2] Understand the water and soil pollution, and control measures and act.
[CO3] Solve various engineering problems applying ecosystem knowledge to produce eco – friendly products.
[CO4] Compare different renewable energy resources and efficient process of harvesting.
[CO5] Estimate the suitable air, extent of noise pollution, and control measures and acts.
[CO6] Build relationships between natural resources, consumption, population, economics of consumerism, etc in an environmental context.

Department of Electrical & Electronics Engineering

Electrical Circuit Analysis Lab
Code: 23270
1 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

[CO1] Recall practical implications of the fundamentals of Ohm's law, Kirchhoff's current and voltage laws.

[CO2] Understand the operation of DSO to measure the frequency, and amplitude of any signal.

[CO3] Carry out practical implementation of the fundamental electrical theorems and modeling of simple electrical systems.

[CO4] Classify the DC analysis, Transient analysis and Frequency analysis of a given circuit depending on types of elements.

[CO5] Measure the voltage, current, power and impedance of any circuit.

[CO6] Design a suitable series R-L-C circuit to operate at resonance condition.

Electrical Machines Lab-I
Code: BTE23043
1 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

[CO1] Recall the fundamental principles and classification of electromagnetic machines.

[CO2] Understand the constructional details and principle of operation of dc machines.

[CO3] Apply the knowledge about testing and find performance characteristics of dc machines.

[CO4] Analyze by conducting various tests on transformers and obtaining their performance indices using standard analytical as well as graphical methods.

[CO5] Acquire knowledge about the constructional details, principle of operation, testing and applications of transformers.

[CO6] Formulate equivalent circuit parameters for various machines.

Department of Electrical & Electronics Engineering

Analog Electronics Lab
Code: BTE23381
1   Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

[CO1] Acquire basic knowledge of physical and electrical conducting properties of semiconductors.

[CO2] Understand the characteristics of different semiconductor devices like diode, BJT, FET, UJT, etc. experimentally

[CO3] Develop the ability to understand the design and working of BJT / FET amplifiers.

[CO4] Analyze the effect of negative feedback on different parameters of an Amplifier and different types of negative feedback topologies.

[CO5] Develop the skill to build, and troubleshoot Analog circuits.

[CO6] Design amplifier circuits using BJT s and FET's and observe the amplitude and frequency responses of common amplifier circuits.

Semester IV

Electrical Machines-II
Code: BTE24072
4 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

[CO1] Recognize different electrical machine.

[CO2] Understand the operation of ac machines.

[CO3] Apply the concepts of rotating magnetic fields to find characteristics of Induction motor.

[CO4] Ability to conduct experiments on Ac Machines to find the Characteristics.

[CO5] Evaluate performance characteristics of ac machines.

[CO6] Modify the characteristics of operation of Synchronous motor.

Digital Electronics
Code: BTE23029
3 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify the fundamental concepts and techniques used in digital electronics.

[CO2] Understand the process of Analog to Digital conversion and Digital to Analog conversion.

[CO3] Apply the defined technique to structure various number systems.

[CO4] Examine the structure of various number systems and its application in digital design.

[CO5] Interpret the use of PLDs to implement the given logical problem.

[CO6] Design and implement Combinational and Sequential logic circuits.

Department of Electrical & Electronics Engineering

Power Electronics
Code: BTE25111
4 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

[CO1] Recall the operation of DC-DC choppers.

[CO2] Understand the differences between signal level and power level devices.

[CO3] Apply the concept of commutation to turn off converter circuits.

[CO4] Analyze the operation of voltage source inverters.

[CO5] Choose suitable power electronic devices by assessing the requirements of application fields.

[CO6] Design and implement Combinational and Sequential logic circuits.

Signals and Systems
Code: BTE25112
3 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

[CO1] Recognize sampling theorem and its implications.

[CO2] Understand the concepts of continuous time and discrete time systems.

[CO3] Solve systems in complex frequency domain.

[CO4] Analyze the discrete time signals and system using different transform domain techniques.

[CO5] Evaluate the various signal responses.

[CO6] Design and implement LTI filters for filtering different real world signals.

Department of Electrical & Electronics Engineering

Subject: Biology for Engineers
Code: BTE23018
2   Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to
[CO1] Understand the biological concepts from an engineering perspective
[CO2] Understand the concepts of biological sensing and its challenges
[CO3] Understand development of artificial systems mimicking human action
[CO4] Integrate biological principles for developing next generation technologies

Essence of Indian Knowledge Tradition
Code: BTE25095
0 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

[CO1] Label thought process, reasoning and inferencing.
[CO2] Understand the Indian Knowledge Systems and Indian perspective of modern scientific world-view.
[CO3] Focus on Indian philosophical traditions, Indian linguistic tradition and Indian artistic tradition.
[CO4] Understand, connect up and explain basics of Indian Traditional knowledge modern scientific perspective.
[CO5] Assess basic principles of Yoga and holistic health care systems
[CO6] Generate awareness to Indian society for historic Indian culture.

Department of Electrical & Electronics Engineering

Electrical Machines II Lab
Code: BTE24077
1 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

[CO1] Recognize constructional details and principle of operation of alternators.
[CO2] Explain about the working of synchronous machines as generators and motors.
[CO3] Apply the knowledge about testing and applications of synchronous machines.
[CO4] Analyze the principle of operation of three phase and single-phase induction motors.
[CO5] Evaluate performance indices by performing various tests on induction machine.
[CO6] Elaborate about the starting and speed control of induction motors.

Digital Electronics Lab
Code: BTE23035
1Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify combinational circuit
[CO2] Explain basic concept of logic circuits.
[CO3] Apply half and full adders to perform
[CO4] Analyze the operation of counters and registers.
[CO5] Interpret use of flip-flops& memory units.
[CO6] Design various gates.

Department of Electrical & Electronics Engineering

Power Electronics Lab
Code: BTE25115
1 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

[CO1] Select power electronic devices for specific applications.

[CO2] Understand industrial control circuits.

[CO3] Apply troubleshoot for turn-on and turn-off circuits of Thyristors.

[CO4] Analyze performance of phase-controlled rectifiers.

[CO5] Estimate the performance of Thyristors.

[CO6] Design the control strategies for various converters.

Semester V

Department of Electrical & Electronics Engineering

Power Systems-I
Code: BTE25382
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify and explain the different methods of generation, distribution, control and compensation involved in the operation of power systems.

[CO2] Design the mathematical models of the mechanical and electrical components involved in the operation of power systems and demonstrate the understanding of the open loop and closed loop control practices associated with the voltage and frequency control of single area or interconnected multi area power systems.

[CO3] Specify the equivalent electrical parameters of transmission line to prepare and analyze models to predict the range and ratings of the equipments to be used, the protection required against line transients and determine the appropriate methods of compensation required for operational stability.

[CO4] Solve the problems related to the economic dispatch of power, plant scheduling, unit commitment and formulate strategies to minimize transmission line losses and penalties imbibed.

[CO5] Design protection schemes required for the system to safeguard against faults after identifying and determining the severity of the faults occurring during the period of operation and design testing strategies to determine the performance characteristics of the compensating equipment to be used in the system.

[CO6] Assess the different methods of control and compensation to choose the best option so that social and environmental problems are minimized and recognize the need to continuously follow the advancements in technology and incorporate them in the present system to improve efficiency and increase the flexibility and quality of operation.

Department of Electrical & Electronics Engineering

Control Systems
Code: BTE26154
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Learn the features of different types of compensators & to design compensators using time- domain and frequency domain specifications.

[CO2] Understand the modelling of linear-time-invariant systems using transfer function and state-space representations.

[CO3] Apply the concept of stability and its assessment for linear-time invariant systems.

[CO4] Analyse the system response and stability of systems represented in state space form and to design compensators for systems modelled in state space form.

[CO5] Obtain models of dynamic systems in transfer function and state space forms.

[CO6] Model and to analyse the response of discretized systems.

Microprocessors
Code: BTE25100
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Learn configuring and using different peripherals in a digital system like I/O, A/D, D/A, timer etc.

[CO2] Understand the working of a microprocessor/microcontroller.

[CO3] Compile and debug a Program.

[CO4] Generate an executable file and use it.

[CO5] Evaluating logic of particular dedicated task.

[CO6] Develop systems using different microprocessor/ microcontrollers.

Department of Electrical & Electronics Engineering

Electrical Energy Conservation and Auditing
Code: BTE25286
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Acquire the knowledge of fundamentals of economic operation of an electrical system.

[CO2] Understand the concepts of energy management.

[CO3] Apply the methods of improving energy efficiency in different electrical systems.

[CO4] Analyse the concept of Transformer loading and Feeder loss evaluation methods, scheme for reactive power management, energy efficient illumination system.

[CO5] Choose efficient control strategies, optimal selection, sizing, operation of variable speed drives like pumps and fans.

[CO6] Create innovative energy conservation measures and optimal operation methods for electric load like air conditioning, refrigeration, gysers-solar water heaters, compressors, electrolytic process.

Electrical Machine Design
Code: BTE25114
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] List the constructional parts and performance characteristics of electrical machines.

[CO2] Understand the various factors that influence the design: electrical, magnetic and thermal loading of electrical machines

[CO3] Apply the principles of electrical machine design and carry out a basic design of an AC machine.

[CO4] Discover software tools to do design calculations.

[CO5] Interpret the information required for the fabrication of the alternator with an estimate of various performance indices.

[CO6] Generate a detailed design of an induction machine and provide the information required for the fabrication of the same along with an estimate of various performance indices.

Industrial Electrical Systems
Code: BTE25287
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Recognize the fundamentals of electrical Installations like requirements, design considerations, testing, estimating and costing.

[CO2] Understand various components of industrial electrical systems.

[CO3] Utilize design procedure, estimation and costing method, safety aspect of electrical installation in a commercial building, hospital, industries.

[CO4] Analyze and select the proper size of various electrical system components.

[CO5] Interpret design procedure, estimation and costing methods of outdoor and indoor substations.

[CO6] Formulate designing aspect of earthing system and lightning protection scheme.

Electronic Devices
Code: BTE25288
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Acquire the knowledge of principles of semiconductor Physics.

[CO2] Understand and utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.

[CO3] Develop analysis capability in BJT and FET Amplifier Circuits.

[CO4] Distinguish competence in frequency response analysis of discrete amplifiers.

[CO5] Interpret design competence in signal and power amplifiers using BJT and FET.

[CO6] Design trade-offs in various digital electronic families with a view towards reduced power consumption.

Department of Electrical & Electronics Engineering

Strength of Materials
Code: BTE25289
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Recognize various types loads applied on machine components of simple geometry and understand the nature of internal stresses that will develop within the components.

[CO2] Demonstrate the stress and strain relationship and also distinguish the determinate an indeterminate structures.

[CO3] Solve deflection of beams under various loading condition.

[CO4] Analyse the shear force and bending moment diagrams for various beams.

[CO5] Evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.

[CO6] Predict principle stresses, knowledge of calculating deformation in thin cylindrical and spherical shells.

Data Structures and Algorithms
Code: BTE25290
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Recall basic terminologies related to Data Structures.

[CO2] Compare Graph search and traversal algorithms and determine the time and computation complexity.

[CO3] Model an algorithm for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.

[CO4] Analyze the algorithms to determine the time and computation complexity and justify the correctness.

[CO5] Interpret a given problem of Stacks, Queues and linked list and analyze the same to determine the time and computation complexity.

[CO6] Formulate solution for a given Search problem (Linear Search and Binary Search).

Department of Electrical & Electronics Engineering

Professional Practice, Law & Ethics
Code: BTE25299
3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Understand what constitutes professional practice, introduction of various stakeholders and their respective roles; understanding the fundamental ethics governing the profession.

[CO2] Compare into contracts and contracts management in engineering, dispute resolution mechanisms; laws governing engagement of labor.

[CO3] Apply the understanding of Intellectual Property Rights, Patents.

[CO4] Distinguish various constitutional laws & ethics.

[CO5] Justify the types of roles they are expected to play in the society as practitioners of the engineering profession.

[CO6] Build good ideas of the legal and practical aspects of their profession.

Power Systems-I Lab
Code: BTE25291
1Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify the different types of faults.

[CO2] Understand basic protection schemes.

[CO3] Apply the protection schemes for different power system components.

[CO4] Distinguish various types of existing relays, their design, constructional details & operations.

[CO5] Evaluate PSM & TSM for different relays.

[CO6] Modify the operating time of relay for different time-current characteristics.

Department of Electrical & Electronics Engineering

Control Systems Lab
Code: BTE25292
1Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Characterize a system and find its state behavior.
[CO2] Illustrate type & order of different kind of systems.
[CO3] Investigate stability of a system using different tests.
[CO4] Discover different controller responses.
[CO5] Estimate response for different signal inputs for various systems.
[CO6] Design a Lead compensator and to obtain the characteristics by experiment and simulation using MATLAB

Microprocessors Lab
Code: BTE25293
1Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify features in Proteus & Keil Softwares.
[CO2] Explain the program features of the Microcontroller based application.
[CO3] Develop C- language program & assembly language program.
[CO4] Compile and debug a Program.
[CO5] Justify different peripherals used in digital systems.
[CO6] Generate an executable file and use it.

Semester VI

Power Systems – II
Code: BTE26383
3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Recognize the basics of power system economics.
[CO2] Understand the monitoring and control of a power system.
[CO3] Apply the methods to control the voltage, frequency and power flow.
[CO4] Analyze the stability constraints in a synchronous grid.
[CO5] Estimate the steady state parameters of power system using various numerical methods.
[CO6] Formulate load flow & short circuit calculations.

Measurements and Instrumentation
Code: BTE26303
3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Understanding the working of various electrical bridges.
[CO2] Understanding the construction and working of various measuring instruments.
[CO3] Apply the energy conversion techniques.
[CO4] Analyze the different types of errors in measurement, calibration process and standards.
[CO5] Interpret the methods for measurement of non-electrical quantities like temperature, Pressure, Force, Torque, Density, Liquid level, Viscosity, Flow, Displacement etc.
[CO6] Improve the existing technology in the field of measurements in terms of accuracy, cost, and durability and user friendliness.

Department of Electrical & Electronics Engineering

Digital Signal Processing
Code: BTE26155
3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Represent signals mathematically in continuous and discrete-time, and in the frequency domain.

[CO2] Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms.

[CO3] Apply digital signal processing for the analysis of real-life signals.

[CO4] Analyze discrete-time systems using z-transform.

[CO5] Estimate the response parameters for digital filters.

[CO6] Design digital filters for various applications.

Control Systems Design
Code: BTE26304
3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify the different controllers.

[CO2] Understand various design specifications.

[CO3] Apply the controllers to satisfy the desired design specifications using simple controller structures (P, PI, PID, compensators).

[CO4] Analyse the response of nonlinear systems.

[CO5] Evaluate the response parameters of a given linear system.

[CO6] Design controllers using the state-space approach.

Department of Electrical & Electronics Engineering

Line-Commutated and Active Rectifiers
Code: BTE26305
3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify different types of semiconductor devices available & their characteristics.
[CO2] Understand the operation of line-commutated rectifiers – 6 pulse and multi-pulse
configurations.
[CO3] Apply the required strategy for commutation of semiconductor devices.
[CO4] Analyze the working of PWM rectifiers – operation in rectification and regeneration modes and lagging, leading and unity power factor mode.
[CO5] Evaluate the ripple factor for controlled rectifiers.
[CO6] Design a multi pulse converter.

High Voltage Engineering
Code: BTE26153
3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify the tests on H. V. equipment and on insulating materials, as per the standards.
[CO2] Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials.
[CO3] Utilize the concept of generation and measurement of D. C., A.C., & Impulse voltages.
[CO4] Analyze the causes for rise of over-voltages in a power system, and protection against these over voltages.
[CO5] Evaluate the system parameters for over voltages due to lightning.
[CO6] Design of insulation levels of various parts of power system.

Department of Electrical & Electronics Engineering

Electromagnetic Waves
Code: BTE26306
3Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Visualize TE and TM mode patterns of field distributions in a rectangular wave-guide.
[CO2] Understand the concept of radiation by antennas.
[CO3] Provide solution to real life plane wave problems for various boundary conditions.
[CO4] Analyze the field equations for the wave propagation in special cases such as lossy and low loss dielectric media.
[CO5] Estimate voltage and current at any point on transmission line for different load conditions.
[CO6] Formulate the problems involving lossy media with planar boundaries using uniform plane waves.

Wavelet Transforms
Code: BTE26307
3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Understand about wavelet packets
[CO2] Classify wavelet basis and characterize continuous and discrete wavelet transforms
[CO3] Implement discrete wavelet transforms with multirate digital filters.
[CO4] Analyze multi-resolution analysis and identify various wavelets and evaluate their time- frequency resolution properties.
[CO5] Evaluate a signal using windowed Fourier transform and differentiate between windowed Fourier transform and wavelet transform.
[CO6] Design certain classes of wavelets to specification and justify the basis of the application of wavelet transforms to different fields.

Department of Electrical & Electronics Engineering

Internet of Things
Code: BTE27323
3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify various tools and have basic implementation skills.
[CO2] Understand of various aspect of Internet of Things (IoT)
[CO3] Use real IoT protocols for communication.
[CO4] Analyze the working of an IoT device with a Cloud Computing infrastructure.
[CO5] Evaluate & verify the IoT data in the cloud and in between cloud providers.
[CO6] Design and program IoT devices.

Thermal and Fluid Engineering
Code: BTE26308
3Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] List various thermodynamics concepts and approach real life engineering problems like engines compressor etc.
[CO2] Understand various practical power cycles.
[CO3] Apply mathematical analysis simple flow situations.
[CO4] Analyze energy conversion in various thermal devices.
[CO5] Compute force of buoyancy on a partially or fully submerged body.
[CO6] Predict pressure drop in pipe flow for laminar flow in a pipe.

Department of Electrical & Electronics Engineering

Intellectual Property Rights
Code: BTE26385
Credits- 3 | Semester VI

Course Outcomes: At the end of the course, students will be able

[CO1] Identify activities, constitute IP infringements and the remedies available to the IP owner, and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development.

[CO2] Understand the knowledge on patent and copyright for their innovative research works.

[CO3] Apply information in patent documents provide useful insight on novelty of their idea from state of-the art search. This provide further way for developing their idea or innovations.

[CO4] Apply the activities and constitute IP infringements and the remedies available to the IP owner and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development.

[CO5] Anticipate the critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.

[CO6] Formulate the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing.

Power Systems II Lab
Code: BTE26310
1 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Recall the various types of methods for load flow.
[CO2] Understand the Economic Load Dispatch.
[CO3] Model the required system.
[CO4] Analyse the power system stability, security and reliability.
[CO5] Estimate the network parameters with load flow analysis.
[CO6] Formulate required parameters for various kind of power system networks.

Department of Electrical & Electronics Engineering

Measurements and Instrumentation Lab

Code: BTE26311
1 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

[CO1] Recognize the various types of instruments.
[CO2] Understand the various types of Energy Meter.
[CO3] Apply principle of calibration of a measuring instrument and plotting of calibration curves.
[CO4] Analyze the working of ammeter, voltmeter, wattmeter, Kelvin's double bridge and wheat stone's bridge.
[CO5] Evaluate the circuit parameters from measurement devices.
[CO6] Choose appropriate measurement device & connection to find the required parameter.

Semester VII

Power System Protection
Code: BTE27200
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO 1] Identify the system protection schemes, and the use of wide-area measurements.

[CO 2] Understand & relate the different components of a protection system.

[CO 3] Provide standards and specifications related to switchgear and protection.

[CO 4] Analyze the basic principles of digital protection

[CO 5] Evaluate fault current due to different types of fault in a network.

[CO 6] Design the protection schemes for different power system components.

Electrical and Hybrid Vehicles
Code: BTE27325
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify power flow control in Hybrid drive –train and electric derive Topologies.

[CO2] Explain the Electric Propulsion Unit and use of its application.

[CO3] Utilize the different strategies related to energy storage systems.

[CO4] Inspect the different possible ways of energy storage.

[CO5] Rate the models to describe Conventional and hybrid vehicles and their performance.

[CO6] Design of a Hybrid Electric Vehicle (HEV).

Department of Electrical & Electronics Engineering

Computational Electromagnetic
Code: BTE27326
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify power flow control in Hybrid drive –train and electric derive Topologies.
[CO2] Understand the basic concepts of electromagnetics.
[CO3] Apply different finite element method.
[CO4] Analyze computational techniques for computing fields.
[CO5] Justify the techniques to simple real-life problems.
[CO6] Create some innovative computational electromagnetics method

Power System Dynamics and Control
Code: BTE27327
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO 1] Recognize different model components of power system.
[CO2] Understand the problem of power system stability and Analyze linear dynamical systems by use of numerical integration methods.
[CO 3] Develop Measurement stability analysis of different power system.
[CO 4] Distinguish different methods to improve stability.
[CO 5] Estimate modeling of Synchronous Machines and use of associated Controllers.
[CO 6] Modelling of power system components - generators, transmission lines, excitation and prime mover controllers.

Power Quality and Facts
Code: BTE27329
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO 1] Recognize the working of AC transmission lines and FACTS
[CO 2] Learn modeling and operation of Voltage source converter
[CO 3] Select the application of FACTS and Power Quality Problems in Distribution Systems.
[CO 4] Inspect the work of Power Quality Conditioner.
[CO 5] Estimate the reactive power compensation.
[CO 6] Create special purpose FACTS controllers and custom power.

Electrical Drives
Code: BTE27330
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to
[CO1] Select a suitable DC Motor and Power Electronic Converter package from description of drive requirement – involving load estimation, load cycle considerations, thermal aspects and motor converter matching.
[CO2] Understand the characteristics of dc motors and properties chopper fed DC derive.
[CO3] Apply the principles of speed-control of dc motors.
[CO4] Analyze the characteristics of Induction motor and Scalar control or constant V/f control of induction motor.
[CO5] Examine & describe Operation of multi –quadrant dc machines and choppers.
[CO6] Design the power electronic converters used for dc motor and induction motor speed control.

Department of Electrical & Electronics Engineering

Analog and Digital Communication
Code: BTE27331
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO1] Recall the behavior of a communication system in presence of noise.
[CO2] Compare different analog modulation schemes for their efficiency and bandwidth.
[CO3] Apply different digital modulation schemes and compute the bit error performance.
[CO4] Explain different Analysis and Detection of Characteristics of PMS
[CO5] Interpret pulsed modulation system and analyze their system performance.
[CO6] Build an innovative technique for Carrier Recovery for Digital modulation.

Embedded Systems
Code: BTE26106
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to
[CO1] Recognize the differences between the general computing system and the embedded   system.
[CO2] Understand hardware and software design requirements of embedded systems.
[CO3] Apply interfacing design for peripherals like I/O, A/D, D/A, timer etc.
[CO4] Analyze the embedded systems' specification and develop software programs.
[CO5] Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.
[CO6] Design real time embedded systems using the concepts of RTOS.

Fluid Machinery
Code: BTE26163
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO1] Label the impact on JET.

[CO2] Explain flow of fluid through different pipes.

[CO3] Apply fluid mechanics concepts and its applications to various real life-engineering problems like notches, flow-measuring devices etc.

[CO4] Analyze the construction and working of turbines and pumps and test the performance of turbines and pumps.

[CO5] Evaluate different parameters such as co-efficient of friction, power, efficiency etc. of various systems.

[CO6] Improve characteristics curves of turbines and pumps.

Power Plant Engineering
Code: BTE27211
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO1] Define the working principle of Gas turbine power plant, its layout, safety principles and compare it with plants of other types.

[CO2] Understand the working principle and basic components of the nuclear power plant and the economic and safety principles involved with it.

[CO3] Utilize economics of power plants and list factors affecting the power plants.

[CO4] Analyse the working and operation of steam power plants and the different systems comprising the plant and discuss about its economic and safety impacts.

[CO5]Determine performance of different power plants based on load variations.

[CO6] Choose different types of sources and mathematical expressions related to thermodynamics and improve factors involved with power plant operation.

Department of Electrical & Electronics Engineering

Image Processing
Code: BTE27332
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO1] Understand the fundamentals of digital image.
[CO2] Explain different process of image enhancement and image restoration.
[CO3] Carry out process of color imaging.
[CO4] Discover the basic principles of wavelets and multi-resolution processing
[CO5] Interpret different causes for image degradation and overview of image restoration techniques.
[CO6] Design application software of image compression and principal of object recognition.

Automobile Engineering
Code: BTE28249
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO1] Recall the working and principle of engines.
[CO2] Understand the types and function of automobile.
[CO3] Apply the knowledge of EVs, HEVs & solar vehicles.
[CO4] Compare & select the proper automotive system for the vehicle.
[CO5] Explain use alternative energy sources in automobile
[CO6] Design a new concept of work process component of automobile.

Department of Electrical & Electronics Engineering

Project Management
Code: BTE28352
3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

[CO1] Recognize functions of management and practice in real world.
[CO2] Understand the importance of projects and its phases.
[CO3] Apply crashing procedures for time and cost optimization.
[CO4] Analyze projects from marketing, operational and financial perspectives.
[CO5] Evaluate projects based on discount and non-discount methods
[CO6] Develop network diagrams for planning and execution of a given project.

Semester VIII

Department of Electrical & Electronics Engineering

HVDC Transmission Systems
Code: BTE28354
3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

[CO1] List the advantages of dc transmission over ac transmission.
[CO2] Understand the operation of Line Commutated Converters and Voltage Source Converters.
[CO3] Develop the control strategies used in HVDC transmission system.
[CO4] Analyze the reactive & active power flow in HVDC transmission system.
[CO5] Evaluate the performance parameters for converters in HVDC transmission systems.
[CO6] Formulate methods for improvement of power system stability using an HVDC system.

Wind and Solar Energy Systems
Code: BTE28355
3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify the basic properties of different renewable sources of energy and technologies for their utilisation,
[CO2] Understand the basic physics of wind and solar power generation.
[CO3] Describe main elements of technical systems designed for utilisation of renewable sources of energy.
[CO4] Discover the issues related to the grid-integration of solar and wind energy systems.
[CO5] Interpret the energy scenario and the consequent growth of the power generation from renewable energy sources.
[CO6] Design a power electronic interface for wind and solar generation.

Department of Electrical & Electronics Engineering

Department of Electrical & Electronics Engineering

Advanced Electric Drives
Code: BTE28356
3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

[CO1] Recognize the operation of power electronic converters and their control strategies.
[CO2] Understand the vector control strategies for ac motor drives.
[CO3] Implement the control strategies using digital signal processors.
[CO4] Analyze the various drives for AC machines.
[CO5] Evaluate the performance parameters for AC drives.
[CO6] Improve the working and design details of frequency-controlled converters used in induction motor drives.

VLSI Circuit
Code: BTE28357
3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to
[CO1] Recognize the scale of integration for VLSI design.
[CO2] Understanding the processes for VLSI fabrication.
[CO3] Solve the performance issues in circuit layout.
[CO4] Analyze circuits using both analytical and CAD tools.
[CO5] Interpret logic circuits with different design styles.
[CO6] Create appropriate automation algorithms for partitioning, floor planning, placement and routing.

Department of Electrical & Electronics Engineering

Modern Manufacturing Processes
Code: BTE28358
3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify the appropriate process parameters, and possible defects of manufacturing processes to remove them.

[CO2] Understand the different conventional and unconventional manufacturing methods employed for making different products.

[CO3] Develop simplified manufacturing processes with the aim of reduction of cost & manpower.

[CO4] Compare basic manufacturing processes of Casting, Joining, Forming and machining.

[CO5] Choose suitable manufacturing processes to manufacture the products optimally.

[CO6] Plan sequential action in manufacturing through practice in various sections.

Computer Networks
Code: BTE26138
3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify the functional blocks of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) & describe the function of each block.

[CO2] Explain the functions of the different layer of the OSI Protocol.

[CO3] Apply the knowledge in some specific areas of networking such as the design and maintenance of individual networks.

[CO4] Analyze and evaluate a number of datalink, network, and transport layer protocols.

[CO5] Program network communication services for client/server and other application layouts.

[CO6] Design of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) based on the market available component.

Department of Electrical & Electronics Engineering

Electrical Materials
Code: BTE28359
3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

[CO1] Select insulating, conducting and magnetic materials used in electrical machines.

[CO2] Understand the properties of liquid, gaseous and solid insulating materials.

[CO3] Apply the physics behind the electrical engineering materials.

[CO4] Analyze the electrical properties and characteristics of various materials, used in the electrical appliances, devices & instruments.

[CO5] Evaluate breakdown strength of transformer oil by testing.

[CO6] Create innovative research in the field of electrical engineering material science.

Subject: Big Data Analysis
Code: BTE28360
3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

[CO1] Identify key issues in big data management and its associated applications in intelligent business and scientific computing.

[CO2] Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.

[CO3] Apply the fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and No SQL in big data analytics.

[CO4] Analyze adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

[CO5] Choose machine learning libraries and mathematical and statistical tools with modern technologies like hadoop and map reduce.

[CO6] Create machine learning techniques and computing environment that are suitable for the applications under consideration.