K.D.K. College of Engineering, Nagpur
Department of Electrical Engineering

Course Outcomes	
Course Code	**Course Outcomes**
1BEE01T	**Applied Mathematics-I**
1	Apply the concepts of matrix operations and inversion.
2	Determine Partial derivative of various functions and apply their concepts to Engineering problems.
3	Apply the concepts of Beta and Gamma functions to solve the problems.
4	Solve ordinary differential equations using elementary techniques and apply it to formulate mathematical models.
5	Use higher order differential equations to solve the problems in engineering field.
1BEE02T	**Applied Physics**
1	Develop elementary concepts of quantum mechanics and their applications.
2	Relate the structure of crystalline solids by applying knowledge of crystallography.
3	Categorize solids on the basis of band theory and study of semiconductor devices along with their applications.
4	Describe the quantum transitions and apply them to the working of lasers.
1BEE02P	**Applied Physics Lab**
1	Create the basic circuitries in Electronics. Demonstrate and illustrate the basic principles of operation of semiconductor diodes and transistors.
2	Differentiate between the types of semiconductors through band gap experiment. Analyze the magnetic field-based experiment to distinguish the materials.
3	Apply the concept of diffraction for the optical based devices using LASER beam. Develop the concept of fiber optic cables to determine the numerical aperture of the fiber cables and to get acquainted with its use in daily life.
4	Examine the various electrical and electronics-based parameters viz. A.C. Voltage, frequency, and phase shift and time period using CRO.
5	Practice effectively as an individual and as a member of a team.
1BEE03T	**Fundamentals of Electrical Engineering**
1	Apply laws and principles to calculate the unknown quantities in electric circuits.
2	Calculate various Magnetic circuit parameters.
3	Draw phasor diagram and calculate electrical parameters for single phase AC circuit.
4	Explain three phase AC circuits and calculate various parameters.
1BEE03T	**Fundamentals of Electrical Engineering Lab**
1	Demonstrate behavior of Electrical Components.
2	Measure electrical signals and interpret the results.
3	Identify types of transformers and determine transformer parameters.
1BEE04T	**Problem Solving using "C"**
1	Design solutions to simple engineering problem by applying the basic programming principles of C language and basic mathematical knowledge.

2	Develop simple C programs to solve simple mathematical, decision making problems and problems using looping construct.
3	Develop simple C programs to demonstrate the applications of derived data types such as arrays, pointers, strings and functions.
4	Develop simple C programs to demonstrate the applications of derived data types such as functions.
5	Develop simple C programs to demonstrate the applications of File Handling.
1BEE04T	**Problem Solving using "C" Lab**
1	Understand fundamentals of C language.
2	Analyze correctness in syntax and logic for the program which is developed from the algorithm.
3	Apply debugging techniques according to the algorithm requirements.
4	Evaluate the computation recourses for a program application.
5	Implement conditional branching, iteration and recursion, to decompose a problem into functions and synthesize a complete program.
1BAE01T-A	**Professional communication**
1	Apply basic communication skill and correct grammar usage.
2	Design formal written communication
3	Prepare and illustrate their thoughts effectively through improving listening & speaking skills
4	Use of oral communication skills in order to handle themselves effectively in interview and group discussion
1BAE01T-B	**Business communication skills**
1	Demonstrate effective verbal and non-verbal communication skills in a business context.
2	Explain professional written communication.
3	Describe and demonstrate their thoughts effectively through improving listening & speaking skills.
4	Develop and evaluate efficiently in team-based communication projects.
1BAE01T-C	**English for Professional Aptitude**
1	Use communication skills in English, particularly in professional settings
2	Write the importance of effective communication in the professional world
3	Explain listening skills and their significance in professional settings
4	Prepare oral communication skills in order to handle themselves effectively in interview and group discussion
1BEE05P	**Electrical workshop-I**
1	Choose electrical components/equipment for a particular application.
2	Identify electrical cables/wires and line joints
3	Measure the electrical quantities using different measuring instrument
4	Select different types of switches, sockets and plugs for different applications
5	build the various electrical wiring for different application
2BEE01T	**Applied Mathematics-II**
1	Analyze statistical data using curve fitting techniques.
2	Evaluate integrals using concepts of scalar and vector point function.
3	Apply the various numerical methods to solve simultaneous equations.

4	Solve partial differential equations by various methods.	
5	Use Laplace Transform techniques in engineering problems.	
2BEE02T	**Applied Chemistry**	
1	Illustrate qualitative and quantitative aspects of water for industrial and domestic applications.	
2	Identify the types of fuels and explain working of I.C. engines.	
3	Apply concepts of electrochemistry for energy storage devices and corrosion.	
4	Identify and describe different types of advanced engineering materials.	
5	Apply the principles of green chemistry in designing alternative reaction methodologies and use of solid waste as energy source	
2BEE02P	**Applied Chemistry Lab.**	
1	Estimate the soluble impurities present in the given water sample.	
2	Analyze a broad foundation in energy and environment that stresses scientific reasoning and analytical problem solving.	
3	Point out & operate the different instruments used in chemistry laboratory.	
2BEE03T	**Analog Devices and Circuits**	
1	Explain different types of semiconductor devices, their operation and characteristics.	
2	Illustrate the use of different transistor configurations as amplifiers circuits.	
3	Demonstrate the use of transistor as power amplifier and oscillator.	
4	Describe the working of Op-Amp	
5	Use Op-Amps and linear ICs for different applications.	
2BEE03P	**Analog Devices and Circuits Lab**	
1	Design and analyze the Half wave rectifier circuits, Full wave rectifier circuits using diodes	
2	Demonstrate the use of Op-Amps for different applications.	
3	Analyze the basics of IC 555 and LM741 IC	
2BEE04T	**Electrical Measurements & Instrumentation**	
1	Explain types of measuring instruments.	
2	Measure and calculate electrical quantities like power, energy etc.	
3	Explain the use of instrument transformers for measurement of electrical quantities.	
4	Select the suitable transducers for measurement of physical quantities.	
2BIK01T-A	**Indian Knowledge System**	
1	Illustrate the diverse dimensions of Indian knowledge traditions.	
2	Analyze the contributions of ancient Indian scholars to different fields of knowledge.	
3	Point out the interconnectedness of various branches of Indian knowledge.	
4	Evaluate critically the relevance of Indian knowledge systems in modern society.	
2BIK01T-B	**Consciousness Studies**	
1	Identify and analyze the basics of Consciousness	
2	Develop detailed knowledge about the Psychological Perspectives and neurological aspects of consciousness	
3	Apply the various methods for studying the Consciousness level	

4	Relate the role of consciousness in the society for better living
2BIK01T-C	**Preserving Art, Culture, and Tradition**
1	Identify the significance of preserving art, culture, and tradition.
2	Point out the relationship between art, culture, tradition, and identity& analyze different methods and approaches to preserve cultural heritage.
3	Illustrate *Policies, Challenges & Threats for* cultural & heritage preservation.
4	Examine the role of technology in preserving and promoting cultural heritage.
2BIK01T-D	**Wellness, Traditional Medicines, and Yoga**
1	Identify the concept of wellness and its importance in modern life.
2	Illustrate the principles and practices of traditional medicines from different cultures
3	Distinguish various yoga techniques and their benefits for physical and mental health and to analyze the scientific basis and evidence supporting traditional medicines and yoga.
4	Develop practical skills for incorporating wellness practices into daily life.
2BIK01T-E	**Glimpses of ancient Science and Technology**
1	Illustrate information about great mathematicians and to help students to trace, identify, practice, and develop the significant Indian mathematics
2	Develop the concept of motion and its application in Indian ancient physics literature.
3	Identify the concepts of basic chemical & metallurgical process of ancient and medieval India.
4	Analyze the scientific basis and evidence supporting traditional medicines and yoga.
2BIK01T-F	**Foundation Literature of Indian Civilization**
1	Identify the major literary texts of ancient and classical India.
2	Illustrate the historical and cultural contexts in which these texts were produced.
3	Analyze the themes, characters, and narrative techniques employed in Indian literary classics.
4	Examine the influence of these texts on Indian society and culture and To encourage critical thinking and interpretation of Indian literary heritage
2BSE01P-A	**Electrical workshop-II**
1	Describe the layout of electrical substation.
2	Develop single line diagrams of electrical layouts of industries/offices/houses.
3	Apply I.E. rules and first aid in case of electrical hazards.
2BSE01P-B	**Industrial Visit & Report Writing**
1	Understand the basics of electrical installations and there operations.
2	Explain effectively the working of electrical installations.
2BSE01P-C	**Electrical Drawing & Simulation**
1	Demonstrate the different aspects of electrical engineering software like MATLAB, VISIO for the purpose of drawing and simulation.
2	Draw and simulate various electrical systems using different software.
3	Develop single line diagrams of electrical layouts of industries/offices/houses. Understand the basics of electric network. Understand the basics of electrical installations and there operations.
1BCC01P-A	**Yoga/Sports Recreation**

/2BCC01P-A	
1	Illustrate the fundamental techniques, underlying principles, and standard practices of both sports and yoga.
2	Collect practical experience in applying the principles of general and targeted physical conditioning exercises and yoga.
3	Enhance health-related fitness levels and achieve harmony between body and mind through participation in a variety of fitness activities, sports, recreational games, and yoga.
4	Practice Healthy & active living with reducing Sedentary Life style.
1BCC01P-B /2BCC01P-B	**Fundamentals of Indian Classical Dance- Kathak**
1	Illustrate the historical and cultural context of Kathak, including its origins, development, and significance within the Indian classical dance tradition.
2	Illustrate the fundamental techniques and movements of Kathak, including footwork (tatkar), hand gestures (mudras), body postures (bhangas), and facial expressions (abhinaya).
3	Apply theoretical knowledge to practical performance, effectively interpreting Kathak compositions and expressing emotions through rhythmic sequences and storytelling elements.
4	Develop physical fitness, coordination, and gracefulness through regular practice and refinement of Kathak repertoire, fostering a deeper connection with the art form and its artistic expression.
1BCC01P-C /2BCC01P-C	**Music**
1	Identify various Raags of music and differentiate between the classical music and the light music.
2	Operate various instruments of music.
3	Differentiate between the various musical instruments
4	Use music in therapy.
1BCC01P-D /2BCC01P-D	**Chess**
1	Develop problem solving skills and memory Improvement.
2	Work under tense situations and pressure.
1BCC01P-E /2BCC01P-E	**Introduction to Foreign Languages and Culture- Japanese /Spanish /German**
1	Develop ability to use vocabulary required for everyday conversations of basic level communication in Japanese language.
2	Demonstrate basic knowledge about Spain language and develop ability to use simple language structures in everyday communication, write in basic Spanish about themselves and others.
3	Use basic knowledge about German language to develop ability of reading and writing German conversations related to simple day-to-day situations.
4	Identify Japanese culture, Spanish culture and German culture to meet the needs of growing industry.
1BCC01P-F /2BCC01P-F	**Basics of Vedic Math**
1	Compute simple arithmetic calculations with speed and accuracy.
2	Generate tables of any number
3	Solve products of large numbers quickly

4	Solve difficult calculations like square roots and cube roots of integers speedily.
1BCC01P-G /2BCC01P-G	**Self- defense Essentials and Basics**
1	Develop strength, coordination, and balance.
2	Develop advance student's growth and conditioning toward lifelong fitness. assaults in everyday situations
3	Use protection skills against threat,
4	Prepare to work in civil defence, security services in public and private/corporate sectors and government establishment etc.
1BCC01P-H /2BCC01P-H	**Basket Ball**
1	Demonstrate basic basketball rules, terminology, and safety concerns
2	Demonstrate the ability to perform individual offensive and defensive skills and strategies.
3	Demonstrate the ability to perform team offensive and defensive skills and strategies.
4	Demonstrate an understanding of health-related fitness components: muscular strength, muscular endurance, and stress management
1BCC01P-I /2BCC01P-I	**Athletics**
1	Demonstrate attitudes, behaviors, and practices that support personal well-being and life-long learning.
2	Apply discipline and commitment developed in practice and competition to academic achievement.
3	Demonstrate traits of good sportsmanship and teamwork in both competition and practice.
4	Demonstrate an expert knowledge of the strategies and skills of the athletics and use critical thinking skills to apply this knowledge in competitive situations.
1BCC01P-J /2BCC01P-J	**Painting**
1	Recognize the symbolic and narrative possibilities inherent in painting and drawing
2	Identify a variety of historical and contemporary approaches to representational drawing.
3	Apply variety of techniques and different methods of painting.
4	Demonstrate basic concept of Art, its meaning, definitions, and basic elements of visual Art.
BTCHEE301T	**Electrical Engineering Mathematics**
C301.1	Solution of Partial Differential Equations of First Order First Degree, Numerical Solution to Ordinary differential equations
C301.2	Formulation and solving the systems with complex variables
C301.3	Understanding the basics of various Transforms and converting the functions into required transforms, Laplace Transforms analysis andits application to solve differential equations
C301.4	Application of Differential equations and Laplace Transform for mathematical model formulation of the physical systems, Understanding the concept of transfer function
C301.5	Understanding the concepts of Stochastic analysis and its application
BTCHEE302T	**Network Analysis**
C302.1	Apply mesh current and node voltage methods to analyze electrical circuits.
C302.2	Apply network theorems for the analysis of networks.

C302.3	Obtain transient and steady-state responses of electrical circuits.	
C302.4	Synthesize waveforms and apply Laplace transforms to analyze networks.	
C302.5	Evaluate different Network Functions and understand two port network behavior	
BTCHEE302P	**Network Analysis**	
C302.1	Verify different network theorems as applicable to electric circuits.	
C302.2	Measure AC power & evaluate power factor for different electrical circuits.	
C302.3	Compute various network parameters.	
BTCHEE303T	**Electrical Measurement & Instrumentation**	
C303.1	Various aspects of measurement and instrumentation.	
C303.2	Different active and passive components measurement methods.	
C303.3	Power and Energy measurement.	
C303.4	Instrument Transformers.	
C303.5	Aspects and types of transducers.	
BTCHEE303P	**Electrical Measurement & Instrumentation**	
C303.1	Carry out measurement of various electrical circuit parameters using AC & DC bridges.	
C303.2	Calibrate various electrical measuring instruments and measure power & energy.	
C303.3	Measure various non-electrical quantities using Transducers.	
BTCHEE304T	**Analog Devices & Circuits**	
C304.1	Design and Analyze rectifier circuits	
C304.2	Understand the characteristics and use of a transistor as amplifiers	
C304.3	Apply the knowledge of transistor for the analysis of power amplifiers and oscillators.	
C304.4	Understand OP-AMPs.	
C304.5	Analyze and utilize OP-AMPs	
BTCHEE304P	**Analog Devices & Circuits**	
C304.1	Identify and analyze the various semiconductor devices.	
C304.2	Analyze and distinguish various characteristics of transistor.	
C304.3	Design Operation amplifier.	
BTCHEE305T	**Renewable Energy studies**	
C305.1	Memorize the fundamental of solar radiation geometry	
C305.2	Identify and analyze the process of power generation through solar photovoltaic.	
C305.3	Highlighting the various applications of Solar Energy.	
C305.4	Outline the site requirement criteria for wind farm & compare different types of wind generators.	
C305.5	Identifying non-conventional Energy sources such as Geothermal, MHD, Biomass, Fuel cell, Tidal, Ocean for generating Electricity.	
BTCHEE306T	**Introduction to Python programming**	

C306.1	Identify different operators and execute different programs using loops
C306.2	Analyze Strings, List, Tuples, Dictionary and Sets.
C306.3	Illustrate functions and utilize Date Time in programming language.
BTCHEE306P	**Introduction to Python programming**
C306.1	Construct Python Program using various python operators.
C306.2	To Develop python program using List, tuple, strings, dictionary.
C306.3	Construct python program using functions, loops &modules
BTCHEE307T	**Environmental studies**
C307.1	Understand Air pollution and its control techniques
C307.2	Understand Water pollution and its control techniques
C307.3	Understand Various Environmental Pollutions &amp, Waste Management
C307.4	Understand Social Issues and the Environmental Laws
BTCHEE401T	**Signal & Systems**
C401.1	Understanding the basics of signal space theory.
C401.2	Understanding the concepts of state space representation.
C401.3	Understand convolution sum of two signals.
C401.4	Apply Fourier and Laplace transforms, understand the duality Apply DFT, DTFT and ztransform.
C401.5	Understand the concept of sampling and reconstruction.
BTCHEE402T	**Digital Electronics**
C402.1	Understand number system, logic gates and logic families.
C402.2	Design and implement combinational digital circuits.
C402.3	Design and implement sequential logic circuits.
C402.4	Understand the process of Analog to Digital conversion and Digital to Analog conversion.
C402.5	Understand memories and PLDs to implement given logic.
BTCHEE402P	**Digital Electronics**
C402.1	Demonstrate and design different basic logic gates using Diode and Transistors.
C402.2	Demonstrate and design combinational and sequential circuits.
C402.3	Demonstrate and design linear and Non-linear circuits using operational amplifier.
BTCHEE403T	**Electrical machines-I**
C403.1	Determine Equivalent Circuit parameter, Efficiency and Regulation of Single Phase Transformer and to Explain the Phasor groups of Three Phase Transformer. CO2. CO3. CO4. CO5.
C403.2	Analyze different characteristics of D. C. Motor and Speed Control of D.C. Motor.
C403.3	Explain different types of Three Phase Induction Motor and Analyze the characteristics at different Value of Slip.
C403.4	Know Voltage Regulation of Three Phase Synchronous Generator and Behavior of Synchronous Motor with Different Excitations.
C403.5	Understand Single Phase Machines and Special Machines.
BTCHEE403P	**Electrical machines-I**

C403.1	Evaluate the electrical parameters, efficiency, and regulation of transformers.
C403.2	Experiment with the operation and characteristics of DC & AC Machines.
C403.3	Analyze asynchronous machines for its operation and performance.

BTCHEE404T	**Power System**
C404.1	Understand the basic structure of power system , smart grid and micro grid.
C404.2	Model and represent the power system compo value. nents in its per unit
C404.3	Learn the parameters of transmission lines and cables.
C404.4	Evaluate the performance of transmission lines.
C404.5	Acquaint with the method of load flow analysis and the concept ofvoltage stability.

BTCHEE405T	**Electromagnetic Fields**
C405.1	Recognize and apply the knowledge of different co-ordinate systems.
C405.2	Evaluate the physical quantities of electromagnetic fields in different media and apply Gauss law.
C405.3	Describe static electric fields boundary conditions, nature of dielectric materials and evaluate potential fields.
C405.4	Explain steady magnetic fields, their behavior in different media, associated laws and inductance.
C405.5	Understand Maxwell's equations in different forms and different media.

BTCHEE406T	**Simulation & Programming Techniques**
C406.1	Learn the basics of C programming and apply the knowledge for developing small programs including Function.
C406.2	Apply the knowledge of C language for developing simple programs using variables, arrays, structures etc. for applications like searching and sorting, use of pointers & File handling functions.
C406.3	Understand the basics of C++
C406.4	Study the basic of MATLAB and apply fundamental knowledge for analysis of basic engineering problems.
C406.5	Apply knowledge of MATLAB, Toolboxes and Simulink to solve matrix equations, plot graphs, build and analyze simple electrical circuits.

BTCHEE406P	**Simulation & Programming Techniques**
C406.1	Develop and execute simple programs in "C" language.
C406.2	Develop and execute programs for sorting and searching techniques using "C" language.
C406.3	Develop and execute simple MATLAB programs.

BTCHEE501T	**Microprocessor and Micro Controllers**
C501.1	Describe internal organization of 8085 and 8086 microprocessors and 8051 microcontrollers.
C501.2	Describe the concept of addressing modes and timing diagram of microprocessor.
C501.3	Interface 8085&8051 with keyboard / Display ADC/DAC, stepper motor etc.
C501.4	Demonstrate the concept of interrupts and it use.

C501.5	Demonstrate the concept of serial and parallel data communication.
C501.6	Describe handshaking concept and interfacing with peripheral devices, interface various hardware with microprocessor and microcontrollers.
BTCHEE501P	**Microprocessor and Micro Controllers**
C501.1	Describe the Components of Microprocessor development Board.
C501.2	Write program using Assembly Language.
C501.3	Describe architecture, programming and Interfacing of peripheral IC's with 8085 Microprocessor.
BTCHEE502T	**Control System**
C502.1	Model the linear system and study the control system components specifications through classical approach.
C502.2	Understand the time response and time response specifications and different controllers.
C502.3	Analyze the absolute stability and analyze the relative stability through root locus method.
C502.4	Frequency response tools like Bode plot and Nyquist plot
C502.5	Understand the concept of state variable approach.
BTCHEE502P	**Control System**
C502.1	Analyze the use of various error detectors in control systems and distinguish between each one of them.
C502.2	Comprehend and evaluate the performance of various position control systems.
C502.3	Build, simulate and analyze different control systems for their time responses and frequency responses using MATLAB.
BTCHEE503T	**Power Electronics**
C503.1	Knowledge of different types of semiconductor switches and their characteristics.
C503.2	Knowledge of different types of power conversion system with their operation.
C503.3	Knowledge of various rectifier circuits at loading conditions.
C503.4	Knowledge of various operating modes of inverter and control circuits.
C503.5	Knowledge of different Dc-Dc conversion circuit and four quadrant operation.
BTCHEE503P	**Power Electronics**
C503.1	Deduce the characteristics of Power Electronic switches with various parameters.
C503.2	Study and analyze power electronic converters.
C503.3	Study and analyze power electronic inverter circuits.
BTCHEE504T	**Advanced Electrical power system**
C504.1	Apply symmetrical components concepts in fault analysis.
C504.2	Evaluate fault currents for different types of faults.
C504.3	Appreciate concepts of power system stability.
C504.4	Understand methods to control the voltage, frequency and power flow.
C504.5	Understand economic operation of power system.
BTCHEE505T	**Electrical Machines-II(Professional Elective-I)**
C505.1	To explain speed control and electric braking in AC and DC machines.
C505.2	To analysis and compare voltage regulation method and parallel operation of alternator.

C505.3	To explain two reaction theory of salient pole synchronous machine and slip test.
C505.4	To analyses power flow in synchronous machine, comparison applications and working of reluctance motor and PM ac motor.
C505.5	To describe transient behavior of synchronous machine under the sudden short circuit, determination of reactance's.
BTCHEE505T	**UTILIZATION OF ELECTRIC ENERGY(Professional Elective-I)**
C505.1	Understand use of electric energy for industrial heating.
C505.2	Study the use of electrical energy in electric welding.
C505.3	Learn basics of illumination and design of lighting schemes for various applications.
C505.4	Understand pumps and DG systems and evaluate their performance.
C505.5	Understand electric traction system with its power supply structure.
BTCHEE505T	**POWER STATION PRACTICE(Professional Elective-I)**
C505.1	Understand various sources of electrical energy and different factors related to generating stations and connected load.
C505.2	Study general layout, major equipment's and auxiliaries in thermal power station.
C505.3	Understand the basic principle of hydro power station.
C505.4	Learn basics of nuclear, power generation.
C505.5	Understand the basic excitation system, co-generation, and captive.
BTCHEE601T	**ENGINEERING ECONOMICS & INDUSTRIAL MANAGEMENT**
C601.1	Understand the concept of demand and supply and its relationship with the price.
C601.2	Relate various factors of production with reference to different economic sectors.
C601.3	Analyse the causes and effects of inflation and understand the market structure.
C601.4	Acquire knowledge of various functions of Management and marketing management.
C601.5	Perceive the concept of Financial Management for the growth of business.
BTCHEE602T	**COMPUTER APPLICATIONS IN POWER SYSTEM**
C602.1	Students will be able to determine bus impedance and admittance matrix by singular transformation for power system
C602.2	Determine bus impedance and admittance matrix by inspection and building algorithm and able to accommodate changes in power system.
C602.3	Do the short circuit calculation for symmetrical and unsymmetrical fault using bus impedance and admittance matrix.
C602.4	Do the load flow analysis by NR method and transient stability analysis by modified Euler's method.
BTCHEE602P	**COMPUTER APPLICATIONS IN POWER SYSTEM**
C602.1	Construct programs using MATLAB to obtain different power system matrices.

C602.2	Develop programs using MATLAB to study power flow of system.
C602.3	Construct programs to assess the performance of synchronous machines .
BTCHEE603T	**SWITCH GEAR AND PROTECTION**
C603.1	Understand basic terminology of protective relaying, different types of faults and component used in power system protection
C603.2	Apply overcurrent protection schemes for medium voltage lines.
C603.3	Apply various distance protection schemes for high voltage lines.
C603.4	Understand Differential and other protections used for generator, transformer and motors.
C603.5	Comprehend switching phenomenon and working of various types of circuit breakers.
BTCHEE603P	**SWITCH GEAR AND PROTECTION**
C603.1	Analyze the magnetization characteristics of protective CTs and differentiate between protective CTs and measuring CTs.
C603.2	Verify standard time – current characteristic of over current relays and suggest suitable relays for different applications.
C603.3	Evaluate the performance of various static and numerical Relays.
C603.4	Examine the performance of differential relays and defend the role of percentage bias.
BTCHEE604T	**Solar PV System (Open Elective-I)**
C604.1	Review solar tracking, tracking control and find heat radiation related queries.
C604.2	Analyse the simple model of PV cell and PV modules.
C604.3	Analyse the balance of solar PV systems having battery and inverter.
C604.4	Demonstrate various photovoltaic system configurations.
C604.5	Apply solar PV to various distributed generation and smart consumption
BTCHEE604T	**PLC and SCADA System (Open Elective-I)**
C604.1	Identify and understand components of PLCs for Automation.
C604.2	Select appropriate module as per application.
C604.3	Develop PLC Programming for given application.
C604.4	Understand SCADA system.
C604.5	Develop SCADA system for various applications
BTCHEE605T	**ELECTRICAL DRIVES & THEIR CONTROL(Professional Elective-II)**
C605.1	Understand the concept of electrical characteristics like starting, speed control and breaking along with numerical.
C605.2	Relate various factors of industries with reference to PLC its programming and digital control.
C605.3	Analyse the causes and effects of motor control used in electric vehicles.
C605.4	Acquire knowledge of various electrical drives used in industries, ac and dc contractors and work on drives used in industries.
C605.5	Perceive the concept of electric traction and their control strategies used in practice
BTCHEE605T	**Advanced Control Systems(Professional Elective-II)**
C605.1	Determine state transition Matrix and solution of state equation for the given system.
C605.2	Evaluate controllability, observability and design suitable state feedback vector for the given control system.

C605.3	Evaluate optimal control problem.
C605.4	Describe different types of nonlinearities in control system.
C605.5	Solve stability problem of discrete time digital control system.
BTCHEE701T	**HIGH VOLTAGE ENGINEERING (Professional Elective-III)**
C701.1	Understand breakdown mechanism in solid liquid and gaseous medium.
C701.2	Knowledge of lightening and switching over-voltages.
C701.3	Analyze different methods of generation of high voltage and currents in laboratory.
C701.4	Analyze different methods of measurement of high voltage and currents in laboratory.
C701.5	Analyze different methods of nondestructive and High Voltage testing of Apparatus and cables in laboratory.
BTCHEE706P	**HIGH VOLTAGE ENGINEERING**
C706.1	Evaluate the performance of breakdown testing of various dielectrics, lightning arrestors.
C706.2	Analyse different methods of measurement for high voltage and current in laboratories.
C706.3	Visualize and analyze the corona effect.
C706.4	Distinguish between different types of Insulators.
BTCHEE701T	**ENERGY MANAGEMENT AND AUDIT(Professional Elective-III)**
C701.1	Explain present energy scenario with need of energy audit and energy conservation.
C701.2	Recommend appropriate type of Energy Audit looking into user requirements.
C701.3	Prepare process flow, material and energy balance diagrams.
C701.4	Prepare energy action plan and strategy for monitoring and targeting as expected of Energy manager.
C701.4	Select proper energy conservation mechanism for Electrical and Mechanical Systems.
BTCHEE702T	**FLEXIBLE AC TRANSMISSION SYSTEM (FACTS) (Professional Elective-IV)**
C702.1	Knowledge of Power Flow in AC system with different factors affecting stability.
C702.2	Knowledge of Voltage and Current Source Converters.
C702.3	Knowledge of Static Shunt Compensators.
C702.4	Knowledge of Static Series Compensators.
C702.5	Knowledge of Static Voltage and Phase angle Regulators and Basic concept of Combined Compensators.
BTCHEE702T	**ELECTRICAL INSTALLATION DESIGN(Professional Elective-IV)**
C702.1	Understand concept of electrical load assessment and basics of busbar and cables.
C702.2	Identify switches for smooth functioning of protective scheme utilized for short circuit calculations.
C702.3	Analyze Power and control circuit for industrial application utilizing Reactive power Management.
C702.4	Apply industrial installations and earthling system design.
C702.5	Inferring the design of 11kV and 33 kV substations for industrial installations.

BTCHEE703T	ELECTRICAL MACHINE DESIGN (Professional Elective-V)
C703.1	Design the overall dimensions of 1- phase and 3-phase core type transformer.
C703.2	Estimate the performance characteristics of the transformer as per specified design requirements and constraints.
C703.3	Design the overall dimensions of 3 Phase Induction Motor.
C703.4	Design Rotor Design of 3-phase Induction Motor.
C703.5	Design & Calculations of the volume of coolant required for the cooling of the alternator.
BTCHEE703T	ELECTRIC AND HYBRID VEHICLES (Professional Elective-V)
C703.1	Explain electric vehicle characteristics and typologies.
C703.2	Identify and analyze the process of power management system.
C703.3	Analyze various power electronics devices in electric vehicles.
C703.4	Outline the types and size of electric motors in electric and hybrid vehicles.
C703.5	Identifying electric motor and internal combustion engine match and energy management strategies.
BTCHEE704T	POWER PLANT ENGINEERING (Open Elective-II)
C704.1	Electrical energy, economic and environmental issues.
C704.2	Operation of Thermal power Plant.
C704.3	Subsystems of thermal power plants and cogeneration systems.
C704.4	Operation of Hydroelectric Power Plants.
C704.5	Operation of Nuclear Energy Conversion.
BTCHEE704T	FUNDAMENTAL OF CONTROL SYSTEMS(Open Elective-II)
C704.1	Identify the various control system components and their representations.
C704.2	Analyze the various time domain parameters.
C704.3	Analysis the various frequency response plots and its system.
C704.4	Apply the concepts of various system stability criterions.
C704.5	Analysis and Implementation of State Variable Methods.
BTCHEE706P	Electrical Drawing and Simulation
C706.1	Demonstrate the different aspects of electrical engineering software like MATLAB, VISIO for the purpose of drawing and simulation.
C706.2	Draw and simulate various electrical systems using different software.
C706.3	Develop single line diagrams of electrical layouts of industries/offices/houses.
BTCHEE707P	ELECTRICAL INSTALLATION DESIGN
C707.1	Study and understand the working of substation.
C707.2	Understand various safety devices and earthing used in electrical system.
C707.3	Organize reports based on performed experiments with effective demonstration of diagram.
C707.4	Summarize and explain the prepared report based on substation or industrial visit.
BTCHEE707P	ELECTRICAL Workshop
C707.1	Identify various symbols used in electrical engineering and construct single line diagrams of a power systems.
C707.2	Study and estimate various scheme of illumination.
C707.3	Design, fabricate and carry-out performance analysis of single phase transformers for given ratings.
BTCHEE708P	Project Phase-I
C708.1	Do literature survey using library, internet, technical journals, product Catalogue, datasheets etc. for a defined area.

C708.2	Understand & deliver the seminar topic.
C708.3	To enhance the skills of self- study and lifelong learning.
BTCHEE801T	**Electrical Safety & Standards**
C801.1	Understand the Indian power sector organization and Electricity rules, electrical safety in residential, commercial, agriculture, hazardous areas.
C801.2	Outline the electrical safety during installation, testing and commissioning procedure.
C801.3	Make use of specification of electrical plants and classification of safety equipment for various hazardous locations.
C801.4	Understand Safety Management & Standards in Electrical Systems.
BTCHEE802T	**POWER SEMICONDUCTOR DRIVES(Professional Elective-VI)**
C802.1	Understand dynamics of electric drives used in industry with steady state stability.
C802.2	Apply the knowledge of various converters control methods used for DC drives.
C802.3	Analyze control topologies used for induction motor applicable to various industrial Applications.
C802.4	Execute the basics of Industrial drives used for special applications.
C802.5	Attribute the traction drives using ac and dc motors with advanced control.
BTCHEE802T	**ELECTRICAL DISTRIBUTION SYSTEM(Professional Elective-VI)**
C802.1	Understand the general aspects of electrical distribution system.
C802.2	Design and analysis of distribution feeders and substations.
C802.3	Understand the need for protection and distribution automation.
C802.4	Recognize the significance of voltage drop and power loss in the distribution system.
C802.5	Understand the need for controlling the PF, Voltage and Power and the equipment used for mitigating them.
BTCHEE803T	**EHVAC-HVDC Transmission System(Professional Elective-VII)**
C803.1	Analyze power handling capacity of different EHVAC transmission lines
C803.2	Knowledge of Electrostatic and electromagnetic fields and corona in EHVAC lines.
C803.3	Knowledge of different types HVDC systems.
C803.4	Analyze power flow control in HVDC lines & design parameters of harmonic filters.
C803.5	Design appropriate circuit breakers and protective schemes for different HVDC systems.
BTCHEE803T	**Power Quality(Professional Elective-VII)**
C803.1	Explain importance of Power Quality and good grounding practices.
C803.2	Describe the causes of flickers and transient over voltages and suggest corrective measures.
C803.3	Discuss the causes and consequences of voltage sags and suggest mitigation techniques
C803.4	Discuss the causes and effects of harmonics and suggest harmonic reduction techniques.
C803.5	Explain the need, objectives and approaches of power quality monitoring and assessment
BTCHEE804P	**Project Phase-II**
C804.1	Students will be able to apply technical & Managerial skills for analysis, design, simulation & modelling of Engineering problems.
C804.2	To learn the time & Finance management for task completion in a group with professional ethics.

C804.3	To present their work in a professional manner.
C804.4	To enhance the skills of self-study and lifelong learning.