

Course Code	Name of Course	CO's	CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3			
BTES203	Engineering Mechanics	CO 1	Apply fundamental Laws of Engineering Mechanics	2																	
		CO 2	Apply Conditions of static equilibrium to analyze given force system	1	2																
		CO 3	Compute centre of gravity and moment of inertia of plane surfaces		2																
		CO 4	Compute the motion characteristics of a body/particle for a rectilinear and curvilinear motion	1	2																
		CO5	Know and discuss relation between force and motion characteristics	2	1																
BTES204	Computer Programming in C	CO 1	Analyse broad perspective about the uses of computers in engineering industry and C Programming	3	1	1	1														
		CO 2	Identify and develop the basic concept of algorithm, algorithmic thinking and flowchart	3	2	2	2														
		CO 3	Create variable, keywords and different types of operators	3	2	3	3														
		CO 4	Demonstrate programs using c programming concept like loops, control statements and array	3	2	2	2														
		CO 5	Verify tasks in which the pointers are applicable and apply them to write programs and hence use computers effectively to solve the task.	3	2	2	2														
BTES205	Workshop Practices	CO 1	Build thorough knowledge of various tools, machines, devices used in engineering practice	2					2			1			1						
		CO 2	Summarize thorough knowledge of carrying out various operations in mechanical engineering workshop	2									1			2					
		CO 3	Utilize measuring skills and practical skills gained in the workshop practice	2	2								1			1					
		CO 4	Demonstrate "Hands on" training to use of various tools, devices and machines	2									2			1					
		CO 5	Acquire skills in basic engineering practice for creating objects from raw materials	1	2					2			2			2					
BTES206	Basic Electrical and Electronics Engineering	CO 1	Apply basic ideas and principles of electrical engineering	3																	
		CO 2	Identify protection equipment and energy storage devices.		2																
		CO 3	Differentiate electrical and electronics domains and explain the operation of diodes and transistors	2																	
		CO 4	Acquire knowledge of digital electronics.	3																	
		CO5	Design simple combinational and sequential logic circuits.			2															
BTBS207L	Engineering Chemistry Lab	CO 1	Understand different techniques of quantitative chemical analysis to generate experimental skills	3	2		1			2		1			1						
		CO 2	Apply instrumental techniques for chemical analysis	3	2		1					1			1						
		CO 3	Evaluate accurate results from experiment procedure & represent effectively in laboratory reports including innovative experiments	2	3		1						1			1					
		CO 4	Analyse different properties of lubricant for selection of good lubricant	3	3		1						1			1					

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BTEEC401	Network Theory	CO1	Understand different technologies of electric network.	3	3	2							1		1					
		CO2	Apply basic laws, theorems and the network topologies method of solving an electrical network to DC and AC electric circuit.	3	2	2								1	3	3				
		CO3	Analyze the transient and steady state response of electrical circuits in time and frequency domain.	3												1		2		
		CO4	Evaluate the various parameters of two port network and network synthesis.	2	2								1			2	2			
		CO5	Analyze response in series and parallel circuit and design filters.	3									1			2	2			
BTEEC402	Power System	CO1	Explain different power plants of electrical power generation.				2			2				2		3				
		CO2	Illustrate an electrical design of overhead transmission line.	2		3										2				
		CO3	Illustrate the mechanical design of overhead transmission line.	2		3												2		
		CO4	Analyze performance of transmission line.	2	2		2										2			
		CO5	Explain ACDC distribution system.	3						2					1			2		
BTEEC403	Electrical Machine II	CO1	Explain the working principle of induction machine	3	3	2							1		1	2	3			
		CO2	Discuss the working principle of Synchronous machine.	3	2	2								1	3		3			
		CO3	Illustrate different methods of speed control of AC motor	3												1	1	1		
		CO4	Explain importance and procedure of different performance test on AC motor.	2	2								1			2	2	3		
		CO5	Draw different operating characteristics of Frictional kilowatt machines.	3										1		2		1		
		CO6	Describe different types of special purpose machine.	3										1		1	3	2		
BTBS404	Analog and Digital Electronics	CO1	Analyse Bipolar Junction Transistor circuits.	3	3	2							1		1	3				
		CO2	Apply concepts of Operational amplifier design applications.	3	2	2									1	3	3			
		CO3	Illustrate Number systems, Logic Gates and Boolean algebra.	3												1	3			
		CO4	Illustrate Digital Logic Gates characteristics and minimization techniques.	2	2								1			2				
		CO5	Examine Combinational Systems.	3										1		2				
BTEEP405D	Electronic Devices and Circuits	CO1	Analyse Bipolar Junction Transistor circuits.	3	1		1	1										2		
		CO2	Analyse JFET and MOSFET Transistor circuits.	3	2		1	2											2	
		CO3	Apply transistor knowledge to study Power amplifiers and feedback amplifiers.	3	3		2	3	1							1	2			
		CO4	Illustrate circuits of sinusoidal and nonsinusoidal oscillators and Multivibrators.	3	1		1	1												
		CO5	Examine circuits of regulated power supply.	3	3		2	3	1							1	1			

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BTEEL406	Network Theory Lab	CO1	Apply basic laws,theorms,methods for DC electric network	3	3		3	3					2		2	3			
		CO2	Acquire skills of MATLAB for transient response of RC,RL networks	3	3		3	3						2		3	2	1	
		CO3	Analyse resonance in series R,L and C	3	2		3	3						2		2	2	1	
		CO4	Evaluate various parameters of 2 port network	3	2		3	1						2		2		1	
BTEEL407	Power System Lab	CO1	Explain working of Electrical Power Generation plant.	2	2	3										3			
		CO2	Describe overhead transmission line & its parameter.	2		2	2										2		
		CO3	Discuss distribution Substation layout & working			3	2											2	
BTEEL408	Electrical Machine II Lab	CO1	Analyze working of 3 phase Synchronous machine.	3	2	2						2			1	3			
		CO2	Ecaluate the regulation methods of alternator.	3	3	2							2		1	2	3		
		CO3	Develop the understanding of starters for Induction motor.	3										1		1	3		
		CO4	Develop the understanding of test conducted for Induction motor.	2	1									2					
		CO5	Use the computer to understand speed control method of induction motor.	3	2	2								2					
		CO6	Use the computer to understand slip test of synchronous machine.	3	2	2								2					
BTEEL409	Analog and Digital Electronics Lab	CO1	Demonstrate charateristics and frequency response of Bipolar Junction Transistor.	3			2								3		1		
		CO2	Understand and demonstrate characteristics of Opamp	2			2									3			
		CO3	Verify functionality of Logic Gates	3	3		2											1	
		CO4	Design and implement Sequential Logic design			3		3						2		3		1	
		CO5	Design and implement Combinational Logic design			3		3						2		3		1	
BTEEP410	InternshipII	CO1	Understand sensors, actuators, communication and Networking.	3		1						3							
		CO2	Understand Cyber Physical Systems and Cyber security in Industry 4.0.	3		2						3				3			
		CO3	Knowledge of theory related to Industrial IoT Systems	2			2		2										
		CO4	Ability to implement real case studies by gained knowledge of Industrial applications with IoT capability	3	2								1		1		3		
BTEEC501	Electrical Machine II	CO1	Explain the working principle of induction machine	3	3			3							3		2		
		CO2	Analyze the working principle of Synchronous machine.	3	2	3		3								2		3	
		CO3	Explain different methods of speed control of AC motor	3	2	2										3	2		
		CO4	Describe importance and procedure of different performance test on AC motor.	2	2											2		2	
BTEEC502	Power System II	CO1	Understand the Power system operation and control methods.	3	3			3							3	2	3		
		CO2	Select proper methodologies for load flow studies for the power network	3	2	3		3								2	2	3	
		CO3	Explain different methods of reactive power control.	3	2	2										3	1	3	
		CO4	Analyze different faults in power system.	2	2											2		2	
		CO5	Apply concepts of Stability Analysis.	2	3	3	2									3	1	2	
		CO6	Apply concepts of Stability Analysis.	2	2		2	2								2	1		2

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BTEEL503	Microprocessor and MicroController	CO1	Explain the Architecture of 8085.	3	1		1	1												
		CO2	Analyze interfacing and interrupt features of 8085.	3	2		1	2										1		
		CO3	Develop Assembly language programs for 8085.	3	3		2	3	1							1		1		
		CO4	Explain the Architecture of 8051.	3	1		1	1												
		CO5	Develop programs for basic applications of 8051.	3	3		2	3	1							1		2		
BTHM504	Value Education, Human Rights and Legislative Procedures [MOOC/Swayam/NP	CO1	Understand value of education and self development.								2	2	2							
		CO2	Develop good values and character.						2		1	1	1							
		CO3	Know human rights and legislative procedures.								1	1	1							
BTEEE505	Advances in Renewable Energy Sources	CO1	Explain the principle of energy conversion technique from biomass energy systems	3	3			3							3			3		
		CO2	Explain different resource to generate energy from geothermal energy systems	3	2	3		3								2			3	
		CO3	Discuss need and types of hybrid energy systems	3	2	2										3			2	
		CO4	Analyze effects of air pollution and noise pollution	2	2											2			1	
		CO5	Explain definition, concept of environmental impact and structure of ecosystems	2	3	3	2									3			1	
BTEEOE506	Power Plant Engineering	CO1	Review basic components of power system, types of conventional and non conventional energy sources.	2	1											1		1		
		CO2	Explain principle of construction and operation of different nonconventional power plants.	2	1												1		1	
		CO3	Explain principle of construction and operation of different conventional power plants.	2	1												1		1	
		CO4	Explain economics of combined working of power plants.	2	1												1		1	
		CO5	Analyze interfacing of different power plant to grid.	3	2												1		1	
BTEEL507	Electrical Machine II Lab	CO1	Demonstrate working of 3 phase Synchronous machine.	3	2	2		2									3			
		CO2	Illustrate the regulation methods of alternator.	3	3	2		2										3		
		CO3	Demonstrate the understanding of starters for Induction motor.	3	3	2		2										3		
		CO4	Illustrate testing of Induction motor.	3	3	2		2					2					3		
BTEEL508	Power System II Lab	CO1	Understand the Sequence reactance of Synchronous machine	3	3			3							3	2	3			
		CO2	Analyze the fault in AC network.	3	2	3		3								2	2	3		
		CO3	Develop Load flow equations for components in AC system	3	2	2										3	2	3		
		CO4	Use the computer for Stability study.	2	2			3								2		2		
BTEEL509	Microprocessor and MicroController Lab	CO1	Demonstrate architecture of Microprocessor and Microcontroller.	3			2								3					
		CO2	Demonstrate use of 8085 Microprocessor instruction set.	2			2									3				
		CO3	Demonstrate Assembly language Program of 8085 Microprocessor.	3	3		2											2		
		CO4	Demonstrate Assembly language Program of 8081 Microcontroller.			3		3						2		3		2		
		CO5	Demonstrate interfacing of Input/ Output devices to Microprocessor and Microcontroller			3		3						2		3		2		

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BTEEF510	Industrial Training	CO1	Develop practical skills, critical thinking, problem solving skills by working on projects.	2	1	2	1									1	2			
		CO2	Apply theoretical knowledge to real world problem.	3	1	1											1	2		
		CO3	Build communication and teamwork skills.							3	3						1	2		
		CO4	Develop a professional network and gain exposure.							3	2	2					1	2		
		CO5	Reflect on personal strengths and areas for professional development and career advancement.							2			3				1	2		
		CO6	Document and prepare report.									3			2		1	2		
BTEEC601	Control System	CO1	Categorize and analyze different types of nonlinearity present in system	3	1		1	1									2			
		CO2	Design PID based controllers	3	2		1	2										3		
		CO3	Apply state variable techniques to analyze systems	3	3		2	3	1							1		2		
		CO4	Apply concepts of Discrete Data Control System to analyze Control System	3	1		1	1										2		
		CO5	Organize relevant control system for Engineering application	3	3		2	3								1		2		
BTEEC602	Principles of Electrical Machine Design	CO1	Explain principles of electric machine design.	2	2		2										3			
		CO2	Explain different types of electrical apparatus	3				2						2				2		
		CO3	Describe types and parameters of AC and DC windings	3				2						2			2			
		CO4	Explain Heating, Cooling and Ventilation for electrical machine	2		2													2	
		CO5	Design Transformer for different ratings	3	2	3		2						2			2			
		CO6	Explain CAD and use it for transformer design	1		3		3						1					3	
BTEEC603	Power Electronics	CO1	Review principle of construction, operation and characteristics of basic semiconductor devices.	3												1				
		CO2	Understand and analyze performance of controlled and uncontrolled converters.	2			2											1		
		CO3	Understand and analyze performance of DC to DC converters. DC to AC converters.	2			2												1	
		CO4	Understand and analyze performance of AC voltage controllers.	3			2												1	
BTEEE604	Industrial automation and Control	CO1	Develop components and layers of industrial automation control system.	3	1	1	1	3							3		2			
		CO2	Explain construction and working principle of different industrial measurement systems.	3	2	3	1	3								3	1			
		CO3	Identify new trends in industrial process control	3	2	3	3	1								3		2		
		CO4	Describe PLC and design a relay ladder logic in sequenece control.	3	1	1	3	2								1		2		
		CO5	Explain different technologies of hydraulic control and pneumatic control, CNC, Field bus.	3	1	1	1	2								1	2			
BTEEC605	Switch Gear and Protection	CO1	Explain principles of protective relaying.	3	3			3					1			2	2			
		CO2	Describe principle of construction, operation and selection of different type of circuit breaker used in power system.	3	2			3						1	1	2	2			
		CO3	Explain different protection schemes used in power system operation.	3								1					3	1		
		CO4	Discuss insulation coordination and over current protection.	2									1			2	1	1		

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BTEEOE606	Project Management	CO1	Analyze of data, information and knowledge.			2	2			2										
		CO2	Define the concept of marketing.		2	2							1							
		CO3	Identify project and work for community devepment.	2	2	2								2						
		CO4	Analyze the business model.	2	2	2	2								2					
BTEEL607	Control System Lab	CO1	To understand and use various components of Analog Computer System.	3			2											3		
		CO2	To understand concepts of MATLAB programing and simulation tools.	2			2												3	
		CO3	To analyze Control System using MATLAB programming commands.	3	3		2													
		CO4	To simulate nonlinear control systems using MATLAB simulation tool.			3		3					2							3
		CO5	To obtain solutions of state space equations using MATLAB			3		3					2							3
BTEEL608	Principles of Electrical Machine Design Lab	CO1	Illustrate electrical symbol & electrical installation procedure.	2	2	3										2				
		CO2	Design of DC shunt motor starter & Start Delta Starter.	2		2												2		
		CO3	Design of AC DC winding	2		3	2												2	
		CO4	Design of transformer	2		3	2												3	
BTEEL609	Power Electronics Lab	CO1	Use the power electronics simulation packages to develop the power converters.	2			2	3										1		
		CO2	Analyze the different converters output waveforms for R and RL loads	2			2	3										1		
		CO3	Understand operating principle of various power electronics circuits /converter.	2			2	3									1			
BTEEC701	Power System Operation & Control	CO1	Explain the fundamental concept of power system.	3	3										3	3				
		CO2	Design the mathematical model of synchronous machine.	3	2	3										2		2		
		CO3	Design the mathematical model Excitation system and speed governing system.	2	2			3								3	2			
		CO4	Analyse the transient stability of power system using swing equation and equal area criteria.	2	2											2	3			
		CO5	Analyse the economic operation of power system.	3	2	2		3								3	2			
BTEEC702	High Voltage Engineering	CO1	Illustrate the concept of electric field stresses, applications of insulating materials	3	3										3	2	2	1		
		CO2	Explain the breakdown process in solid, liquid, and gaseous materials.	3	2	3									2	1	3	2		
		CO3	Analyze methods for generation and measurement of High Voltages and Currents (both ac and dc)	2	2			3							3		2	3		
		CO4	Describe the phenomenon of overvoltage and choose appropriate insulation coordination levels based on IS & IEC Standards.	2	2										2	1	2	1		
		CO5	Understand the methods for Nondestructive testing of equipment like transformers, insulators, isolators, bushings, lightning arrestors, cables, circuit breakers and surge diverters	3	2	2		3							3	2	3	2		

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BTEEC703	Electrical Drives	CO1	Analyze the dynamics of Electrical Drives system.	3	1												3			
		CO2	Use various control techniques for controlling the speed of AC and DC motors.	3	3													3		
		CO3	Analyze the AC and DC drives.	2	2	1											2			
BTEEE704	Special Purpose Electrical Machines	CO1	Explain the details of construction, principle of operation and performance of synchronous reluctance motors and their different applications.	3				3									3			
		CO2	Analyze the details of construction, principle of operation and performance of stepper motors and their different applications.						1				3					3		
		CO3	Describe the details of construction, principle of operation and performance of switched reluctance motor and their different applications.								2								3	
		CO4	Explain the details of construction, principle of operation and performance of permanent magnet brushless DC motor and their different applications.		1	2									3				3	
		CO5	Explain the details of construction, principle of operation and performance of permanent magnet synchronous motor and their different applications.					3				1							3	
BTEEE705	HVDC Transmission and FACTS	CO1	Compare the HVDC and HVAC transmission options, justify the advantages of HVDC transmission system.	1												2				
		CO2	Analyze converter configuration and also HVDC converter for different mode of operation	2	3												2			
		CO3	Choice of converter and their control configuration	3		1												1		
		CO4	Identify the different types of protections used HVDC system.	2		2	2											3		
		CO5	Analyze the basic FACTS concept and general system configuration.	3				2					3	3		3	2			
		CO6	Explain detail study of static shunt compensator	2														1		
BTEEL706	Power System Operation & Control Lab	CO1	Understand program to compute the voltage and power factor using MATLAB.	2	2	2		3								2				
		CO2	Understand simulation of AVR single load frequency control using MATLAB.	2	2	3		3										2		
		CO3	Understand program for economic dispatch in power systems using MATLAB	2	2	2		3									2			
		CO4	Understand for synchronous machine operation using MATLAB	2	2	2		3									3			
		CO5	Understand program to solve the given Equal Area Criteria problem using MATLAB	2	2	2		3									2			
BTEEL707	High Voltage Engineering Lab	CO1	Understand and assimilate the concepts of High Voltage Engineering.	3	3				2						3	2	2	1		
		CO2	Analyze the effect of high voltage on equipment	3	2				3						2	1	3	2		
		CO3	Simulate the components for protection from overvoltage or lightning phenomenon.	2	2			3	2						3		2	3		
		CO4	Understand the concept of breakdown strength of insulating material and dielectric material	3	2				3						2	1	2	1		
BTEEL708	Electrical Drives Lab	CO1	Simulate single phase half/ full controlled converter DC Drive.	1	2	2	3								1	2	2			
		CO2	Simulate Speed control of DC motor using chopper.	1	1	1	2									1	2	2		
		CO3	Simulate of AC Drive .	2	2	2	2									1	2	2		
		CO4	Simulate V/f control of AC drive	1	2	2	3									1	2	2		
		CO5	Simulate the inverter fed induction motor drive.	1	1	1	2									1	2	2		

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BTEES709	Seminar	CO1	Verifys basic scientific principles of Electrical Engineering topics	1	2	2	3								1	1				
		CO2	Enhance presentation skills.	1	2	2	3									1				
		CO3	Develop report writing skills	1	1	1	2									1				
BTEEP710	Project PartI	CO1	Demonstrate an understanding of the fundamental principles of Electrical Engineering and apply them to the design and development of a complex electrical system	3		2	2					2		2	2	2				
		CO2	Conduct research and analyze existing literature in the field of Electrical Engineering to identify the latest trends and technologies		3						2									
		CO3	Use advanced software tools and techniques to design , simulate and test electrical system	2		2	2	3									2	2		
		CO4	Work effectively in a in a team to plan manage and execute the project and communicate progress and outcomes							3				1		2				
		CO5	Document and report on project with outcomes									3				2				
BTEEF711	Field Training /Internship/Industrial Training III	CO1	Develop practical skills, critical thinking, problem solving skills by working on projects.	2	1	2	1									1	2			
		CO2	Apply theoretical knowledge to real world problem.	3	1	1											1	2		
		CO3	Build communiacion and teamwork skills.							3	3							1	2	
		CO4	Develop a professional network and gain exposure.							3	2	2						1	2	
		CO5	Reflect on ersonal strengths and areas for professional develoment and career advancement.							2			3					1	2	
		CO6	Document and prepare report.									3			2			1	2	
BTEEP801	Introduction to Industry 4.0 and Industrial Internet of Things	CO1	Understand sensors, actuators, communication and Networking.	1																
		CO2	Understand Cyber Physical Systems and Cyber security in Industry 4.0.	2	3															
		CO3	Knowledge of theory related to Industrial IoT Systems	3		1														
		CO4	Ability to implement real case studies by gained knowledge of Industrial applications with IoT capability	2		2	2													
BTEEP802	Entrepreneurship Essentials	CO1	Analyze the data, information and knowledge.				3	1												
		CO2	Define the concept of marketing.	1	2															
		CO3	Identify projectand work for community development.		3						2	1		3						
		CO4	Analyze the business model.				3	1	1											
BTEEP803	Project II	CO1	Demonstrate an understanding of the fundamental principles of electrical Engineering and apply them to the design and development of a complex electrical system	3		2	2					2		2	2	2				
		CO2	Conduct research and analyze existing literature in the field of Electrical Engineering to identify the latest trends and technologies		3							2								
		CO3	Use advanced software tools and techniques to design , simulate and test electrical system	2		2	2	3									2	2		
		CO4	Work effectively in a in a team to plan manage and execute the project and communicate progress and outcomes							3				1		2				
		CO5	Develope skills in project management, time management and organization									3				2				