DEPARTMENT OF ELECTRICAL ENGINEERING

Code of subject	Name of subject	CO No.	Course Outcome
(BTBS301)	Engineering mathematics-III	1	Understanding the Laplace transform and its applications in solving differential equations and evaluating integrals.
		2	Understanding the inverse Laplace transform and its applications in solving linear differential equations and simultaneous linear differential equations with constant coefficients.
		3	Ability to apply the properties of Fourier transforms to solve differential equations and evaluate integrals.
		4	Ability to apply the method of separation of variables to solve partial differential equations and find solutions of one-dimensional heat flow equation, and two-dimensional heat flow equation.
		5	Understanding the concepts of functions of complex variables and their applications in solving problems related to mapping, harmonic functions, and residues.
		6	Ability to apply the cauchy-riemann equations, Cauchy's integral theorem, Cauchy's integral formula, and residue theorem to solve problems related to complex variables.
(BTEEC302)	Electrical machine1	1	Acquire knowledge about the constructional details, principle of operation and applications of single phase & three phase transformers.

		2	Learn to calculate losses, efficiency, voltage regulation and other parameters of transformers by conducting different routine & type tests
		3	Understand electromagnetic energy conversion principles and classification of electrical machines.
		4	Acquire knowledge about the constructional details and principle of operation of dc motors & generators.
		5	Acquire knowledge of emf equations, torque equations, characteristics & starting methods of different electrical dc machines.
		6	Acquire knowledge of construction details and principle of working of special purpose machines such as brush less dc motor, stepper motor, reluctance motor & variable reluctance motor.
(BTEEC303)	Electrical and electronics measurement	1	Generalized measurement & instrumentation system with the help of a block diagram, its properties and fundamentals.
		2	Choose the suitable method for measurement of active, reactive powers and energy.
		3	Apply the suitable method for measurement of resistance, inductance and capacitance
		4	Do digital measurement of electrical quantities with the help of block diagram
		5	Identify the transducers and its use for measurement of force, torque, velocity, acceleration
(BTES305)	Engineering material science	1	To recall the basics of crystallography of different material.
		2	To classify the concepts of different magnetic properties of material

		3	To identify the various properties of conducting and superconducting materials
		4	To distinguish the characteristics and application of semiconducting materials
		5	To assess the knowledge of fundamentals, construction details and classification of dielectrics
		6	To propose the classification regarding nan materials
(BTHM304)	Basic human right	1	Define human rights
		2	Respect diversity in the society.
		3	Identify fundamental rights and duties of Indian citizen
		4	Recognize the importance of groups and communities in the society.
		5	Realize the philosophical, cultural and historical perspectives of human rights.
		6	Perform their responsibilities towards the nation.
(BTBS404)	Analog and digital electronics	1	To develop capacity to analyze and interpret different electronics circuits.
		2	To impart knowledge of working principles of op-amp & its applications
		3	To review basic number system.
		4	To understand deign and characteristics of digital logic gates.
		5	To study different techniques in use of digital circuits.
		6	To design digital systems.
(BTEEC401)	Network theory	1	Apply the knowledge of basic circuital law & simplify the networks using reduction techniques.
		2	Analyze the network using kirchhoff's laws and network simplification theorems.

		3	Evaluate the initial conditions using knowledge of laplace transformation & analysis of various waveforms.
		4	Evaluate two port network parameters & transfer functions.
		5	Apply the knowledge of resonance for series and parallel rlc circuit and calculation of various electrical quantities for 3-phase circuits.
(BTEEC403)	Electrical machine 2	1	Define fundamentals of 3-phase and 1-phase induction machines and synchronous machines
		2	Compare various parameters of ac electric machines
		3	Identify and organize the characteristics of different ac electrical machines
		4	Analyze the circuit model of ac electrical machines
		5	Justify various ac electrical machines
		6	Construct the control operations and formulate various tests on electrical machines
(BTEEPE405)	Advance renewable energy sources	1	Understand renewable and nonrenewable source of energy
		2	Gain knowledge about working principle of various solar energy system
		3	Understand the application of wind energy and wind energy conversion system
		4	Develop capability to do basic design of bio gas plant
		5	Understand the application of different renewable energy sources like ocean thermal ,geothermal energy etc
(BTEEC501)	Power system analysis	1	Able to define the single line diagram for the electrical power system
		2	Able to explain the symmetrical components in a power system

		3	Able to solve for the symmetrical & unsymmetrical faults in a power system
		4	Able to compare between the different load flow analysis methods used in a power system
		5	Able to determine the short circuit mva for symmetrical faults for design of rating of circuit breaker
		6	Able to evaluate the per unit reactance diagram for given system
(BTEEC502)	Microprocessor and microcontroller	1	To know the architecture of 8085.
		2	To understand interfacing features of 8085.
		3	To understand interrupt features of 8085.
		4	To develop program for basic applications.
		5	To know the architecture and interfacing and interrupt features of 8051.
(BTEEC503)	Power electronics	1	Understand the operation of power electronic devices and its applications.
		2	Analyze the i-v characteristics of scr, diac and triac.
		3	Illustrate the functioning of rectifiers and firing circuits.
		4	Distinguish the speed control of dc motor using converters.
(BTEEOE505)	Elctrical safty	1	To study and understand primary and secondary hazards arc.
		2	Make use of specification of electrical plants and classification of safety equipment for various hazardous locations
		3	Outline the policy , safety audit , rescue techniques for electrical safety programme structure
		4	To study and understand safety related case for electrical maintenance

		5	Understand the Indian power sector organization , Indian electricity acts related to electrical safety
(BTEEPLE504)	Power quality issues	1	Define different types of power quality issues
		2	Explain transient over voltage, devices for over voltage protection
		3	Explain sources of harmonics, effects of harmonics distortion, standards of harmonics
		4	Explain devices for voltage regulation, utility voltage regulation application
		5	Explain power quality measuring instruments and equipments
code of subject	**Name of subject**	**CO NO.**	**Co**
(BTEEC601)	Switchgear and protection	1	Explain the working of different types of switchgear equipment like circuit breakers and relays
		2	Study the ratings for fuses according to the requirement
		3	Elucidate various protection schemes of various power system components like alternators, transformers and bus-bars
		4	Explain various methods of over voltage protection in power systems
(BTEEC602)	Electrical machine design	1	To recall the concept and ability to analyze the magnetic materials and magnetic circuits in electrical machines
		2	To identify and design the different types of winding
		3	To distinguish the characteristics and application of induction motor stator
		4	To distinguish the characteristics and application of induction motor rotor
		5	To assess the knowledge of fundamentals, construction details and classification of heating , cooling, ventilation

(BTEEC603)	Control system engineering	1	Compute transfer function of linear time invariant systems
		2	Describe operation of various control system components
		3	Analyze and evaluate linear systems in time domain
		4	Analyze and evaluate of linear time invariant systems in frequency domain
		5	Explain various industrial controllers
(BTEEOE605)	Power plant engineering	1	Describe and analyze different type of source in ppe
		2	Discuss the working principle and basic component of thermal and a hydroelectric pp
		3	Discuss the working principle and basic component of nuclear ,diesel and a gas pp
		4	Study about different renewable gas power plant
		5	Combine operation of previously learnt courses to define the working principle of different pp.
(BTEEPE604)	Smart grid technology	1	To make students aware the need and importance of conventional grid over smart grid with smart grid applications.
		2	To impart knowledge about components , architecture and performance of electric and hybrid vehicles
		3	To impart knowledge about architecture and performance of electric hybrid vehicles and plug in hybrid vehicle.
		4	Do digital measurement of electrical quantities with the help of block diagram.
		5	To classify the different drives and control of smart power grid system.
(BTEEC702)	High voltage engineering	1	Illustrate the concept of electric field stresses in high voltage engineering
		2	To enable students to know and compare the various processes of breakdown in gaseous dielectric materials

		3	To enable students to know and compare the various processes of breakdown in liquid and solid dielectric materials
		4	To enable students to know the charge formation and separation phenomenon in clouds, causes of overvoltage and lightening phenomenon
		5	To enable students understand and apply various methods of generation and measurement of dc, ac, impulse voltage and current.
		6	Describe the phenomenon of over-voltage and choose appropriate insulation coordination levels based on is & iec standards.
(BTEEC703)	Electical drive	1	To recall the concept and ability to analyze the electric and magnetic materials and magnetic circuits in electrical machines
		2	To classify the different components of electric machine
		3	To identify and design the different types of winding
		4	To distinguish the characteristics and application of dc motor
		5	To assess the knowledge of fundamentals, construction details and classification of transformer
(BTEEE704)	Electrical traction and utilization	1	To recall the knowledge about the electric traction system.
		2	To classify the track electrification
		3	To identify the constructional features of traction motors
		4	To distinguish the characteristics and application of dc motor
		5	To assess the knowledge of fundamentals, construction details and classification of traction controls

		6	To propose the braking methods for smooth controlling
(BTEEE705)	Energy audit and conservation	1	Understand different energy sources and importance of energy conservation, global warming and effects of global arming
		2	Different efforts for energy conservation , and mechanism for reduction of carbon emission
		3	Energy conservation opportunities in boiler, boiler efficiency calculation
		4	Energy conservation opportunities 5n electrical appliances and system
		5	Network analysis in management, calculation
		6	Define time value of money, npv, irr and solve n4mericals 6n npv and irr
(BTEEO801F)	Introduction to industry 4.0 and IoT	1	To understand the basics of networking and security.
		2	To understand predecessor of iot technology and emergence of internet of things
		3	To understand architecture for internet of things
		4	To recognize various devices, sensors, actuators, and various processing paradigms for iot.
		5	To apply industrial internet of things (iiot) is an application of iot in industries
(BTEEO802G)	Entrepreneurship essentials	1	The course provides foundational knowledge on various aspects of entrepreneurial venture creation and management during its life-cycle.
		2	The objective of the course is to teach key issues faced by entrepreneurs and managers at different stages of the life-cycle of an enterprise and is relevant both for aspiring entrepreneurs and for decision makers in established enterprises

		3	Topics can be classified in some major themes such as : making a choice to create an entrepreneurial venture, current trend of technology entrepreneurship, how to start a start-up, identifying opportunities, factors driving competitive advantages, organ
		4	Basic knowledge of financial statements and project report,introductory knowledge on marketing management, human resource management, & strategic management.
		5	Risk analysis, legal aspect of business, how to raise fund during life-cycle of a new ventures.