BLOWUPSYLLABUS
FirstSemesterB.E.
INTRODUCTION TO ELECTRICAL ENGINEERING FOR ALL BRANCHES(22ESC142)
(Effectivefromthe academic year2022-23)

Topics	TopicsToBeCovered	Hours
Module-I		
Introduction: Conventional and non-conventional energy resources; General structure of electricalpower systems using single line diagram approach.	Discussion on Conventional and non-conventional energy resources; General structure of electricalpower systems using single line diagram approach. Article No: 24.3 of Textbook 2 Article No: 15.9 of Reference book 1	2
Power Generation: Hydel, Nuclear, Solar & wind power generation (Block Diagram approach).	Discussion on Hydel, Nuclear, Solar & wind power generation with their schematic diagram Article No: 24.5.3,24.5.2,24.6.1,24.6.3.2	3
DC circuits: Ohm's Law and its limitations. KCL & KVL, series, parallel, series-parallel circuits.Simple Numerical.	Discussion on Ohm's Law and its limitation, KCL & KVL, Series circuit, Parallel circuit, Potential division rule, Current division rule, and problems as suggested in Article No:2.1, 2.2 and 3.6 of Textbook 1 Article No:1.13,1.14, 1.16 and 2.2 of Textbook 2	3
Total		**8**
Module-II		
A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions) Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, R-C, R-L-C Series circuits. Active power, reactive power and apparent power.Concept of power factor. (Simple Numerical).	Discussion on Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions) Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, R-C, R-L-C Series circuits. Active power, reactive power and apparent power.Concept of power factor. (Simple Numerical). Article No:9.1, 9.2, 9.7,10.1,10.2,10.6,10.3,9.6 of Textbook 1 Article No:11.2,11.6to11.13,11.17 to 11.19, 11.28 to 11.30,11.32, 13.1 to 13.9 of Textbook 2	6
Three Phase Circuits: Generation of Three phase AC quantity, advantages and limitations; star and delta connection,relationship between line and phase quantities (excluding proof)	Discussion on generation of Three phase AC quantity, advantages and limitations; star and delta connection, relationship between line and phase quantities (excluding proof) Article No:12.1, 12.4, 12.6, 12.7, 12.8 of Textbook 1 Article No: 19.1,19.5,19.6,19.8 and 19.9 of Textbook 2	2
Total		**8**
Module-III DC Machines		
DC Generator: Principle of operation, constructional details, induced emf expression, types ofgenerators. Relation between induced emf and terminal voltage. Simple numerical.	Discussion on Principle of operation, constructional details, induced emf expression, types ofgenerators. Relation between induced emf and terminal voltage. Simple numerical. Article No: 16.2,16.5 and 16.6 of Textbook 1	3
DC Motor: Principle of operation, back emf and its significance. Torque equation, types of motors,characteristics and speed control (armature & field) of DC motors (series & shunt only). Applicationsof DC motors. Simple numerical.	Discussion on Principle of operation, back emf and its significance. Torque equation, types of motors,characteristics and speed control (armature & field) of DC motors (series & shunt only). Applicationsof DC motors. Simple numerical. Article No: 16.11 to 16.13 of Textbook 1 Article No: 10.1, 10.2, 10.4, 10.5, 10.8, 10.9, 10.12 of Reference book 1	5
Total		**8**

Module-IV		
Transformers: Necessity of transformer, principle of operation, Types and construction of single phase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical.	Discussion on Necessity of transformer, principle of operation, Types and construction of single phase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical. Article No: 13.1 to 13.5 and 13.10 of Textbook 1	**4**
Three-phase induction Motors: Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor. Slip and its significancesimple numerical.	Discussion on Concept of rotating magnetic field, Principle of operation,constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance simple numerical. Article No: 15.1 to 15.3 of Textbook 1 Article No: 19.1 to 19.7 of Reference book 2	**4**
	Total	**8**
Module-V		
Domestic Wiring: Requirements, Types of wiring: casing, capping. Two way and three way control of load	Discussion on Requirements, Types of wiring: casing, capping. Two way and three-way control of load Article No:19.1, 19.4,19.6, 19.7 of Textbook 1	**2**
Electricity Bill: Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.	Discussion on Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff *, calculation of electricity bill for domestic consumers. Article No: 15.17 of Textbook 1(D C Kulshreshtha,2nd edition)	**2**
Equipment Safety measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits.	Discussion on Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Article No: 16.5 of Reference Book 1	**2**
Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	Discussion on Electric Shock, Earthing and its types, Safety Precautions to avoid shock. Article No: 19.9, 19.10 of Textbook 1 Article No: 8.11 of Textbook 1 (D C Kulshreshtha)	**2**
	Total	**8**

Text Books:
1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. A text book of Electrical Technology by B.L. Theraja, S Chand and Company, reprint edition 2014.

Reference Books:
1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Tata McGraw Hill 4th edition, 2019.
2. Principles of Electrical Engineering & Electronics by V. K. Mehta, Rohit Mehta, S. Chand and Company Publications, 2nd edition, 2015.
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI, 3rd edition, 2014.

Web links and Video Lectures:www.nptel.ac.in