BLOWUP SYLLABUS

First Semester B.E.

ELEMENTS OF ELECTRICAL ENGINEERING FOR ELECTRICAL AND ELECTRONICS ENGINEERING STREAM (22EEE13)

(Effective from the academic year2022-23)

Topics	Topics To Be Covered	Hours
Module-I: DC Circuits &Electromagnetism		
DC circuits: Ohm's law analysis of series, parallel and series-parallel circuits. Power and energy.	Discussion on Ohm's Law, Series circuit, Parallel circuit, Potential division rule, Current division rule,Power and energy and problems . Article No:2.1 and 2.2 of Textbook 1 Article No:1.1 to 1.16 of Textbook 2	**2**
Kirchhoff's laws analysis	Discussion on Kirchhoff's Law for series, parallel and series parallel circuit and problems. Article No:3.6, 3.7and 3.8 of Textbook 1 Article No:2.1 to 2.4 of Textbook 2	**2**
Electromagnetism: Faraday's Laws of Electromagnetic Induction, Lenz's Law, Fleming's rules.	Introduction to different magnetic terminology, analogy between electric and magnetic circuit, Right hand thumb rule and Electromagnetism. Discussion on Faraday's Laws of Electromagnetic Induction, Lenz's Law, and Fleming's rules. Article No: 6.1, 6.2 and 6.3 of Textbook 1. Article No:7.1 and 7.5 of Textbook 2	**2**
Statically and dynamically induced EMF; concepts of self and mutual inductance. Coefficient of Coupling. Energy stored in magnetic field. Simple Numerical.	Discussion on Statically and dynamically induced EMF; concepts of self and mutual inductance and derivation of the term 'L' and 'M'. Coefficient of Coupling. Energy stored in magnetic field and problems Article No:7.1,7.3and 7.7of Textbook 1 Article No:7.6 to 7.13 of Textbook 2	**2**
	Total	**8**
Module-II: Single phase AC Circuits		
Single-phase AC circuits: Generation of sinusoidal voltage, frequency of generated voltage, average value, RMS value, form factor and peak factor of sinusoidal voltage and currents. Phasor representation of alternating quantities.	Discussion on generation of AC, frequency of generated voltage, basic terminology in AC circuits, average value, RMS value, form factor and peak factor of sinusoidal voltage and currents. Phasor representation of alternating quantities, Phasor representation using Polar form and Rectangular form and problems Article No:9.1 to 9.5of Textbook 1 Article No:11.1 to 11.27 of Textbook 2 Article No:12.1 to 12.9 of Textbook 2	**4**
Analysis of R, L, C, R-L, R-C and R-L-C circuits with phasor diagrams, Real power, reactive power, apparent power, and Power factor. Series, Parallel and Series-Parallel circuits. Simple Numerical.	Discussion on analysis of R, L, C, R-L, R-C and R-L-C circuits with phasor diagrams, Real power, reactive power, apparent power, and Power factor. Series, Parallel and Series-Parallel circuits and numerical Article No:10.1 to 10.7 of Textbook 1 Article No:13.1 to 13.5,13.7,13.9,1.1 to 14.8 of Textbook 2	**4**
	Total	**8**
Module-III: Three phase AC Circuits		
Three-phase AC circuits: Necessity and advantage of 3-phase system. Generation of 3-phase power. Definition of phase sequence. Balanced supply and balanced load	Discussion on Necessity and advantage of 3-phase system, Generation of 3-phase power, basic terminology phase sequence, naming the phases, double script notation. Balanced supply and balanced load. Article No:12.1 to 12.5 of Textbook 1 Article No:19.1 to 19.5 of Textbook 2	**1**

Relationship between line and phase values of balanced star and delta connections. Power in balanced 3-phase circuits. Measurement of 3-phase power by 2-wattmeter method. Simple Numerical.	Discussion on the given topics as suggested in Article No:9.1 to 9.5of Textbook 1 Article No:19.6 to 19.9 of Textbook 2 Article No:19.15 to 19.24 of Textbook 2	**7**
	Total	**8**
Module-IV: Measuring Instruments &Domestic Wiring		
Measuring instruments: construction and working principle of whetstone's bridge, Kelvin's double bridge, Megger, Maxwell's bridge for inductance, Schering's bridge for capacitance, concepts of current transformer and potential transformer. (Only balance equations and Excluding Vector diagram approach)	Discussion on construction and working principle of whetstone's bridge, Kelvin's double bridge, Megger, Maxwell's bridge for inductance, Schering's bridge for capacitance, concepts of current transformer and potential transformer Article No:16.1 to 16.3,16.10,10.24,10.68,10.70,10.73 of Textbook 2 Article No:14.2.3,14.2.4,14.2.8,14.3.1,14.3.2 of Reference book 4	**6**
Domestic Wiring: Requirements, Types of wiring: casing, capping. Two way and three way control of load.	Discussion on different requirements for wiring, types of wiring and two way and three way control of lamp Article No:19.6 to 19.97,19.4 of Textbook 1	**2**
	Total	**8**
Module-V: Electricity bill, Equipment Safety measures, Personal Safety measures		
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 different house hold appliances, two part tariff system, electricity bill calculation Article No:15.6,15.17 of Textbook 1(D C Kulshreshtha,2nd edition)	**3**
Equipment Safety measures: Working principle of Fuse and Miniature circuit breaker(MCB),merits and demerits.	Discussion on importance of Fuse and MCB and its working as suggested in Article No:15.3,15.4 of Textbook 1(D C Kulshreshtha,2nd edition)	**2**
Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock, and Residual Current Circuit Breaker(RCCB) and Earth Leakage Circuit Breaker (ELCB).	Discussion on earthing and its types, electric shock, precaution against shock, RCCB and ELCB as suggested in Article No:15.6,15.7,15.10,15.12 of Textbook 1 (D C Kulshreshtha,2nd edition)	**3**
	Total	**8**

Textbooks:-

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. Electrical Technology by E. Hughes, Pearson, 12th Edition, 2016.
4. Electrical and electronic measurements and instrumentation by A K Sawhney, Dhanapat Rai and Co. edition, January 2015

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