ELECTRICAL ENGINEERING (NEE101/NEE201)

Unit-I
1. D C Circuit Analysis and Network Theorems:
Circuit Concepts: Concepts of network, Active and passive elements, Voltage and current sources, Concept of linearity and linear network, Unilateral and bilateral elements, \( R, L \) and \( C \) as linear elements, Source transformation Kirchhoff’s laws; Loop and nodal methods of analysis; Star-delta transformation Network theorems: Superposition theorem, Thevenin’s theorem, Norton’s theorem, Maximum Power Transfer theorem (Simple numerical problems)

Unit-II
2. Steady-State Analysis of Single Phase AC Circuits:
AC fundamentals: Sinusoidal, square and triangular waveforms – Average and effective values, Form and peak factors, Concept of phasors, phasor representation of sinusoidally varying voltage and current, Analysis of series, parallel and series-parallel RLC Circuits, Resonance in series and parallel circuits, bandwidth and quality factor; Apparent, active & reactive powers; Power factor, Causes and problems of low power factor, Concept of power factor improvement (Simple numerical problems)

Unit-III
3. Three Phase AC Circuits:
Three phase system-its necessity and advantages, Star and delta connections, Balanced supply and balanced load, Line and phase voltage/current relations, Three-phase power and its measurement (simple numerical problems).

4. Measuring Instruments:
Types of instruments, Construction and working principles of PMMC and moving iron type voltmeters & ammeters, Single phase dynamometer wattmeter, Use of shunts and multipliers (Simple numerical problems on shunts and multipliers)

Unit-IV
5. Introduction to Earthing and Electrical Safety:
Need of Earthing of equipment and devices, important electrical safety issues.

6. Magnetic Circuit:
Magnetic circuit concepts, analogy between electric & magnetic circuits, \( B-H \) curve, Hysteresis and eddy current losses, Mutual coupling with dot convention, Magnetic circuit calculations.

7. Single Phase Transformer:
Principle of operation, Construction, EMF equation, Equivalent circuit, Power losses, Efficiency (Simple numerical problems), Introduction to auto transformer.

Unit-V
8. Electrical Machines:

Text Books:
1. “Principles of Electrical Engineering”, V. Del Toro; Prentice Hall International
4. “Fundamentals of Electrical Engineering”, B Dwivedi, A Tripathi; Wiley India
5. ”Basic Electrical Engineering”, Kuldeep Sahay, New Age International Publishers

Reference Books:
1. “Electrical and Electronics Technology”; Edward Hughes; Pearson
3. “Basic Electrical Engineering”, C L Wadhwa; New Age International