VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
BASIC ELECTRICAL ENGINEERING

B.Tech. I Year I Sem.   L   T   P   C
                                                                                         2   0   0   2

Prerequisites: Mathematics

Course Objectives:
➢ To understand DC and Single & Three phase AC circuits

➢ To study and understand the different types of DC, AC machines and Transformers.

➢ To import the knowledge of various electrical installations and the concept of power, power factor and its improvement.

UNIT-I:
D.C.Circuits: Electrical circuit elements(R, LandC),voltage and current sources, KVL & KCL, analysis of simple circuits with dc excitation. Super position, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II:
A.C. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, realpower, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations(series and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III:
Transformers: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV:
Electrical Machines: Construction and working principle of dc machine, performance characteristics of dc shunt machine. Generation of rotating magnetic field, Construction and working of a three-phase induction motor, Significance of torque-slip characteristics. Single-phase induction motor, Construction and working. Construction and working of synchronous generator.

UNIT-V:
Electrical Installations: Components of LT Switch gear: Switch Fuse Unit(SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Course Outcomes: After learning the contents of this paper the student must be able to

CO-1:   Analyze circuit theorems, mesh and nodal analysis, series and parallel
          networks, Electrical power

CO-2:   Gain knowledge on AC circuits, reactance, Impedance, Susceptance and
          Admittance and Power Factor
CO-3:   Learn the working principle of DC motors, Transformers
CO-4:   Understand the construction and performance characteristics of Electrical
          Machines
CO-5:   Introduce components of Low Voltage Electrical Installations

TEXTBOOKS:
   1. D.P.KothariandI.J.Nagrath,"BasicElectricalEngineering",TataMcGrawHill,4[th]Edition,
      2019.
   2. MSNaiduandSKamakshaiah,"BasicElectricalEngineering",TataMcGrawHill,2[nd]Editio
      n,2008.

REFERENCEBOOKS:
   1. P.Ramana,M.Suryakalavathi,G.T.Chandrasheker,"BasicElectricalEngineering",S.Cha
      nd,2nd Edition,2019.
   2. D.C.Kulshreshtha,"BasicElectricalEngineering",McGrawHill,2009
   3. M.S.Sukhija,T.K.Nagsarkar,"BasicElectricalandElectronicsEngineering",Oxford,1[st]E
      dition,2012.
   4. AbhijitChakrabarthi,SudiptaDebnath,ChandanKumarChanda,"BasicElectricalEnginee
      ring",2[nd]Edition,McGrawHill,2021.
   5. L.S.Bobrow,"FundamentalsofElectricalEngineering",OxfordUniversityPress,2011.
   6. E.Hughes,"ElectricalandElectronicsTechnology",Pearson,2010.
   7. V. D.Toro, "ElectricalEngineeringFundamentals",PrenticeHallIndia,1989.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
BASIC ELECTRICAL ENGINEERING LABORATORY

L T P C
0 0 2 1

Prerequisites: Basic Electrical Engineering
Course Objectives:

➢ To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.

➢ To study the transient response of various R,L and C circuits using different excitations.

➢ To determine the performance of different types of DC, AC machines and Transformers.

List of experiments/ demonstrations:

1. Verification of KVL and KCL

2. Verification of Thevenin's and Norton's theorem

3. Transient Response of Series RL and RC circuits for DC excitation

4. Resonance in series RLC circuit

5. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits

6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer

7. Performance Characteristics of a DC Shunt Motor

8. Torque-Speed Characteristics of a Three-phase Induction Motor.

9. Verification of Super position theorem.

10. Load Test on Single Phase Transformer(Calculate Efficiency and Regulation)

Course Outcomes: After learning the contents of this paper the student must be able to

CO-1:   Verify the basic electrical circuits through different laws and theorems

CO-2:   Analyse the transient responses of R, L and C circuits for DC excitation

CO-3:   Create resonance condition in series R-L-C circuit

CO-4:   Analyze the performance of DC shunt motor, single phase transformer and Three-phase Induction Motor.

TEXTBOOKS:
1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition,2019.

2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition,2008.

REFERENCEBOOKS:

1. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand,2nd Edition,2019.

2. D.C.Kulshreshtha,"BasicElectricalEngineering",McGrawHill,2009

3. M. S.Sukhija, T.K.Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1stEdition, 2012.

4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2ndEdition, McGraw Hill,2021.

5. L.S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.

6. E.Hughes, "Electrical and Electronics Technology", Pearson, 2010.

7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

******