

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC- Electrical Engineering

SEMESTER: V

Subject Name: **Elements of Electrical Design**

Subject Code: **X50902**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (E)	Mid Sem Exam (Theory) (M)	Practical (Internal)
3	0	2	5	70	30	50

Sr. No	Course Content	Total Hrs.
1.	Fundamental of Magnetic Circuit: Basic principles of magnetic circuits , use of B-H curves in magnetic circuits, Calculations of MMF for air gap and teeth, Real and apparent flux density, Effect of saturation, flux density distribution, calculation of magnetizing current, Field Form, Introduction, carter's fringe curves, flux plotting, air gap flux distribution factor (field form factor), actual flux distribution factor, Magnetizing current calculation, Leakage Reactance calculation for various types of slots, Iron loss calculation concepts.	08
2.	Design of Electromagnets: Introduction, Types of Electromagnets, Design of Magnet coils, Problems on above topics, Design of small Flat-faced armature type circular magnet, Design of large-faced armature type circular magnet, Design of Horse shoe type magnet, Design of plunger type magnet, Design of magnetic clutches.	06
3.	Design of starters, field regulators & control panels: A.C. and D.C. starters, field regulator and general purpose control panels.	04
4.	Design of small Transformers and Choke coils: Design of Small single-phase transformers, Design of welding transformers, Design of variable air gap single-phase choke coil, Design of variable air gap three-phase choke coil Design of ballast.	06
5.	Estimating Costing for Residential, Commercial & Service Connections (1- ϕ & 3-ϕ): Tenaments, Row houses, Bungalows, Flats, Multi – Storied Buildings, Internal Wiring Estimation (Length of wire) Commercial Complexes like Offices, Hospitals, Hotels, and Theatres. Internal Wiring Estimation (Length of wire), Lighting Series & Hoardings.	06

6.	Design consideration of Electrical Installation: Types of load, Electrical Supply Systems, Wiring systems, Load Assessment, Permissible voltage drops & Conductor size calculations, Control panel, Illumination Schemes.	06
7.	Armature Windings: DC windings: Simplex & Duplex windings, Lap & Wave windings, Applications, Basic terms related to armature windings, Dummy Coils, Equalizer connections, split coils. AC windings: Introduction, No. of phases, Phase spread, concentric winding, Hemitropic winding, Whole coil winding, Mush winding, Double layer windings, Integral slot lap and wave winding. Fractional slot lap & wave windings. Performance analysis of various windings.	06

References Books:

1. Electrical Estimating & Costing by N. Alagappan & S. Ekambaram (TTTI, Madras) - (Tata McGraw-Hill Ltd).
2. Electrical Estimating & Costing by Surjit Singh (Dhanpat Rai & sons).
3. Electrical Machine Design by A. K. Shawney, Dhanpatrai & sons. Pub.
4. Electrical Design, Estimating & Costing By K.B.Raina & S.K.Bhattacharya (TTTI, Chandigarh) – (Wiley Eastern Ltd.).
5. Electrical Installation, Estimating & Costing By J.B. Gupta (S.K.Kataria & Sons).
6. Electrical Machine Design by R. K. Agrawal.
7. Electrical Machine Design by V. N. Mittle, TMH publications.
8. Electrical Machine Design by S. K. Sen, Oxford Publications.
9. Electrical Machine Design by Gray A. Macgraw Hill publications.