

# GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V

Electrical Engineering

Subject Name: **Elements of Electrical Design**

Subject Code: **150904**

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

Sr. No.	Course content
1.	<b>Fundamental of Magnetic Circuit:</b> 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, Magnetising current calculation, Leakage Reactance calculation for various types of slots, Iron loss calculation concepts.
2.	<b>Design of Electromagnets:</b> 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
3.	<b>Design of starters, field regulators &amp; control panels:</b> A.C. and D.C. starters, field regulator and general purpose control panels.
4.	<b>Design of small Transformers and Choke coils:</b> 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
5.	<b>Estimating Costing for Residential, Commercial &amp; Service Connections (1-<math>\phi</math> &amp; 3-<math>\phi</math>):</b> Tenaments , Row houses , Bungalows , Flats , Multi – Storied Buildings , Internal Wiring Estimation ( Length of wire ) Commercial Complexes like Offices , Hospitals , Hotels , Theatres . Internal Wiring Estimation ( Length of wire ) , Lighting Series & Hoardings.
6.	<b>Design consideration of Electrical Installation:</b> Types of load, Electrical Supply Systems, Wiring systems, Load Assessment, Permissible voltage drops & Conductor size calculations, Control panel, Illumination Schemes.

7.	<p><b>Armature Windings:</b></p> <p><b>DC windings :</b></p> <p>Simplex &amp; Duplex windings, Lap &amp; Wave windings, Applications, Basic terms related to armature windings, Dummy Coils, Equalizer connections, split coils.</p> <p><b>AC windings :</b></p> <p>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 &amp; wave windings. Performance analysis of various windings.</p>
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Term work and minimum 5 drawing sheets and sketches shall be based on the above syllabus:

### Reference Books:

1. Electrical Estimating & Costing by **N. Alagappan & S. Ekambaram** (TTTTI, Madras) - (Tata mcgrawhill 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** (TTTTI, 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, Oxferd Publications.**
9. Electrical Machine Design by **Gray A. Macgraw Hill publications.**