

**Kadi Sarva Vishvavidyalaya, Gandhinagar**  
**Bachelor of Engineering (Electrical Engineering Syllabus)**  
**B.E Semester: V<sup>th</sup> (EE)**

**Subject Name & Code: Element of Electrical Design and Costing (EE-505)**

**Course Objective:**

- To present a problem oriented introductory knowledge of Economics and planning of Electrical Design and costing Engineering systems.
- To understand basic concepts of Electrical Design and costing of Electrical Engineering.

**A. Teaching / Examination Scheme**

SUBJECT		Teaching Scheme				Total Credit	Examination Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
EE-505	Element of Electrical Design and Costing	3	0	2	5	4	3	70	30	20	30	150

**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, Magnetising current calculation, Leakage Reactancecalculation for various types of slots, Iron loss calculation concepts.

**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 plungertype magnet – Design of magnetic clutches

**Design of Starters, small Transformers and Choke coils:**

A.C. and D.C. starters, field regulator and general purpose control panels.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

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**Estimating Costing for Residential, Commercial & Service Connections (1-ø & 3-ø):**

Tenements , 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.

**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.

**B. INSTRUCTIONAL METHOD AND PEDAGOGY (Continuous Internal Assessment (CIA) Scheme)**

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures, practical's and Tutorial which carries 05 Marks.
- At regular intervals assignments is given. In all, a student should submit all assignments of 05 marks each.
- Classroom participation and involvement in solving the problems in Tutorial rooms carries 05 Marks.
- Viva Voce will be conducted at the end of the semester of 05 Marks.
- One internal exam of 30 marks is conducted as a part of mid semester evaluation.
- Experiments shall be performed in the laboratory related to course contents.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.

**C. Lesson Planning**

SR No.	Lectures (Hours)	Weight age in % in Exam	Topic
1	04	30	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
2	04		Effect of saturation – flux density distribution – calculation of magnetizing current – Field Form – Introduction – carter's fringe curves – flux plotting
3	04		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.

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4	04	25	Introduction – Types of Electromagnets – Design of Magnet coils – Problems on above topics – Design of small Flat-faced armature type circular magnet
5	04		Design of large-faced armature type circular magnet – Design of Horse shoe type magnet – Design of plungertype magnet – Design of magnetic clutches
6	05	20	A.C. and D.C. starters, field regulator and general purpose control panels. Design of Small single-phase transformers – Design of welding transformers
7	05		Design of variable air gap single-phase choke coil, Design of variable air gap three-phase choke coil, Design of ballast
8	06	25	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.
9	06		Types of load, Electrical Supply Systems, Wiring systems, Load Assessment
10	03		Permissible voltage drops & Conductor size calculations, Control panel, Illumination Schemes.
	45	100	

**D. Instructional Method & Pedagogy**

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.
- Attendance is compulsory in lectures, which may carries five marks in overall evaluation.
- One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
- Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
- Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.

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**E. Students Learning Outcomes**

On successful completion of the course

- The student can be acquired the basic knowledge of Economics and planning of Electrical Design and costing Engineering systems.
- The students will be able to effectively employ electrical systems and lead the exploration of new applications and techniques for their use.

**Suggested Books:**

1. Electrical Estimating & Costing by **N. Alagappan & S. Ekambaram**(TTTI, 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** (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.**