Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

Third Year Bachelor of Engineering (EE)

With effect from: Academic Year 2019-20

Subject Code: EE504-N	Subject Title: Element of Electrical Design and Costing
Pre-requisite	

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.

Teaching scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		Theory		IE Marks	CIA Marks	Pract. Marks	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks				
03	00	02	05	04	03	70	30	20	30	150

Outline of the Course:

Sr. No	Title of the Unit	Minimum Hours
1	General Design Aspects	6
2	AC and DC Starter for motors	4
3	Design of starting resistances for ac & dc starters& field regulators	6
4	Design of electromagnets	6
5	Design of small 1-phase transformer and variable choke coils	6
6	Design consideration of electrical installation	6
7	Illumination Schemes	6
8	Estimating Costing for Residential, Commercial &Service Connections (1- ø &3-ø)	5

Total Hours (Theory): 45
Total Hours (Lab): 30
Total Hours: 75

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Detailed Syllabus

Sr. N	Topic	Lecture Hours	Weightage(%)
1	**General Design Aspects:** 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.	6	14
2	**AC and DC Starter for motors**: Function and necessity of a starter, three point starter, four point starter, automatic DC starters. Function & necessity of ac starter, methods for 3-phase induction motors.	4	8
3	**Design of starting resistances for ac - dc starters & Field regulators**: Grading of starting resistance for DC shunt and series motor starters. Function and necessity of field regulator in case of shunt motor & generators.	6	14
4	**Design of Electromagnets:-** Introduction, Types of Electromagnets, Design of Magnet coils, space factor, magnetic force, index number of electromagnet, 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.	6	14
5	**Design of small 1-phase transformer & variable choke coils :** Design of Small single-phase transformers ,Principle of design choke coil, Design of variable air gap single-phase choke coil, Design of variable air gap three-phase choke coil,	6	14
6	**Design consideration of electrical installation:** Types of load, Electrical Supply Systems, Wiring systems, Load Assessment, Permissible voltage drops & Conductor size calculations, Control panel.	6	14
7	**Illumination Schemes :** Basic terms used in illumination scheme, electric lamps, recommended levels of illumination, design of lighting scheme.	6	14
8	**Estimating Costing for Residential, Commercial &Service Connections (1- ø &3-ø):** Introduction to estimating and costing, general rules/guidelines for internal wiring estimation, electrical diagrams, general and conventional symbols used in electrical circuit and installation, Examples on electrical installation for residential and commercial buildings.	5	8
	Total	45	100

Instructional Method and 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.

Learning Outcome

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**.**

Text Book & Reference Books:

- Elements of electrical design by Dr. J.G.Jamnani (Mahajan publishing house)
- Electrical Estimating & Costing **by Surjit Singh** (Dhanpat Rai & sons).
- Electrical Estimating & Costing **by N. Alagappan & S. Ekambaram** (TTTI, Madras) - (Tata mcgrawhill Ltd).
- Electrical Design, Estimating & Costing **By K.B.Raina & S.K.Bhattacharya** (TTTI, Chandigarh) – (Wiley Eastern Ltd.).
- Electrical Installation, Estimating & Costing **By J.B. Gupta** (S.K.Kataria & Sons).
- Electrical Machine Design **by A. K. Shawney,Dhanpatrai & sons. Pub.**

List of experiments:

Sr. No.	Name of experiment
1.	Design of AC and DC starter.
2.	Design of Illumination scheme and wiring system.
3.	Estimating and costing of residential building.
4.	Design of Electromagnets.
5.	Design of chock coils.
6.	House wiring with drawing and estimation.
7.	Industrial wiring with drawing and estimation.
8.	Examples of commercial building wiring.