

EE452: COMPUTER AIDED ELECTRICAL MACHINE DESIGN
CREDITS = 5 (L=3, T=0, P=2)

Course objective:

The subject aims to provide the student of electrical engineering discipline with:

- C1.** Select proper materials based on their properties and selection criterion, IS standards Used in electrical machine design.
- C2.** Design commercial Electrical Machine.
- C3.** Apply computer aided optimization techniques for design of electrical machines

Teaching and examination scheme:

Teaching Scheme			Credit	Marks Distribution				Total Marks
L	T	P		Theory Marks		Practical Marks		
3	0	2	5	ESE	CE	ESE	CE	150
				70	30	30	20	

Course Contents:

Sr. No.	Topics	Teaching Hours
1	<u>Concept of Computer Aided Design:</u> Introduction, Advantages & Limitations of Computer Aided Design, Different Approaches for computer aided design, Flowchart of electrical machines for overall design of DC machine, transformer, synchronous machines & induction machines.	10
2	<u>Basic Concepts of Electrical Machine Design:</u> Introduction, Specification, Output Coefficient, Importance of Specific Loadings, Electrical Materials, Magnetic Circuit Calculations, General Procedure for Calculation of Amp-Turns, Heating & Cooling, Modes of Heat Dissipation, Standard Rating of Electrical Machines, Ventilation Schemes, Quantity of Cooling Medium, Types of Enclosures, General Design Procedure, Steps to Get Optimal Design.	08
3	<u>DC Machines:</u> Introduction, Sequential Steps for Design of Each Part and Programming Simultaneously using MATLAB & SciLab.	08
4	<u>Transformers:</u> Introduction, Sequential Steps for Design of Each Part and Programming Simultaneously (Shell Type Power Transformer, core Type Power	08

Transformer) using MATLAB & SciLab.

5 **Three-Phase Induction Motors:** 06

Introduction, Sequential Steps for Design of Each Part and Programming Simultaneously (Squirrel Cage Motor only) using MATLAB & SciLab.

6 **Single-Phase Induction Motors:** 04

Introduction, Sequential Steps for Design of Each Part and Programming Simultaneously using MATLAB & SciLab.

TOTAL 44

List of References:

1. K.M.Vishnu, "Computer Aided Design of Electrical Machines", B.S. Publications, 2008.
2. A.K.Sawhney – "A Course in Electrical Machine Design" 10th Edition, - Dhanpat Rai And sons New Delhi.
3. R. K. Agarwal, "Principles of Electrical Machine Design", S.K.Kataria & Sons, Fifth Edition 2016, New Delhi.

Course Outcomes (COs):

At the end of this course students will be able to ...

CO1: Understand general concepts of CAD

CO2: Understand and implement CAD for Electrical Equipment

CO3: Understand and implement CAD of DC Machine

CO4: Understand and implement CAD of Transformer

CO5: Understand and implement CAD of Three phase Induction Motor

CO6: Understand and implement CAD of Single phase Induction Motor