Course Number and Name
BEE504 &Electrical Machine Design

Credits and Contact Hours
4&60

Course Coordinator's Name
Mrs.Anitha Sampathkumar

Text Books and References

Text Books:

 1.Sawhney, A.K., 'A Course in Electrical Machine Design', Dhanpat Rai& Sons, New Delhi, 1984.

2. Sen, S.K., 'Principles of Electrical Machine Designs with Computer Programmes', Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 1987

References:

A.Shanmugasundaram, G.Gangadharan, R.Palani, 'Electrical Machine Design Data Book', New Age Intenational Pvt. Ltd., Reprint 2007.

Course Description

To provide sound knowledge about constructional details and design of various electrical machines.

Prerequisites	Co-requisites
Electrical Machines-I & II	Nil
required, elective, or selected elective (as per Table 5-1)	
Required	

Course Outcomes (COs)

CO1: To study MMF calculation and thermal rating of various types of electrical machines.
CO2:To design armature and field systems for D.C. machines
CO3: To design core, yoke, windings and cooling systems of transformers
CO4: To design stator and rotor of induction machines
CO5: To design stator and rotor of synchronous machines and study their thermal behavior

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H	H	L	L	H	M	M	L	L	L	L	L
CO2	H	H	L	L	M	M	M	L	L	L	L	L
CO3	H	H	L	L	H	M	M	L	L	L	L	L
CO4	H	H	L	L	H	M	M	L	L	L	L	L
CO5	H	H	L	L	H	M	M	L	L	L	L	L

List of Topics Covered

UNIT I   INTRODUCTION   12

Major considerations in Electrical Machine Design - Electrical Engineering Materials – Space factor – Choice of Specific Electrical and Magnetic loadings - Thermal considerations - Heat flow – Temperature rise - Rating of machines – Standard specifications.

UNIT-II   DCMACHINES   12

Output Equations – Main Dimensions - Magnetic circuit calculations – Carter's Coefficient - Net length of Iron –Real & Apparent flux densities – Selection of number of poles – Design of Armature – Design of commutator and brushes – performance prediction using design values.

UNIT-III TRANSFORMERS   12

Output Equations – Main Dimensions - KVA output for single and three phase transformers – Window space factor – Overall dimensions – Operating characteristics – Regulation – No load current – Temperature rise in Transformers – Design of Tank - Methods of cooling of Transformers.

UNIT-IV INDUCTIONMOTOR   12

Output equation of Induction motor – Main dimensions – Length of air gap- Rules for selecting rotor slots of squirrel cage machines – Design of rotor bars & slots – Design of end rings – Design of wound rotor -– Magnetic leakage calculations – Leakage reactance of polyphase machines- Magnetizing current - Short circuit current – Circle diagram - Operating characteristics.

UNIT-V   SYNCHRONOUS MACHINES   12

Output equations – choice of loadings – Design of salient pole machines – Short circuit ratio – shape of pole face – Armature design – Armature parameters – Estimation of air gap length – Design of rotor –Design of damper winding – Determination of full load field mmf – Design of field winding – Design of turbo alternators – Rotor design.