Course Number and Name

BEE401 & Electrical Machines-II

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Mrs.Anitha Sampathkumar

Text Books and References

Text Books:

1. D.P. Kothari and I.J. Nagrath, 'Electric Machines', Tata McGraw Hill Publishing Company Ltd, 2002.
2. P.S. Bhimbra, 'Electrical Machinery', Khanna Publishers, 7thEdition, 2011.
3. B.R Gupta," Fundamentals of Electric Machines ". New Age International (P) Limited 3rd Edition 2005

References:

1. A.E. Fitzgerald, Charles Kingsley, Stephen.D.Umans, 'Electric Machinery', Tata McGraw Hill publishing Company Ltd, 2003.
2. J.B. Gupta, 'Theory and Performance of Electrical Machines', S.K.Kataria and Sons, 2002.
3. K. Murugesh Kumar, 'Electric Machines', VikasPublishing House Pvt Ltd, 2002.

Course Description

To give the students a fair knowledge on the working of various AC machines and the characteristics.

Prerequisites	Co-requisites
Electrical Machines-I	Nil

required, elective, or selected elective (as per Table 5-1)

Required

Course Outcomes (COs)

CO1: To impart knowledge on Construction and performance of salient and non – salient type synchronous generators.

CO2:To impart knowledge on Principle of operation and performance of synchronous motor.

CO3:To impart knowledge on Construction, principle of operation and performance of induction machines.

CO4:To impart knowledge on Starting and speed control of three-phase induction motors.

CO5:To impart knowledge on Construction, principle of operation and performance of single phase induction motors and special machines.

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	M	L	L	H	M	M	L	L	L	L
CO2	H	M	M	L	L	H	M	M	L	L	L	L
CO3	H	M	M	L	L	H	M	M	L	L	L	L
CO4	H	M	M	L	L	M	M	M	L	L	L	L

CO5	H	M	M	L	L	L	M	M	L	L	L	L

List of Topics Covered

UNIT I SYNCHRONOUS GENERATOR 9

Constructional details – Types of rotors – emf equation – Synchronous reactance – Armature reaction – Voltage regulation – EMF, MMF, ZPF –Synchronizing and parallel operation – Synchronizing torque - Change of excitation and mechanical input – Two reaction theory – Determination of direct and quadrature axis synchronous reactance using slip test – Operating characteristics .

UNIT II SYNCHRONOUS MOTOR 9

Principle of operation – Torque equation – Operation on infinite bus bars - V-curves – Power input and power developed equations – Starting methods – Current loci for Constant power input, constant excitation and constant power developed.

UNIT III THREE PHASE INDUCTION MOTOR 9

Constructional details – Types of rotors – Principle of operation – Slip – Equivalent circuit – Slip-torque characteristics - Condition for maximum torque – Losses and efficiency – Load test - No load and blocked rotor tests -Separation of no load losses – Double cage rotors – Induction generator – Synchronous induction motor.

UNIT IV SINGLE PHASE INDUCTION MOTOR AND STARTING METHOD 9

Constructional details of single phase induction motor – Double revolving field theory and operation – Equivalent circuit – No load and blocked rotor test – Performance analysis – Starting methods of single-phase induction motors .Need for starting – Types of starters – Rotor resistance, Autotransformer and Star-delta starters – Speed control method

UNIT V FRACTIONAL HORSE POWER MOTOR 9

Shaded pole induction motor - Linear reluctance motor - Repulsion motor - Hysteresis motor - AC series motor-variable reluctance motor -permanent magnet stepper motor –hybrid stepper motor- permanent magnet D.C motor- permanent magnet A.C motor .