Course Number and Name

BEE703 & ELECTRICAL DRIVES AND CONTROL

Credits and Contact Hours

4 & 60

Course Coordinator's Name

Text Books and References

Text Books:

1. S.K Pillai'A First Course On Electrical Drives', Wiley eastern Ltd., Bombay 1989.
2. Gopal,K.Dubey,' Power Semiconductor Controlled Drives,'Prentics Hall, Englewood Cliffs, New Jersey 1989.
3. N.K.De, P.K.SEN, "Electrical Drives", PHI, New Delhi.

References:

1. P.C. Sen,'Thyristor DCdrives', John Whey and Sons, New York, 1981.
2. B.K. Bose,'Power electronics and AC drives', Prentice Hall, Englewood cliffs, New Jersey, 1986.
3. Vedhamsubramanyam, Thyristor control of electric drives',Tata McGraw hill publishing company Ltd. New Delhi, 1991.
4. http://www.motioncontrolonline.org/content-detail.cfm/Motion-Control-News/Electric-Drives-Concepts-and-Applications/content_id/1082

Course Description

To enable the students to gain a fair knowledge on characteristics and applications of electrical drives and how to control the speed of the AC & DC Motors.

Prerequisites	Co-requisites
	NIL

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

Required

Course Outcomes (COs)

CO1: To learn the General characteristics of different types of electrical AC & DC Motors with respect to the applications.
CO2: To understand the operation of different types of DC electrical drives.
CO3: To understand the operation of Three Phase Induction Motors Drive.
CO4: To understand the operation of Three Phase Synchronous Motor Drives.
CO5: To learn the operation of control circuits and applications of Digital Control And Drive Application.

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	M					M	M		M			
CO2	M					M	M		M			
CO3	M					M	M		M			
CO4	M					M	M		M			
CO5	M					M	H		M			

List of Topics Covered

UNIT I CHARACTERISTICS OF ELECTRICAL DRIVES 12

Speed – torque characteristics of various types of loads and drives motors-joint speed –torque characteristics – selection of power rating for drives motors with regard to thermal over loading and load variation factors – load equalization – starting, breaking and reversing operation.

UNIT II DC DRIVES 12

Speed control of DC motors- Ward Leonard scheme - Closed loop operation - speed regulation and speed loop - current loop , tracing of waveforms , speed reversal , torque reversal , with/ without braking and regeneration.

UNIT III THREE PHASE INDUCTION MOTORS DRIVES 12

Speed control of three phase induction motors- Stator control o stator voltages and frequency control-AC chopper, inverter and cyclo converter fed induction motor drives' Rotor control- Rotor resistance control and slip power frequency recovery schemes- Static control of rotor resistance using DC chopper- Static Kramer and scherbius drives.

UNIT IV THREE PHASE SYNCHRONOUS MOTOR DRIVES 12

Speed control of the phase synchronous motor- Voltage source and current source inverts fed synchronous motor- Commutator less DC motor- closed loop control of drives motors. .Marginal angle control - torque angle control - power factor control of synchronous motor

UNIT V DIGITAL CONTROL AND DRIVE APPLICATION 12

Digital techniques in speed control-advantages and limitations-Microprocessor based control of drives-selection of drives and control schemes for steel rolling mills,paper mills,lifts and cranes.