

WITH EFFECT FROM THE ACADEMIC YEAR 2009-2010

EE 403

## ELECTRIC DRIVES AND STATIC CONTROL

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

### UNIT-I

**Electric Drives:** Concept and classification, Dynamics of Electric Drives, Types of Loads, Torque characteristics of Load, characteristics of Motor-Load combination, Dynamics of Motor-Load combination, Steady-state and Transient stability of Electric Drive. Characteristics of Electric Drives: Modified Speed-Torque Characteristics of D.C Shunt motors, D.C Series motor and Induction motors.

### UNIT-II

**Starting of Electric Motors:** Methods of Starting Electric Motors, Acceleration time, Energy relation during starting, D.C Shunt and series Motor and Induction motors, Methods to reduce the energy loss during starting.

**Electric Braking:** Types of Braking, Braking of D.C and A.C motors, Energy relation and Dynamics of Braking.

**Rating of Motors:** Heating effects, Load conditions and classes of duty, determination of power rating. Effect of load inertia and load equalization.

### UNIT-III

**D.C motor control:** Single-phase controlled rectifier and chopper circuit arrangement for continuous armature current operation. Dual converter control, Circulating current and non-circulating current modes of operation, Principles of closed loop control for D.C drives.

### UNIT-IV

**Induction motor control:** Speed control of 3-phase induction motor with A.C voltage regulators, Voltage source inverters and Cyclo-converters, Static rotor resistance control, slip power recovery schemes: Static Kramer drive and Scherbius drive.

### UNIT-V

**Synchronous motor control:** Self controlled and separately controlled synchronous motors, Brushless D.C motors, Switched reluctance motors.

#### Suggested Reading:

1. S.K.Pillai, A First Course in Electrical Drives, New Age International, 2000.
2. G.K.Dubey, Fundamentals of Electric Drives, Narosa Public House, Delhi, 2001.
3. M.D. Singh and K.B.Khanchandani, Power Electronics, Tata McGraw Hill Publishing Company Ltd., 2000.
4. Bimal.K.Bose, Modern Power Electronics and AC Drives, Pearson Education Asia, 2002.