

Course Title: Solid State Drives

Course Code: EPEG 422

Credit Hours: 3

Course Description:

This course introduces students to AC and DC drives for industrial applications.

Course Contents:

Unit 1: Drive Characteristics

Characteristics of mechanical systems; Selection of drives

Unit 2: D.C. Drives

Single phase and 3-phase convert fed drives; Continuous and discontinuous conduction modes; SCR based Class B, Class C and Class D commutation; Chopper fed drivers and braking; Chopper for DC drives; Inching and closed loop drive systems

Unit 3: Stator Controlled Induction Motor Drives

Voltage controlled drive; V/f control; VSI and CSI fed drives, Characteristics, Braking and energy saving; Closed loop control.

Unit 4: Rotor Controlled Induction Motor Drives

Rotor resistance control, Characteristics, Types of rotor choppers; Torque equation; Slip power recovery scheme; Sub-synchronous and super synchronous operations; Method of improving power factor; Closed loop control.

Unit 5: Synchronous Motor Drives

Open loop V/f control; VSI fed and CSI fed drives; Need for leading power factor operation; Self control; Starting method; Solid state excitation system for synchronous motors.

Unit 6: Field Oriented Control of AC Drives

References:

1. Dubey G. K., *Power Semiconductor Drives*, Prentice Hall International 1989
2. Murphy J. M. D., Turnbull F. G., *Thyristor Control of AC Motors*, Pergamon Press 1988
3. Sen P. C., *Thyristor Drives*, John Wiley and Sons 1981
4. Bimbhra P.S., *Power Electronics*, Khanna Publishers
5. Rashid Muhammad H., *Power Electronics, Circuits, Devices and Applications*, Pearson Education