13EE4114-POWER SEMICONDUCTOR DRIVES
(EEE)

Credits: 4

Lectures/Week: 4Hrs. **Sessional Marks: 40**
End Exam Duration: 3Hrs **End Exam Marks: 60**

UNIT-I

ELECTRIC DRIVES: Concept of Electric Drive - Classification, Advantages and choice of Electric Drives – Parts of Electric Drives – Electric Motor, Power Modulators, sources and control unit.

Steady state Speed and Torque expressions of various DC motors– Speed – Torque Characteristics

UNIT-II

DC MOTOR DRIVES: Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Dual converters -Four quadrant operation of D.C motors.

1ϕ CONVERTER CONTROLLED DC DRIVES: Single Phase semi and fully controlled converters connected to D.C separately excited– continuous and discontinuous current operation

UNIT-III

3ϕ CONVERTER CONTROLLED DC DRIVES: Three phase semi and fully controlled converters connected to D.C separately excited motor. Single quadrant,

Chopper controlled DC drives: Two –quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continuous current operation – Speed torque expressions – speed torque characteristics.

UNIT -IV

INDUCTION MOTOR DRIVES: Speed torque characteristics -Variable voltage characteristics-Control of Induction Motor by AC Voltage Controllers .Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters- PWM control – Comparison of VSI and CSI operations– Closed loop operation of induction motor drives (Block Diagram Only)

UNIT-V

SLIP POWER RECOVERY SCHEMES: Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications–problems

SYNCHRONOUS MOTOR DRIVES: speed torque characteristics -Separate control & self control of synchronous motors – Operation of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed– Closed Loop control operation, variable frequency control- Cycloconverter, PWM, VFI, CSI.

TEXT BOOKS:

1."Fundamentals of Electric Drives", G K Dubey ,Narosa Publications
2."Power Electronic Circuits, Devices and applications" by M.H.Rashid, PHI.

REFERENCES:

1. "Power Electronic",MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company,1998
2. "Modern Power Electronics and AC Drives" by B.K.Bose, PHI publishers.
3. "Thyristor Control of Electric drives", Vedam Subramanyam, Tata McGraw Hill Publilcations.
4. "A First course on Electrical Drives", S K Pillai, New Age International(P) Ltd. 2nd Editon.