

# GUJARAT TECHNOLOGICAL UNIVERSITY

## Power Electronics

### M.E. Semester: II

Subject Name: **Modern Electrical Drives**

Sr. No.	Course Content
1.	Mathematical modelling of Electrical Machines, Reference frame Theory, Analysis of AC, DC machines, Linearised equations of AC and DC machines, Duty cycles & ratings.
2.	<b>Converter Control of DC motor:</b> Principal of phase angle control, steady state analysis, performance parameters, performance characteristics, two quadrant DC motor drive, Four quadrant DC motor drive, Harmonics and associated problems, closed loop operation, Modelling of DC machines.
3.	<b>Chopper Control of DC motor:</b> Principal of operation, Four quadrant operation of chopper circuit, steady state analysis of Chopper controlled DC motor drive, closed loop operation.
4.	<b>Induction Motor Control:</b> Scalar controls of induction motor drive, stator voltage control, rotor resistance control, frequency control, V/f control, current control, Analysis of CSI and VSI fed AC drive, Generalized operation of induction motor with impressed voltages of non sinusoidal waveform. Analysis using equivalent circuit, harmonics losses, derating.
5.	<b>Field Oriented Control:</b> Principle of Field control of induction machines, direct vector control, indirect vector control scheme, Flux vector estimation, Space vector modulation control.
6.	<b>Direct torque Control:</b> Direct torque control of induction machine, Torque expression with stator and rotor flux, DTC control strategy, reduction of torque ripple methods.
7.	<b>Variable Frequency Synchronous Motor Drive :</b> Open loop inverter fed synchronous motor drive, self synchronous operation, operating characteristics and control.

## Reference Books:

1. Electric drives: concepts and applications by Vedam Subrahmanyam ( McGraw Hill)
2. Electric Motor Drives by R. Krishnan (PHI)
3. Fundamental of Electric drive by G. K. Dubey ( Narosa)
4. Thyristor DC Drives by P C Sen (john wiley)
5. Modern Power Electronics and AC drives by Bimal K Bose (pearson)
6. Electric Drives by Ion Boldea & Sayed Nasar (Tayelor & Francis)