

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Power Electronics

Semester: I

Subject Name: **Power Processing Circuits**

Sr. No.	Course Content
1.	Introduction: Power Electronics System, Ideal and practical switch characteristics, Review of Power Electronics Devices, SOA, Power Converters classification. Devices used for the firing circuits, Firing circuits and commutation circuits, Driver circuits for Power devices, ratings and protection circuits, Power Factor, Harmonics, and Distortion Limits.
2.	Line Commutated Converter: Different converter configurations, analysis of 1-phase and 3-phase converters with different kind of loads, Effect of source inductance, series connection of converters, line commutated inverter, m-phase controlled converters. Dual Converter, Operation in circulating mode and non circulating mode, four quadrant operations, closed loop system.
3.	Ac Voltage Controllers: Integral cycle control, single phase controller with different types of load, three phase ac voltage controllers, sequence control. Single phase AC chopper.
4.	Cyclo-Converter: Basic principle of operation and configurations, circulating and non circulating mode. Ring connected cyclo-converter circuits, frequency and voltage control, output voltage analysis, firing schemes.
5.	Dc-Dc Converters: Buck converter, Boost converter, Buck-Boost converters, CUK converter, Fly-back converter, Forward Converter, Push-pull converter, Full bridge and Half bridge converters.
6.	Inverters: Review of single phase bridge inverters, 3-phase bridge inverters, and Pulse width modulated inverters, Sinusoidal PWM, Space Vector PWM, and Reduction of harmonics.

Reference Books:

1. Power Electronics: Converters, Applications, and Design”, Mohan & Robbins, John Wiley & Sons Inc., 2001
2. Power Electronics circuits, devices & applications Mohammad H.Rashid Pearson Edu.
3. Elements of Power Electronics, Philip T. Krein .Oxford Press.
4. Handbook of Power Electronics”, M H Rashid
5. Power Electronics Devices, Circuits and Industrial Applications, Oxford, V.R. Moorthi