

GUJARAT TECHNOLOGICAL UNIVERSITY

Power Electronics

M.E. Semester: II

Subject Name: **Advanced Power Converters and Control**

Sr. No.	Course Content
1.	Soft switching Dc-Dc converters: Classification of soft switching resonant converters, Zero current switching topologies, zero voltage switching topologies, load resonant converters, resonant switch converters, clamped voltage topologies, resonant dc link inverters with zero voltage switching, high-frequency-link integral-half-cycle converters.
2.	Multi-level converters Bridge inverters, Need for multi-level inverters, Concept of multi-level, Topologies for multi-level: Diode Clamped, Flying capacitor and Cascaded multi-level configurations; Features and relative comparison of these configurations; Switching device currents; DC-link capacitor voltage balancing, features of multi-level converters, Applications
3.	Matrix converters Fundamentals of matrix converter technology, Analysis of bi-directional switch topologies, Modulation techniques for matrix converters, Performance and control of matrix converters, commutation and protection issues .
4.	Multi-pulse converters Concept of multi-pulse, Types of multi-pulse converters, different transformer connections for multi-pulse converters, Applications of multipulse converters.
5.	Feed back control for Power Electronics Converters: The regulation and control problem, review of feedback control principals, converter models for feedback, piecewise linear model, discrete time models, voltage mode and current mode control of DC-DC converters, comparator based controls for rectifier systems, averaging methods and models for DC-DC converter, small signal analysis and linearization.
6.	HVDC : Introduction, comparison of A.C. and D.C. transmission application of D.C. transmission, modern trends in D.C. transmission, choice of converter configuration, simplified analysis of Graetz circuit, converter bridge characteristics, detailed analysis of converters, converter control characteristics

Reference Books:

1. K.R. Padiyar, 'HVDC Power Transmission System', Wiley Eastern Ltd., First Edition,
2. Philip T. Krain, 'Elements of Power Electronics', Oxford University Press
3. John G. Kassakian, et.el., ' Principles of Power Electronics' , Pearson.
4. Power electronics Hand Book By M.H. Rashid – Academic Press.
5. Power Electronics by B.K.Bose – JAYCO.
6. Recent Research Technical Papers