

GUJARAT TECHNOLOGICAL UNIVERSITY

POWER ELECTRONICS ENGINEERING

B. E. SEMESTER: VII

Subject Name: **Power Processing Circuits - II**

Subject Code: **172403**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	0	4	70	0	30	50

Sr. No	Course Content	Total Hrs.
1.	Introduction: <ul style="list-style-type: none"> Inverters, Basic Principle, Classification, Performance parameters, Applications 	04
2.	Inverters: <ul style="list-style-type: none"> Half & Full Bridge, Series and parallel, VSI & CSI, Load commutated inverters, McMurray Inverters, McMurray Bedford inverters, Conduction mode of inverters 	08
3.	Switch Mode Inverters: <ul style="list-style-type: none"> Square Wave & Quasi square wave operation, 120° and 180° mode of conduction, Series & Parallel Resonant Pulse Inverters, ZCS & ZVS 	08
4.	Multilevel Inverters: <ul style="list-style-type: none"> Multilevel Concept, Diode clamped, Flying capacitor, Cascaded H-Bridge, Applications 	08
5.	Inverter Control Techniques: <ul style="list-style-type: none"> Input Side Control, Variation of DC by Uncontrolled Rectifier & Chopper, Variation of DC by Controlled Rectifier Output Side control, Varying output AC voltage by using transformer, Varying output voltage by AC voltage regulators Internal Control, Voltage Mode, Current Mode, Modulation Techniques, PWM Types, Sine, Sine Triangle, Single Pulse, Stepped, Random, Trapezoidal, Triplen Harmonic Injection, 	10

	<ul style="list-style-type: none"> • SVPWM, Switching states, Space vectors, Dwell time, Modulation index, Over-modulation 	
6.	AC Voltage Controllers: <ul style="list-style-type: none"> • Introduction, performance parameter - Integral cycle control, phase angle control, Half & full wave with R & RL load, Electronic Tap changers, Single & Three phase static switch • Cycloconverters, classification , Single & Three phase 	04
7.	Active Front-End Rectifiers: <ul style="list-style-type: none"> • Review of Controlled Rectifiers, Their main drawbacks, Active front-end rectifiers, Advantages, Applications 	04
8.	Uninterrupted Power Supply: <ul style="list-style-type: none"> • Classification, Block diagrams, UPS performance parameters , Applications • Input Rectifier, Inverter, Static Switches • Battery types, Battery charging, Constant current, constant voltage and trickle charging, Battery Ampere-Hour calculations 	08

Text Books:

1. Principles and Elements of Power Electronics, Barry W Williams
2. High-Power Converters And Ac Drives, IEEE Press, Bin Wu

Reference Books:

1. Power Electronics 3rd ed., Muhamad H. Rashid
2. Modern Power Electronics and AC Drives, Bimal K. Bose
3. Power Electronics 3rd ed., Mohan, Undeland & Robbins
4. Power Electronics Essentials and Applications, L. Umanand
5. Elements of Power Electronics, Philip T. Krein