

“PVC” NSSK GOVT. POLYTECHNIC BILASPUR at KALOL
PLANNED THEORY SYLLABUS COVERAGE

PTSC-7.1

GPB		Department: Electrical Engg.		Subject: Power Electronics and Control of Drives		
		Sem. & Branch: 5th & EE		Duration : 3 Years		
SYLLABUS COVERAGE		Total Periods: Theory: 56 Practical: 28				
Sr No	Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	14 (1-14)	Power Semiconductor Devices	1.1 Advantages of Power Electronics devices based control over conventional control 1.2 Construction, Operation, Symbol & V-I Characteristics of Silicon Controlled Rectifier (SCR) 1.3 Thyristor Specifications and Ratings: Voltage Ratings, Current Ratings, Power Ratings and Temperature Ratings. Turn ON & Turn- OFF time 1.4 Thyristor Turn On (Triggering) Methods: Voltage Triggering, Gate Triggering, dv/dt Triggering and Radiation Triggering. 1.5 Thyristor Turn off Process (Commutation techniques) 1.6 Series and Parallel Connections of SCRs: it's need and criteria 1.7 Heat Sinks- Function/need of Heat Sink, Types of Mountings 1.8 Thyristor Family: Symbols, Construction, Operation & V-I Characteristics of TRIAC, DIAC, and UJT 1.9 UJT Relaxation Oscillator: Circuit description and Working.	Power Electronics by Dr. P. S. Bhimbhra, Khanna Publisher, New-Delhi	Power Electronics by B. R. Gupta & V. Singhal, KATSON Publication, New Delhi	
2	12(15-26)	Converters (Controlled Rectifiers)	2.1 Difference between Uncontrolled rectifier & Controlled rectifier 2.2 Single Phase Half Wave Controlled Converter - With Resistive Load - With RL Load and Freewheeling Diode 2.3 Single Phase Fully Controlled Full Wave Converter - With Resistive Load - With RL Load (with & without freewheeling diode) 2.4 Three Phase Fully Controlled Bridge Converter 2.5 Comparison of 3 phase and 1-Phase Converters 2.6 Cycloconverters (50 Hz to 25 Hz, 16.33Hz, 12.5Hz): Introduction, classification, working principle and applications. 2.7 Dual Converters (1-phase & 3-phase): Classification, working principle and applications			

Sr No	Period Nos	Topic	Details	Instruction Reference	Additional Study Recommendation	Remarks
3	8(27-34)	Inverters	3.1 Working Principle of Inverter 3.2 Series Inverter - Operation of Series Inverter Circuit 3.3 Parallel Inverter - Operation of Parallel Inverter Circuit 3.4 Single Phase Bridge Inverter - Half Bridge Inverter - Full Bridge Inverter	Power Electronics: Circuits, Devices & Applications, by M. H. Rashid, Pearson Education India Publication	Power Electronics by B. R. Gupta & V. Singhal, KATSON Publication, New Delhi	
4	8(35-42)	Choppers (DC to DC Converters)	4.1 Working Principle of Chopper, Duty Cycle of Chopper 4.2 Types of Duty Cycle Control - Constant Frequency System - Variable Frequency System 4.3 Classification of Choppers Class A, Class B, Class C, Class D and Class E: Their Circuit description and Working 4.4 Applications of Choppers.			
5	6(43-48)	Power Electronic Applications in Control of Drives	5.1 DC Drives: Speed control of DC motors with Single phase and Three-phase controlled converters, Speed Control of DC motors using Chopper circuit. 5.2 AC Drives: Speed control of three-phase Induction Motor with Variable voltage, and variable frequency (VVVF Drives) using power electronics devices.			
6	8(49-56)	Other Applications of Power Electronics based Devices	- Automatic Street Light Control using Thyristors - Battery Charging Control - Static Excitation System for Alternators - Static Circuit Breakers (AC & DC)			

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