

CONTENTS

UNIT - 1 POWER SEMICONDUCTOR DEVICES	01-63
1.1 Introduction to Power Electronics	
1.2 Overview of Power Semiconductor Devices	
1.3 Thyristors (SCR, TRIAC, DIAC)	
1.4 Power BJT, MOSFET, IGBT	
1.5 Gate and Base Drive Circuits	
1.6 Protection and Isolation Techniques	
1.7 Thermal Modeling and Heat Sink Design	
UNIT - 2 CONTROLLED RECTIFIERS	64-88
2.1 Principles of Controlled Rectification	
2.2 Single-phase Controlled Rectifiers with R, RL, RLE Loads	
2.3 Three-phase Controlled Rectifiers	
2.4 Effect of Source Inductance and Commutation Overlap	
2.5 Dual Converters	
2.6 Freewheeling Diodes	
2.7 Performance Analysis: THD, Power Factor, Ripple	
UNIT - 3 DC-DC CONVERTERS (CHOPPERS)	89-108
3.1 Introduction and Classification of Choppers	
3.2 Step-down (Buck) Converter	
3.3 Step-up (Boost) Converter	
3.4 Buck-Boost and Inverting Converters	
3.5 Cuk and SEPIC Converters	
3.6 Switched Mode Power Supplies (SMPS)	
UNIT - 4 INVERTERS AND AC VOLTAGE CONTROLLERS	109-137
4.1 Introduction To Inverters (V_{si} And C_{si})	
4.2 Single - Phase Inverters	
4.3 Three-Phase Inverters: 120° And 180° Modes	
4.4 Pwm Techniques: Sinusoidal And Space Vector Pwm	
4.5 Harmonics And Lc Filter Design	
4.6 Multilevel Inverter	
4.7 Ac Voltage Controllers: Phase-Angle And Integral Cycle Control	

UNIT - 5 APPLICATIONS OF POWER ELECTRONICS	138-151
5.1. Introduction	
5.2 Electric Drives (DC & AC Motor Drives)	
5.3 Renewable Energy Systems (Solar, Wind)	
5.4 HVDC and FACTS Devices	
UNIT - 6 DESIGN & PROTECTION IN POWER ELECTRONICS	152-162
6.1 Introduction	
6.2 Thermal Management	
6.3 Device Ratings & Safe Operating Area (SOA)	
6.4 Protection Circuits	