

Devi Ahilya University, Indore, India Institute of Engineering & Technology				III Year B.E. (E&I)			
Subject Code & Name	Instructions Hours per Week			Credits			
EIR5C3 Power Electronics	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	2	3	1	1	5

Learning Objectives:

- To prepare the students to analyze & design different power converter circuits.
- To acquire knowledge about various application of power electronics.

Prerequisites: Basic Electronics

COURSE CONTENTS

UNIT-I

Static Power Devices

Power semiconductor diodes & transistors, Thyristors, Construction, Characteristics, Ratings, Protection, Heating, Cooling, Mounting, Turn on methods, Gate characteristics, Firing circuits of thyristor, Introduction to other members of thyristor family like PUT, SUS, SCS, DIAC, TRIAC.

UNIT-II

Converters

Thyristor commutation techniques, Phase controlled rectifiers, Principal of phase control, Full wave controlled converters, Single-phase full wave converters, Three-phase thyristor converter circuits, Basic principle & power circuit of Dual converter & AC voltage controller.

UNIT-III

DC to DC Converter

Choppers: Basic principal of chopper operation, Control strategies, Step-up chopper, Different types of chopper circuits, Thyristor chopper circuits, Performance analysis.

UNIT-IV

Inverter

Single-Phase voltage source inverters, Principal of operation, Fourier analysis of single-phase inverters, Force-commutated thyristor inverters, Current source inverters, Pulse-width Modulated Inverters.

UNIT-V:

Industrial application of Power Electronics, SMPS, UPS, static switches, circuit breakers, solid state relays, concept of Electric drive.

Learning Outcomes:

Upon Completing the Course, Student will able to:

- Design the Inverter, chopper, rectifiers for high voltage.
- Apply design concepts for industrial applications.

BOOKS RECOMMENDED:

- [1] Muhammad H. Rashid, *Power Electronics Circuits, Devices & Applications*, 3/e. 2004, PHI
- [2] Cyril W. Lander, *Power Electronics*, 3/e.1993, The McGraw-Hill
- [3] Dr. P.S. Bimbhra, *Power Electronics*, 4/e. 2006, Khanna Publishers
- [4] P.C. Sen, *Power Electronics*,
- [5] Ned Mohan, *Power Electronics, Converters, Application & Design*, 2/e. 1995, John Wiley
- [6] Joseph Vithayathil, *Power Electronics, Principles & Applications*, 6/e. 2010, McGraw Hill