Devi Ahilya University, Indore, India Institute of Engineering & Technology				**III Year B.E. (Electronics and Telecommunication)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
ETR5E5	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
POWER ELECTRONICS	**3**	**1**	**2**	**3**	**1**	**1**	**5**
Duration of Theory Paper: 3 Hours							

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

List of Practical Assignments:

1. Study of SCR Characteristics
2. Study of DIAC Characteristics
3. Study of TRIAC Characteristics
4. Study of UJT Characteristics
5. Study of MOSFET Characteristics
6. Study of PUT Characteristics
7. Study of SCR Triggering Circuits
8. Study of Single Phase PWM Inverter
9. Study of Single Phase Controlled Rectifier
10. Study of Single Phase Cycloconverter
11. Study of Step-up Chopper
12. Study of Step-down Chopper
13. Study of SCR commutation Circuits
14. Study of Speed control of universal motor using SCR