GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC-Electrical Engineering

SEMESTER: V

Subject Name: **Power Electronics – II**

Subject Code: **X50903**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
3	0	2	5	70	30	50

Sr. No	Course Content	Total Hrs.
1.	**DC TO AC CONVERTERS: INVERTERS:** **Classification:** Voltage source inverters, Current source inverters, **Single phase inverters:** Series, parallel and bridge type (Half wave and Full wave) inverters, Three phase bridge inverters: 180 degree conduction 120 degree conduction and their comparison, Voltage control of single phase and three phase Inverters. **PWM Inverters:** PWM principles, PWM techniques classifications, Sinusoidal PWM, Third harmonic PWM, Selected harmonic elimination PWM, Hysteresis band current control PWM, Space vector pulse width modulation technique, Comparison of PWM techniques, PWM half bridge and full bridge inverters. **Current Source Inverters:** Single phase and three phase. Comparison of Voltage and Current source Inverters.	12
2.	**AC TO AC CONVERTERS:** **Ac Voltage Controllers:** On-off or integral cycle control- phase controlled switching, Single phase full wave controllers with R, L and RL load, Three phase full wave controllers, Circuit configuration with Y and Δ connected loads, Single phase electronic transformer connection changers- AC Voltage controller with PWM control, Basic principle of matrix converter **Cycloconverters:** Basic Principle, Single and three phase cycloconverter, Output harmonics in cycloconverter, Comparison between cycloconverter and DC link Converter, Load Commutated Cycloconverter.	08

3.	**AC DRIVES:** **Induction Motor Drives:** AC motor operation with non–sinusoidal supply waveform, variable frequency operation, principles of variable frequency operation, steady state performance at constant v/f, constant flux operation, constant current operation, transient performance of the frequency controlled induction motor, closed loop control of Induction Motor, closed loop circuits for stator voltage control, v/f control, slip power recovery control, rotor resistance control by chopper , comparison of ac & dc drive, their selection for particular application, effect of non-sinusoidal wave form on AC machine performance. **Syncronous Motor Drives:** Three phase synchronous motors, variable speed drives, variable frequency control, self-controlled synchronous motor drive employing load commutated thyristor inverter, self controlled synchronous motor drive employing a cycloconverter.	12
4.	**INDUSTRIAL APPLICATIONS:** **Introduction of various applications like:** High voltage DC transmission, static VAR compensators, Active filters, wind generator connected to utility grid, FACTs, induction heating, electric welding, Electronic lamp ballast.AC and DC static switches. Static Excitation system of Alternators. Battery charger, RF heating	10

Text Books:

1. Power electronics By M D Singh and K B Khanchandani by TMH publication 2nd edition.
2. "Power Electronics - circuits, devices and applications", Prentice Hall of India, 2nd ed., 2000- Muhammad H. Rashid.

References Books:

1. Power Electronic devices & circuits by H. C. Rai, Galgotiya Publications
2. Power Electronics – Devices, Converters and Applications", by Vedam Subramanyam Revised 2nd edition, New Age Publications.
3. Power Electronics by P. S. Bimbhra, Khanna Publications.
4. Power Electronics, Converters, Applications and Design- Ned Mohan, Undeland and Robbins, Second Edition, John Wiley Publications.
5. Power Electronics- M. S. Jamil Asghar, PHI Learning Pvt. Ltd.
6. Power Electronics by V. R. Moorthi, Oxferd University press.
7. Thyristorised controller by Dubey, Joshi & Doralda, New age Publication.
8. Power Electronics & Variable Frequency drive, B. K. Bose IEEE press