

# GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Electrical Engineering (Power Electronics & Electric Drives)

## M.E. Semester: IV

Subject Code	Subject Name	Teaching Scheme (Hours)			Credits
		Theory	Tutorial	Practical	
744501	Harmonics Elimination Techniques	4	0	2	5
740001	Mid Sem Thesis Progress Review	0	0	0	5
740002	Dissertation Phase-2	0	0	20	10
	<b>Total</b>				<b>20</b>

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Subject Name: Harmonics Elimination Techniques.

Subject Code: 744501

Sr. No.	Course content
1	<b>Source of harmonics:</b> Introduction to harmonics, Types of Loads, Source of harmonics: Electromagnetic Interference, Pulsating Torque in AC Drive, Power Quality Indices, Traditional and future sources of harmonics, Standardization of harmonics levels
2	<b>Effects of harmonics:</b> Effects on power system equipment, communication system, Solid state Devices etc.
3	<b>Harmonics Elimination Technique:</b> Selective Harmonic Elimination Technique for a Multilevel Inverter. Modulation based harmonics elimination technique, optimal PWM technique, Active Power Filter,
4	<b>Design of Active and Passive Filter for harmonics reduction.</b> Series Active Filtering in Harmonic Isolation Mode . Dynamic Voltage Restorer and its control . Power Quality Conditioner. Passive Harmonic Filtering . Single Phase Shunt Current Injection Type Filter and its Control. Three Phase Three-wire Shunt Active Filtering and their control using p-q theory and d-q modelling . Three-phase four-wire shunt active filters . Hybrid Filtering using Shunt Active Filters . Series Active Filtering in Harmonic Cancellation Mode .
5	<b>Harmonic Measurement and Analysis:</b> Methods of harmonics measurement. Harmonic source representation, Harmonic Propagation facts, flux of harmonic currents, Interrelation between AC system and Load Parameters Analysis methods

Reference Books:

1. Harmonics and Power systems By Francisco C. De La Rosa Taylor& Francis group, CRC Press
2. Power System Harmonics, Second Edition J. Arrillaga, N.R. Watson, John Wiley & Sons, Ltd ISBN: 0-470-85129-5
3. Power Electronics Converter Harmonics By Deare A Paice, IEEE Press
4. Instantaneous Power Theory and Application to Power Conditioning By Hirofumi Akagi etal., IEEE Press, Willey-Interscience A John Willey & Son Publication.