GUJARAT TECHNOLOGICAL UNIVERSITY

POWER ELECTRONICS & ELECTRICAL DRIVES (45)

POWER CONDITIONING

SUBJECT CODE: 2714505

M.E. 1st SEMESTER

Type of course: Engineering Science **(ELECTRICAL)**

Prerequisite: N.A.

Rationale: N.A.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2	0	4	70	30	30	0	20	0	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**NON LINEAR LOAD** Concepts of non-linear loads and electric power conditioning, unity power factor rectifier, STATCON (static condenser)	4	10
2	**SMPS:** SMPS analysis, design and control, UPS on-line and off-line, power supplies	8	20
3	**ELECTRICAL HEATING** High frequency induction heating, Dielectric heating	6	15
4	**FILTER:** Passive filters, active filters for harmonic and reactive power compensation in two wire, three wire and four wire ac systems. Harmonic standards, power quality, surge suppressors, compensation of arc furnace and traction loads	12	30
5	**POWER SUPPLY:** Power supplies for appliances such as camera, X-Ray equipments. Case studies on microcomputer and DSP control in active filters and power supplies. Power supplies in automobiles.	10	25

Reference Books:

1. Akagi H., Jr., watanabe E., Aredes M. "Instantaneous power theory and applications to power conditioning", Wiley IEEE press book chapters.
2. M D Singh and K B Khanchandani, "Power electronics" by TMH publication 2nd edition.
3. Muhammad H. Rashid, "Power Electronics - circuits, devices and applications", Prentice Hall of India, 2nd ed., 2000
4. J, Wesley cable, "Induction and dielectric heating", Prentice Hall of India, 2001.
5. Daniel W. Hart, "Power Electronics|", TMH Publications.
6. P.C.Sen, "Modern Power Electronics ", S. Chand and Co. Ltd., New Delhi, 2000

Course Outcomes:

After learning the course the students should be able to:

1. Understand significance of different types of power supply and its various applications.
2. Find different mathematical parameters of designing filters and implementation on different areas.
3. Understand power conditioning and its application to control active and reactive power.
4. Analyze the performance of different types of theory of power and its design conditioning techniques.
5. Implement power quality management using power conditioning techniques