GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. SEMESTER : VIII

POWER ELECTRONICS ENGINEERING

Subject Name: **INDUSTRIAL MEASUREMENT**

Sr. No.	Course Contents	Total Hrs
1.	**Introduction** • Power Quality – Electric power quality phenomena – IEC and IEEE definitions – Power quality disturbances • Voltage fluctuations – Voltage sags and short interruptions – Flicker – Longer duration variations – Sources – Range & impact on sensitive circuits – Solutions and mitigations • Transients – Origin and classifications – Capacitor switching transient – Lightning load switching – Impact on users – Protection – Mitigation – Unbalance – Waveform distortion – Power frequency variations	**12**
2.	**EMI, RFI and EMC** • Sources of EMI & RFI – Effects on electrical/electronic equipment like wires, probes, PCB, etc. – Remedies – at circuit level and source level – Standards – Tests • Fundamentals of EMC – Different coupling methods of EMC – EMC directive and its relevance to installations in buildings	**10**
3.	Different Probes Used for Measurement of Electrical Quantities • Construction & Working of Voltage, Current, Differential probes – Frequency Response of Probes – Isolated Probes	**8**
4.	Measurement of Voltage, Current, Power • Measurement of High side and Low side voltages, differential voltage, instantaneous, average and RMS voltages – Measurement of instantaneous, average and RMS current – Measurement of instantaneous, active and reactive power	**8**
5.	Harmonics and its measurement • Definition – Generation – Effects – Measurement – Standards – THD – Filtering – Passive & active	**8**
6.	Noise and Measurement/suppression • Introduction – Classification – ExternalNoise – AtmosphericNoise – ExtraTerrestrial Noise – IndustrialNoise – InternalNoise – ShotNoise – FlickerNoise – ThermalNoise – WhiteNoise – Signalto Noise Ratio – Noise measurement and suppression techniques	**6**

References:

1. Ron Schmitt, “Electromagnetics Explained”
2. Keith Billings , “Switch Mode Power Supply Handbook”
3. SanjayManiktala, “Switching Power Supplies A to Z”
4. Mazda, “Power Electronics Handbook”
5. IEEE 519 standard
6. Earthing & EMC - Fundamentals of Electromagnetic Compatibility (EMC)