PEE309 POWER QUALITY & CUSTOM POWER

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Course Objectives: To understand the basics and need of power quality indices, non linear and unbalanced loads and their characteristics, measurem trical quantities and their analysis in frequency and time domain, remedial techniques for improvement in power quality

oduction: Introduction – Characterisation of Electric Power Quality: Transients, short duration and long duration voltage variations, Vol balance, waveform distortion, Voltage fluctuations, Power frequency variation, Power acceptability curves – power quality problems: power factor, Non-linear and unbalanced loads, DC offset in loads, Notching in load voltage, Disturbance in supply voltage – Power qua andards.

-Linear Loads: Single phase static and rotating AC/DC converters, Three phase static AC/DC converters, Battery chargers, Arc furn Fluorescent lighting, Induction lamp, HID ballast, pulse modulated devices, Adjustable speed drives.

asurement And Analysis Methods: Voltage, Current, Power and Energy measurements, power factor measurements and definit ent recorders, Measurement Error – Analysis: Analysis in the periodic steady state, Time domain methods, Frequency domain method ace's, Fourier and Hartley transform – The Walsh Transform – Wavelet Transform.

Analysis And Conventional Mitigation Methods: Analysis of power outages, Analysis of unbalance: Symmetrical components of phas quantities, Instantaneous symmetrical components, Instantaneous real and reactive powers, Analysis of distortion: On–line extraction undamental sequence components from measured samples – Harmonic indices – Analysis of voltage sag: Detorit Edison sag score, Voltage gy, Voltage Sag Lost Energy Index (VSLEI)- Analysis of voltage flicker, Reduced duration and customer impact of outages, Classical ancing problem: Open loop balancing, Closed loop balancing, current balancing, Harmonic reduction, Voltage sag reduction.

er Quality Improvement: Utility-Customer interface – Harmonic filters: passive, Active and hybrid filters –Custom power dev work reconfiguring Devices, Load compensation using DSTATCOM, Voltage regulation using DSTATCOM, protecting sensitive loads u R, UPQC – control strategies: P-Q theory, Synchronous detection method – Custom power park – Status of application of custom pow ces. Difference in role of FACTS devices in transmission and distribution networks.

Course Learning Outcome: On the completion of the course, the student will be able

To understand power quality standards.

To identify linear and non linear loads.

To know about various measurement techniques of voltage and current paparmeters.

To analyse harmonics and their mitigation

To acquire knowledge of custom power devices and their role in T&D system.

Recommended Books

Ghosh, A. and Ledwich, G., Power Quality Enhancement using Custom Power Devices, Kluwer Academic Publishers (2002).

G.T.Heydt, "Electric Power Quality", 2nd Ed, , Stars in a Circle Publications, (1994).

C. Sankaran, "Power Quality", CRC Press, 2002.

Derek A. Paice, Power electronic converter harmonics, Prentice Hall Int., 2003

uation Scheme:

No.	Evaluation Elements	Weightage (%)
1.	MST	30
2.	EST	45
3.	Sessionals (May include Assignments/Projects/Tutorials/Quizes etc.)	25