

ELECTRICAL POWER QUALITY (3-0-0)

MODULE-I

(12 Lectures)

Terms & Definitions: General Classes of Power Quality Problems, Transients, Long Duration Voltage Variations, Short-Duration Voltage Variations, Voltage Imbalance, Waveform Distortion, Voltage Fluctuations, Power Frequency Variations, Power Quality Terms.

Voltage Sags & Interruptions: Sources of Sags and Interruptions, Estimating Voltage Sag Performance, Fundamental Principles of Protection, Solutions at the End-User Level, Evaluating the Economics of Different Ride-Through Alternatives, Motor Starting Sags, Utility System Fault-Clearing Issues.

(Chapter-2: 2.2 to 2.10 and Chapter-3: 3.1 to 3.7)

MODULE-II

(12 Lectures)

Transient Over Voltages: Sources of Transient Over Voltages, Principle of Over Voltage Protection, Devices for Over Voltage Protection, Utility Capacitor-Switching Transients, Utility System Lightning Protection, Managing Ferro-resonance, Switching Transient Problems with Loads, Computer Tools for Transient Analysis.

Fundamentals of Harmonics: Harmonic Distortion, Voltage Versus Current Distortion, Harmonics Versus Transients, Power System Quantities under Non-sinusoidal Conditions, Harmonic Indices, Harmonic Sources from Commercial Loads, Locating Harmonic Sources, System Response Characteristics, Effects of Harmonic Distortion, Inter-harmonics.

(Chapter-4: 4.1 to 4.8 and Chapter-5: 5.1 to 5.11)

MODULE-III

(10 Lectures)

Long Duration Voltage Variations: Principles of Regulating the Voltage, Devices for Voltage Regulation, Utility Voltage Regulator Application, Capacitors for Voltage Regulation, End-User Capacitor Application, Regulating Utility Voltage with Distributed resources, Flicker.

Power Quality Monitoring: Monitoring Considerations, Historical Perspective of Power Quality Measuring Instruments, Power Quality Measurement Equipments, Assessment of Power Quality Measurement Data, Application of Intelligent Systems, Power Quality Monitoring Standards.

(Chapter-7: 7.1 to 7.7 and Chapter-11: 11.1 to 11.6)

TEXT BOOK:

1. "**Electrical Power Systems Quality**" By Roger C. Dugan, Mark F. Mcgranaghan, Surya Santoso & H.Wayne Beaty, 2nd Edition, TMH Education Private Ltd., New Delhi.

Reference Book:

1. Power System Quality Assesment, J.Arrilaga, N.R.Watson, S.Chen, John Wiley & Sons.
2. Understanding Power Quality Problems: Voltage Sags & Interruptions, M.H.J. Boller IEEE, 1999