PR801 CUSTOM POWER PARK - DESIGN AND ARCHITECTURE 3-0-1-4

Unit 1: FACTS Compensators - Need for Q compensation, voltage compensation, power angle compensation, power factor correction, series-parallel and hybrid compensation. Conventional compensation techniques, RLC filters, synchronous condensers, capacitor banks.
Var impedance type shunt and series, switched converter type (shunt and series, hybrid), unified power quality compensator (UPQC), Power Quality Improvements (Harmonic Elimination) using FACTS Compensators.

Unit 2: Custom Power Park & Custom Power Devices – Introduction to Custom Power Devices, Load Compensation using DSTATCOM, Voltage Regulation using DSTATCOM, Protecting sensitive loads using DVR, Custom Power Park.

Solid State Limiting, Breaking & Transferring Devices – Solid State Current Limiter, Solid State Breaker, Solid State Transfer Switch.

Unit 3: Control of Power Converters used in Custom Power Devices - Inverter Topology, High Voltage Inverters, Multi-level Inverters, Open Loop Voltage Control, Closed Loop Switching Control.

Unit 4: Compensation is Custom Power Park using Custom Power Devices - Compensating Single Phase Load; Ideal Three phase Shunt Compensator Structure, Generating Reference Current using Instantaneous PQ Theory, Generating Reference Current using Instantaneous Symmetrical Components. DSTATCOM Structure, Control of DSTATCOM connected to a stiff source, DSTATCOM Current Control through phases.
Series Compensation of Power Distribution System - Rectifier supported DVR, DC Capacitor supported DVR, DVR Structure, Series Active Filter.
UPQC Configuration, Right Shunt UPQC Characteristics, Left Shunt UPQC Characteristics.

TEXT BOOKS/ REFERENCES:

1. Arindam Ghosh and Gerard Ledwich, "Power Quality Enhancement using Custom Power Devices", Kluwer Academic Publishers, 2002.
2. T.J.E. Miller, "Reactive Power Control in Electric Systems", John Wiley and Sons, 1982.
3. Narain G. Hingorani and Laszlo Gyugyi, "Understanding FACTS – Concepts and Technology of Flexible AC Transmission Systems", IEEE Power Engineering Society, 2001.
4. Selected research papers in CPP & CPD.