

Power Quality [PQ]

B.E. Sem. VIII [ELEC]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical & Oral	–	–
Oral Exam	–	25
Term Work	–	25

SYLLABUS

1. Introduction

Overview of Power Quality- Power Quality- Voltage Quality-Disturbances-Unbalance-Distortion-Voltage Fluctuations-Flicker-Quality Assessment

2. Power Quality Indices & standards

Classification of power Quality phenomena-Disturbances-Waveform distortion - Voltage unbalance-voltage fluctuation & flicker

3. Non-linear Loads in Power system (Only short notes)

CFL lamps- HVDC Transmission-HVDC Light-Static Var Compensator (SVC)-Thyristor Controlled Series Compensator (TCSC)-Static Compensator (STATCOM)-Static Synchronous Series Compensator (SSSC)-Unified Power Flow Controller (UPFC)- Distributed Generators

4. Non-sinusoidal wave forms under steady state

Fourier Analysis of Repetitive waveforms-Line Current Distortion- Power and Power Factor

5. Effects of harmonics

Rotating Machines – Transformers – Cables – Capacitors – Harmonic resonance – Voltage Notching – EMI (Electromagnetic Interference) – Overloading of Neutral – Protective relays and Meters – Circuit Breakers and fuses – Telephone Influence Factor

6. Harmonic mitigation

Mitigation of harmonics- Passive filters (no design)- Limitation of passive filters- Active filters-shunt connection, series connection and hybrid connection

7. Load Compensation Using DSTATCOM

Compensating Single-Phase Loads-Ideal Three-Phase Shunt Compensator Structure-Generating Reference Currents Using Instantaneous PQ Theory (with problems)

Reference Books :

1. Power System Quality Assessment (*J. Arrillaga, N.R.Watson*) S.Chen
2. Power Quality Enhancement Using Custom Devices (*Arindam Ghosh*) Gerard Ledwich
3. Power Electronics (*Ned Mohan, Undeland, Robbins*) John Wiley Publication
4. Power System Analysis- Short Circuit Load Flow and Harmonics (*J.C.Das*)
5. Understanding Power Quality Problems, Voltage Sag and Interruptions (*Math H.J.Bollen*)
6. Power System Harmonics (*Jos Arrillaga, Neville R Watson*)
7. 2. Electric Power Quality (*G.T.Heydt*)
8. Electric Power Systems and Quality (*Roger C. Dugan, Mark F. McGranaghan, H.Wayne Beaty*)
9. IEEE-519 Standard

