

EE418 POWER QUALITY (Dept. Elective - V)

Course Description & Objectives:

This course introduces the basics of power quality assessment and control techniques due to extensive use of power electronic devices in operation and control of electrical systems and apparatus.

Course Outcomes:

- I Able to know the significant quality issues in electrical systems
- I Able to know various power quality problems in any electrical systems
- I Able to analyze characteristics any electrical system with relevant to its quality issues
- I Able to suggest any solution for specific power quality problem

UNIT I - Introduction to Power Quality :

Over view of power Quality and quantity standards - IEC and IEEE definitions - voltage fluctuations-transients-unbalance-waveform distortion-power frequency variations.

UNIT II - Voltage Quality & Mitigation Techniques :

Voltage variations, Voltage sags and short interruptions – flicker-longer duration variations - sources – range and impact on sensitive circuits-standards – solutions and mitigations – equipment and techniques.

UNIT III - Transient behaviour :

Transients – origin and classifications – capacitor switching transient – lightning-load switching – impact on users – protection – mitigation.

UNIT IV - Power System Harmonics :

Harmonics – sources – definitions & standards – impacts - calculation and simulation – harmonic power flow - mitigation and control techniques – filtering – passive and active.

UNIT V - Power Quality conditioners:

shunt and series compensators-DStatcom-Dynamic voltage restorer-unified power quality conditioners-case studies.

TEXT BOOKS:

1. Heydt, G.T., “Electric Power Quality”, 2nd ed., Stars in a Circle Publications, Indiana, 1994.
2. Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, “Essentials of VLSI circuits and systems”, 1st ed., PHI, 2009.

REFERENCE BOOKS:

1. S.M. SZE, “VLSI Technology”, 2nd ed., TMH, 2003.
2. Weste and Eshraghian, “Principles of CMOS VLSI Design”, 2nd ed., Pearson Education, 2004.
3. John P. Uyemura, “Chip Design for Sub micron VLSI: CMOS Layout & Simulation”, 1st ed., Thomson Learning, 2009.