

**M.TECH FIRST SEMESTER
POWER QUALITY**

17EEPC1T5A

Lecture: 4 periods/week

Credits: 4

Internal Assessment: 40 marks

End Semester Assessment: 60 marks

Course Objective:

Study various power Quality Phenomenon, their origin and monitoring methods.

Course Learning Outcomes: At the end of the course the student will be able to

1. Understand various power quality problems related to voltage, current, frequency.
2. Learn about various sources of sags & interruptions.
3. Understand about various solutions at the end user level to protect the system against various power quality problems.
4. Gains the knowledge about harmonics.
5. Learn about various equipment used for power quality monitoring.

UNIT- I: POWER AND VOLTAGE QUALITY

General classes of Power Quality Problems, Power frequency variations, power quality evaluation procedure. Transients, long and short duration Voltage variations, Voltage imbalance, waveform distortion, Voltage Flicker.

UNIT-II: VOLTAGE SAGS AND INTERRUPTIONS

Sources of sags and Interruptions. Estimating voltage sag performance. Fundamental principles of protection. Solutions at the end-user level. Evaluating ride-through alternatives. Motor-Starting sags.

UNIT-III: FUNDAMENTALS OF HARMONICS

Harmonic distortion. Voltage versus current distortion. Harmonic indices. Harmonic sources from commercial loads, harmonic sources from industrial loads. Locating Harmonic sources. System response characteristics. Effects of Harmonic Distortion.

UNIT-IV: POWER QUALITY MONITORING

Monitoring Considerations. Historical Perspective of power quality measurement equipment. Assessment of Power Quality measurement data. Application of Intelligent Systems. Power Quality Monitoring Standards.

TEXT BOOKS:

1. Electrical Power Systems Quality by Roger C.Dugan, Mark F. McGranaghan, Surya Santoso, H.WayneBeaty, Third edition, TMH publishers, 2012
2. Understanding Power Quality Problems by Math H.J. Bollen, Wiley-IEEE press, 1999

REFERENCE BOOKS:

1. Power Quality enhancement using custom power devices by ArindamGhosh, Gerard Ledwich, Springer International series in Engineering and computer science,2002
2. Power Quality in Power Systems and Electrical Machines, EwaldF.Fuchs, Mohammad A.S. Masoum, Elsevier Academic Press,2008