4/4 B.Tech. EIGHTH SEMESTER

EE8T2B	**POWER QUALITY**	**Credits: 3**
Lecture: 3 periods/week		**Internal assessment: 30 marks**
Tutorial: 1 period /week		**Semester end examination: 70 marks**

Course Objective:

This course covers general classes of power quality problems, voltage sags and interruptions, fundamental principles of protection, distributed generation and basic problems related to wiring and grounding.

Course Outcomes:

After the completion of this course, student is able to

1. Understand various power quality problems related to voltage, current and frequency.
2. Learn various sources of sags & interruptions
3. Provide solutions at the end user level to protect the system against various power quality problems
4. Gain knowledge about distributed generation and various operating conflicts related to DG
5. Learn about various wiring and grounding problems.

Unit I

Power and Voltage Quality

General classes of power quality problems, Power quality terms, Power frequency variations, power quality evaluation procedure. Voltage quality -- Transients, long and short duration voltage variations, Voltage imbalance, Waveform distortion, Voltage flicker.

Voltage sags and Interruptions -Sources of sags and interruptions, Estimating Voltage sag performance.

Unit II

Fundamental Principles of Protection

Solutions at the end-user level, Evaluating economics of different 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

Distributed Generation and Power Quality

Resurgence of DG, DG technologies, Interface to the utility System, Power Quality Issues, Operating conflicts, DG on distribution networks, Siting DG distributed generation, Interconnection standards.

Unit V

Wiring and Grounding

Resources, Definitions, Reasons for grounding, Typical wiring and grounding problems, Solutions to wiring and grounding problems.

Learning Resources

Text Books:

1. Electrical Power Systems Quality by Roger C.Dugan, Mark F. Mc Granaghan, Surya Santoso, H. Wayne Beaty, 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 Arindam Ghosh, Gerard Ledwich, Springer International series in Engineering and computer science,2002
2. Power Quality in Power Systems and Electrical Machines, Ewald F.Fuchs, Mohammad A.S. Masoum, Elsevier Academic Press,2008