M.TECH FIRST SEMESTER

EEPC1T5C **POWER QUALAITY (ELECTIVE-I)** **Credits: 4**

Lecture: 4 periods/week **Internal assessment: 30 marks**
Semester end examination: 70 marks

Objective :

1. To understand general classes of power quality problems and the evaluation procedure for power quality
2. To learn about voltage sags and interruptions and fundamental principles of protection and harmonics
3. To learn about distributed generation and basic problems related to wiring and grounding
4. To understand about various power quality measurement equipment

Learning outcomes: After the completion of this course

1. Student can understand various power quality problems related to voltage, current, frequency.
2. Student learn about various sources of sags & interruptions
3. Student understand about various solutions at the end user level to protect the system against various power quality problems
4. Student gains the knowledge about distributed generation and various operating conflicts related to DG
5. Student learn about various wiring and grounding problems and the equipment used for power quality monitoring

Unit 1 : Power and Voltage Quality : General, classes of Power Quality Problems, Power quality terms, Power frequency variations, the power quality evaluation procedure.

Unit 2 : Voltage quality : Transients, long and short duration Voltage variations, Voltage imbalance, waveform distortion, Voltage Flicker.

Unit 3 : Voltage sags and Interruptions : Sources of sags and Interruptions. Estimating Voltage sag performance.

Unit 4 : Fundamental Principles of Protection. Solutions at the end-user level. Evaluating Ride-through Alternatives. Motor-Starting Sags.

Unit 5 : Fundamentals of Harmonics : Harmonic distortion. Voltage versus Current distortion. Harmonic indexes. Harmonic sources from commercial loads. Harmonic sources from industrial loads. Locating Harmonic sources. System response characteristics. Effects of Harmonic Distortion.

Unit 6 : 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 7 : **Wiring and Grounding :** Resources, Definitions, Reasons for Grounding, Typical wiring and grounding problems, Solution to wiring and grounding problems.

Unit 8 : Power Quality Monitoring : Monitoring Consideration. Historical Perspective of power quality measurement equipment. Assessment of Power Quality.

Reference:

1. Electrical Power Systems Quality : By ROGER C.DUGAN, Electrotek Concepts Inc. (second edition)