

IV B.Tech I Semester

**15AEE56-POWER QUALITY
(CBCC (DEPARTMENTSPECIFIC))**

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Course Objectives:

This course enables the students to

- *To study the production of voltage sags, interruptions and harmonics and methods of control.*
- *To study various methods of power quality monitoring.*
- *To understand measuring and solving power quality problems.*

UNIT-I INTRODUCTION

Definition of Power Quality- Power Quality Terminology – Classification of Power Quality Issues-Magnitude versus Duration Plot - Power Quality Standards - Responsibilities of The Suppliers and Users of Electric Power-CBEMA and ITIC Curves.

UNIT-II TRANSIENTS, SHORT DURATION AND LONG DURATION VARIATIONS

Categories and Characteristics of Electromagnetic Phenomena in Power Systems-Impulsive and Oscillatory Transients- Interruption - Sag-Swell-Sustained Interruption - Under Voltage – Over Voltage-Outage.Sources of Different Power Quality Disturbances- Principles of Regulating the Voltage- Conventional Devices for Voltage Regulation.

UNIT-III FUNDAMENTALS OF HARMONICS & APPLIED HARMONICS

Harmonic Distortion, Voltage Versus Current Distortion, Harmonics Versus Transients, Power System Qualities Under Non Sinusoidal Conditions, Harmonic Indices, Harmonic Sources From Commercial Loads, Harmonic Sources From Industrial Loads. Applied Harmonics: Effects Of Harmonics, Harmonic Distortion Evaluations, Principles of Controlling Harmonics, Devices for Controlling Harmonic Distortion.

UNIT-IV POWER QUALITY MONITORING

Power Quality Benchmarking-Monitoring Considerations- Choosing Monitoring Locations-Permanent Power Quality Monitoring Equipment-Historical Perspective of Power Quality Measuring Instruments- Power Quality Measurement Equipment-Types of Instruments-Assessment of Power Quality Measurement Data- Power Quality Monitoring Standards.

UNIT-V POWER QUALITY ENHANCEMENT USING CUSTOM POWER DEVICES

Introduction to Custom Power Devices-Network Reconfiguring Type: Solid State Current Limiter (SSCL) -Solid State Breaker (SSB) -Solid State Transfer Switch (SSTS) - Compensating Type: Dynamic Voltage Restorer (DVR)-Unified Power Quality Conditioner (UPQC)-Principle of Operation Only.

Course Outcomes:

The student will have knowledge on the following concepts:

- *Understand the various power quality phenomenons, their origin and monitoring and mitigation methods.*
- *Understand the effects of various power quality phenomenon in various equipments.*

W. Jeyaraj
BOS - chairman

TEXT BOOKS:

1. Electrical Power Systems Quality, Roger C. Dugan, Mark F. McGranaghan, Surya Santoso, H. Wayne Beaty, 2nd Edition, TMH Education Pvt. Ltd.
2. Power quality by C. Sankaran, CRC Press.

REFERENCE BOOKS:

1. Understanding Power quality problems by Math H. J. Bollen IEEE Press
2. Power quality enhancement using custom power devices by Arindam Ghosh, Gerard Ledwich, Kluwer academic publishers

