



**Training Program:**

**Advanced Power System Quality, Monitoring &  
Harmonics**

[www.btsconsultant.com](http://www.btsconsultant.com)

## Introduction:

Power must be supplied that allows loads to operate effectively, regardless the size of the electrical system. Power disturbances often cross the meter boundary between electrical utility and user causing motor overheating, transformer failure, nuisance tripping, data corruption, light flickering and voltage sags and swells. More equipment is in use today than ever before that is sensitive to power quality problems: VFDs, PLCs, computers, electronic ballasts, data processing and medical equipment. These same loads are often the source of power quality problems. The ability to quickly identify, analyze and remedy power quality problems will help ensure metering accuracy, lengthen the life of electrical equipment and improve power system availability.

The Power Quality webinar combines extensive field measurement and study experience to familiarize attendees with the terminology and concepts to evaluate it. The effects of harmonics on various power system components and methods of reducing excessive harmonics will also be addressed. IEEE recommendations, requirements of Canadian Standards Association are also emphasized in this course.

## Who Should Attend?

This course is intended for utility and industrial managers, electrical engineers, electricians and technicians that install, maintain, repair and/or troubleshoot power and auxiliary systems in oil and gas, data centers, industrial plants, commercial facilities, mines, hospitals, and pulp and paper mills.

## Course Objectives:

This course is designed to enable participants to:

- Identify power quality indices
- Recognize symptoms of power quality problems including sags, swells, under or overvoltage, harmonics, transients, interruptions, wiring and grounding issues
- Classify power quality events according to IEEE and public utility standards
- Explain proper application and interpret results of power quality monitoring equipment
- Recommend viable solutions to power quality problems

## Course Outline

### General Introduction

- Electrical engineering basic concept
- Three phase review and per unit
- Voltage level

### Introduction to Power Quality Analysis

- Review of Industrial Power Systems Concepts
- Power Quality Definitions and Indices
- Equipment Ratings
- Effects of Disturbances on Equipment and Processes

**Industry Commitment to Power Quality**

- IEEE Standards and Recommendations
- EPRI Survey Results

**Harmonics**

- Sources of Harmonics
- Symptoms and Effect on Equipment
- Power Factor Correction Capacitors and Resonance
- Harmonic Limitations (IEEE Standard 519)
- Series Resonance and Filter Design
- Third Harmonic Neutral Current

**Calculation of Harmonic Voltages and Currents**

- System Harmonic Models
- The Current Injection Method
- Frequency Response Modeling

**Grounding**

- Types of Grounding
- Arcing Ground Faults
- Symptoms of Ineffective Grounding
- Electronics and Computer Grounding

**Voltage Disturbances**

- Lightning (transients)
- System Switching
- System Faults
- Voltage Sags
- Voltage Swells
- Voltage Unbalance

**Case Study: Power Quality Audit in any industrial Plant****Accreditation:**

**BTS** attendance certificate will be issued to all attendees completing a minimum of 80% of the total course duration.