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Course Name

Wide Area Measurements System (WAMS) Implementation

Sector Name

Electrical Engineering

Document Type

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Wide Area Measurements System (WAMS) Implementation

Course Introduction

A wide-area measurement system (WAMS) consists of advanced measurement technology, the latest communication network infrastructure, and an integrated operational framework.

WAMS

The main enabler of WAMS is phasor measurement unit (PMU) technology. With the innovation of PMU, the problem of measuring the phasor quantities simultaneously from a wide area of distributed substations, also called ‘synchrophasor’, has been solved.

At present, the PMU technology is one of the essential enablers for WAMS. It utilizes the availability of high-precision synchronized clock sources – extracted from global positioning system (GPS) receivers and samples the instantaneous analogue quantities of voltage and current magnitudes and phase angles.

During the **5-da**y Training- Consultancy, we will introduce the technological development of synchronized phasor measurements and their use in modern WAMS. The concept of phasors,

synchrophasors, and their architecture.

The same will touch the modern applications of these systems in monitoring, protection, and control. During this period will also describe industry standards, and will conclude with an account of WAMS applications in many countries around the world.

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Target Audience

- ✓ Power system protection engineers
- ✓ System planners
- ✓ Technical staff responsible for Smart Grid integration into power system monitoring and control
- ✓ Consultants and researchers in the field of operation and control of power systems
- ✓ Operations supervisors and others

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Learning Objectives

- ✓ Illustrate how to enhance the reliability of large interconnected power systems using wide-area measurement technology
- ✓ Envision and implement improved monitoring, protection, and control of power systems and equipment
- ✓ Respond faster and more effectively to system disturbances
- ✓ Recreate the precise sequence of events following a major system disturbance
- ✓ Understanding Synchrophasor Measurement Techniques
- ✓ Provide real-time monitoring of dynamic phenomena
- ✓ Understand the communication infrastructure for WAMS
- ✓ Wide-Area Measurement System (WAMS)
- ✓ Phasor Measurement Unit (PMU)

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Course Outline

✓ DAY 01

Module (01) Overview of Power System Measurements

- ✓ Power System History and Challenges
- ✓ Conventional Measurements and SCADA
- ✓ Synchronized Measurement Technology (SMT)
- ✓ Wide-Area Measurement System (WAMS)
- ✓ WAMS Around the World

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Course Outline

✓ Day 02

Module (02) Synchrophasor Measurement Techniques

- ✓ Review of Phasor Measurement Principles and Techniques
- ✓ Discrete Fourier Transform (DFT) Method
- ✓ Measurements at Nominal Frequency
- ✓ Measurements at Off-Nominal Frequency
- ✓ Frequency Estimation

Module (03) Phasor Measurement Unit (PMU)

- ✓ PMU Architecture and Specifications
- ✓ PMU Performance Under Steady-State and Transient Conditions
- ✓ Hierarchy Structure of PMU Systems
- ✓ Phasor Data Concentrator
- ✓ IEEE Standard C37.118
- ✓ PMU Placement Problem and Techniques
- ✓ PMU Installation Requirements
- ✓ Requirements of Communication Media

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Course Outline

✓ Day 03

Module (04) WAMS Applications (I)

- ✓ Introduction
- ✓ Situational Awareness
- ✓ Signal Trending and Alarming
- ✓ Real-time Stability Monitoring
- ✓ State Estimation
- ✓ Fault Detection and Locating

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Course Outline

✓ Day 04

Module (05) WAMS Applications (II)

- ✓ Power System Oscillations
- ✓ Oscillation Specifications and Damping Criteria
- ✓ Mitigation of Power System Oscillations
- ✓ Small-Signal Stability Assessment in Networks with HVDC Systems
- ✓ Voltage Stability Analysis for Load Points and Transmission Corridors

Module (06) WAMS Applications (III)

- ✓ Dynamic Rating and Real-Time Congestion Management
- ✓ Wide-Area Control Functions
- ✓ Special Protections Scheme
- ✓ Intentional Islanding and System Restoration

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Course Outline

✓ Day 05

Module (07) WAMS Applications (IV)

- ✓ Estimation of System Inertial Constant
- ✓ Generating Unit Model Validation
- ✓ Transmission Line Modeling
- ✓ Load Model Characterization
- ✓ Post Disturbance Analysis

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Jan. 4, 2027	Jan. 8, 2027	5 days	4250.00 $	UAE , Dubai
March 14, 2027	March 18, 2027	5 days	4250.00 $	KSA , Jeddah
Oct. 12, 2026	Oct. 16, 2026	5 days	5950.00 $	switzerland , Geneva
May 11, 2026	May 15, 2026	5 days	4250.00 $	UAE , Dubai

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