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Power System Analysis - Essentials

Course details: https://www.electricityforum.com/electrical-training/450

Our 12-Hour (2 Day) Power System Analysis - Essentials training course is an abbreviated vesion of our 30-Hour (5 Day) Power System Fundamentals, Short Circuit Study and Protective Device Coordination and Arc Flash Analysis/Study Course.

This live online instructor-led course allows students to review the essentials involved in Power System Analysis and introduces students to the fundamentals of power system analysis and design which then leads to a general discussion of the principals of Short Circuit Study and Protective Device Coordination and how that subject is essential to understanding the role that Arc Flash Analysis/Study plays in protecting workers and equipment.

WHO SHOULD ATTEND

This course is designed for utility, industrial, commercial and institutional power system electrical engineering personnel, electrical consulting engineers, as well as electrical design engineers, who are responsible for the reliable design, engineering and operation and of industrial, commercial and insitutional electric power distribution systems.

Plant, facility, and corporate electrical engineers dealing with one or more company

distribution systems and consulting and utility engineers dealing with clients' systems. Consultants, architect-engineers will also find this course very beneficial.

STUDENTS RECEIVE

- This Course Includes Our Latest Electrical Electrical Protection And Arc Flash Safety Handbooks!! (Value $20)
- **$100 Coupon** Toward Any Future Electricity Forum Event (Restrictions Apply)
- 1.2 Continuing Education Unit (CEU) Credits (12 Professional Development Hours)
- **FREE** Magazine Subscription (Value $50.00)

COURSE OUTLINE

POWER SYSTEM ANALYSIS ESSENTIALS - TRAINING COURSE OUTLINE

POWER SYSTEM FUNDAMENTALS

- Introduction
- Time Domain Versus Frequency Domain
- Resistor
- Inductor
- Capacitor
- Complex Impedance

THREE-PHASE POWER

- Introduction
- Balanced Delta-Connected Loads
- Balanced Wye-Connected Loads
- Summary
- Unbalanced Delta-Connected Loads
- Unbalanced Wye-Connected Loads
- Summary

POWER SUBSTATION CONFIGURATION

FUNCTIONS OF A SUBSTATION

- Introduction
- Voltage Transformation – Function 1
- Circuit Switching – Function 2
- Voltage Regulation – Function 3
- VAR Control – Function 4
- System Protection – Function 5

RADIAL SYSTEMS

- Introduction
- Simple Radial Systems
- Expanded Radial Systems
- Single-Ended Unit Substations

LOOP SYSTEMS

- Primary Loop Systems
- Secondary Loop Systems

SELECTIVE SYSTEMS

- Primary Selective Systems
- Secondary Selective Systems
- Combined Selective Systems
- Double-Ended Unit Substations

POWER SYSTEM DESIGN FUNDAMENTALS

- Design Consideration
- Standards and Codes
- One-Line Diagram

- Power System Analysis

POWER SYSTEM PROTECTION

VOLTAGE CONSIDERATIONS

SYSTEM VOLTAGE CLASSES

- Low Voltages
- Medium Voltages
- High, Extra-High, and Ultra-High Voltages

SYSTEM VOLTAGE TERMINOLOGY

- System Voltages
- Nominal System Voltages
- Maximum System Voltages
- Service Voltages
- Nominal Utilization Voltages

TRANSFORMER CONNECTIONS

- Two-Wire
- Three-Wire
- Four-Wire

TRANSFORMER VOLTAGE REGULATION

- Transformer Model
- Transformer Ratios and Relationships
- Transformer No-Load Tap Chargers

EFFECTS OF VOLTAGE VARIATIONS

- Motors

- Lighting
- Miscellaneous

POWER FACTOR FUNDAMENTALS

- Definitions of Power Factor
- Leading and Lagging Power Factors
- Typical Plant Power Factors
- Induction Motor Characteristics

POWER FACTOR CORRECTION SOURCES

- Capacitors

BENEFITS OF CAPACITOR POWER FACTOR CORRECTION

- Introduction
- Utility Power Costs
- Release of Power System Capacity
- Current Decrease
- System Voltage Increase

CAPACITOR BANK LOCATIONS

- Introduction
- Motor Bus
- Group Installations
- Utility Bus

CAPACITOR BANK CONCERNS

- Self-Excitation Overvoltage
- Transient Torques
- Harmonics

CAPACITOR RATINGS

- Voltage Ratings
- Current Ratings
- Discharge Requirements
- Kilovar Ratings

CALCULATION PROCEDURES

- General
- Step 1: Existing Power Triangle
- Step 2: New Power Triangle
- Step 3: Needed Power Triangle
- Step 4: Selected Power Triangle

EXERCISES

- Exercise 1
- Exercise 2
- Exercise 3

LOW VOLTAGE CIRCUIT BREAKER CHARACTERISTICS

MOLDED CASE CIRCUIT BREAKERS (MCCBS)

- Introduction
- MCCB Types
- Thermal Element TCC Curves
- Magnetic (Instantaneous) Element TCC Curves
- Coordination Criteria
- Electronic CB – Trip Functions
- Electronic CB – TCC Curves
- Summary

LOW VOLTAGE POWER CIRCUIT BREAKERS

- Introduction
- Summary

- Coordination Criteria

FUSE CHARACTERISTICS

LOW VOLTAGE FUSES

- Introduction
- Non-Time Delay (Single-Element) Fuses
- Time Delay (Dual-Element) Fuses
- General Characteristics
- Current Limiting Characteristics
- Fuse Coordination Criteria

POWER FUSES

- Types of Medium Voltage Power Fuses
- TCC Curves
- Coordination Criteria

GROUNDING

SYSTEM GROUNDING

- Introduction
- Ungrounded System
- Solid Grounding
- High Resistance Grounding
- Low Resistance Grounding
- Inductance Grounded
- Ground Fault DetectionMethods

EQUIPMENT GROUNDING

- Introduction

SHORT CIRCUIT THEORY AND TERMINOLOGY

PURPOSES OF FAULT CALCULATIONS

- Introduction
- Basic Theory

TYPES OF FAULTS/MAGNITUDES

- Three-Phase Faults
- Phase-to-Phase Faults
- Phase-to-Ground
- Arcing Faults
- Overloads

EFFECTS OF SHORT CIRCUITS

- Arcing and Burning
- Current Flow
- Thermal Stress
- Mechanical Stress
- Voltage Drop

OVERCURRENT COORDINATION FUNDAMENTALS

GENERAL PROCEDURES

- Introduction
- One-Line Diagrams
- Scale Selection Procedures
- Plotting of Fixed Points (Curves)
- Protective Device Plotting/Tracing

- Selection of Ratings and Settings
- Analysis of the Coordination Study

DATA REQUIREMENTS

- Power Company Settings
- Transformer Data
- Motor Data
- Load Data
- Fault Currents Available
- Conductor Data
- Protective Device Data

Time Current Curves – Over Current Coordination

COMPONENT AND EQUIPMENT PROTECTION

- Overview
- Component Protection
- Conductor protection
- Transformer protection
- AC induction Motor Protection
- Transfer Switches
- Generator Protection

ARC FLASH ANALYSIS - OVERVIEW

- Electrical Hazards
- Electrical Accidents – Factors
- Electrical shock
- Arc Flash
- Standards and Codes
- Fault Current Calculations
- Analysis Process
- Flash Protection Boundary Calculations

- Preparing twork safely
- Practical Solutions for Reducing Arc Flash Hazard

COURSE SCHEDULE

Both Days

Start: 10 am Eastern Time

Finish: 4:30 pm Eastern Time

Contact us Today for a FREE quotation to deliver this course at your company's location.

https://www.electricityforum.com/onsite-training-rfq